MCAST

Perceptions and Impacts of Local Education within the ICT Field

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Authorship Statement

This dissertation is based on the results of research carried out by myself, is my own composition, and has not been previously presented for any other certified or uncertified qualification.

The research was carried out under the supervision of Mr Frankie Inguanez.

05/06/2023 .....

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Abstract

This study addresses the imperative for continual assessment of the effectiveness of local education, specifically in the domain of information and communications technology (ICT). In today's world, it is crucial to constantly evolve educational systems to cultivate the next generation of ICT professionals and raise awareness of the pivotal role played by local education and training in shaping the future workforce, considering the evolving needs of society.

The primary aim of this research is to uncover valuable insights into the awareness, influences, and opinions pertaining to diverse educational approaches within the ICT sector. Specifically, the study seeks to appraise and analyse the disparities, commonalities, advantages, and limitations between the two prominent educational paths prevalent in the field: academic/traditional education and vocational education. Furthermore, the research investigates existing studies and research conducted by professionals in the same field to identify any parallels within the prevailing general and local educational systems. To achieve these objectives, the study adopts a mixed-methods research design encompassing three distinct perspectives. The initial viewpoint is the lead researcher's which involved scraping 200 ICT professional profiles from LinkedIn, extensive data cleaning and analyses using MaxQDA and applying Factor Analysis for Mixed Data (FAMD). The second viewpoint entailed the general perspective of ICT students and professionals. The collection of this perspective was through 100 online survey participants. Lastly, the third viewpoint entailed the experience of eight ICT professionals through qualitative interviews. This methodological approach facilitates the

acquisition of varied insights and observations on the ICT field, both within local educational contexts and beyond.

The findings reveal that students highly value practical experience and recognise the benefits of both traditional and vocational education paths. While the direct perception of ICT organisations was not assessed, the study suggests that both educational paths have their respective benefits. Traditional learning equips individuals with research skills and the ability to self-teach, while vocational learning prepares them for a smoother transition to the workforce by providing industry-specific knowledge. Moreover, the results indicate that the initial impact of the educational path diminishes over time as experience and career progression become more influential. Both University of Malta and Malta College of Arts, Science & Technology graduates demonstrate potential for career advancement and entrepreneurial opportunities in the ICT sector.

This study makes a significant contribution to the broader comprehension of the role and significance of local education in the realm of ICT. Additionally, it embraces the concept of industrial revolution 4.0 in universities, exploring new trends and ideas while promoting collaborative efforts between students and industries in creating high-quality education.

Keywords: Traditional/Academic Education, Vocational Learning, Industry 4.0, Triangulation of Viewpoints.

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Table of Contents

Acronyms

ICT	Information Communication Technology
UoM	University of Malta
MCAST	The Malta College of Arts, Science & Technology
IR4.0	Industry Revolution 4.0
IoT	Internet of Things
PPP	Principal Preparation Programme
VET	Vocational Education and Training
FAMD	Factor Analysis for Mixed Data
PC	Principal Components
NPS	Net Promoter Score
IoT	Internet of Things

List of Figures

List of Tables

Chapter 1

Introduction

In today's contemporary world, particularly in the realm of information and communications technology (ICT), the need for ongoing evaluation of the efficiency and validity of local education is increasingly significant. This culture of continual development not only enables local institutions to, "nurture the next generation of professionals in the sector" [1], it also aims to create increased awareness on the role of local education and training systems in shaping the future of diverse professionals. Hence, the need to investigate the perception and impacts of local education within the ICT field is genuine and logical, especially due to our society's shifting demands.

As one of the early founders of American pragmatism, John Dewey's (1859-1952) concept of 'learning by doing' [2] is a central aspect of his educational philosophy where students are actively engaged in their own learning, and preferably, given the chance to investigate and experiment with different ideas through active learning.

Dewey [3] highlighted that knowledge acquired in academic contexts has to be directly relevant to real-world circumstances; he also believed that in addition to learning theory, diverse learners should have the chance to put their knowledge to use in practical situations. Since this methodology enables students to comprehend real-world applications of what is learnt and acquire practical skills,

Dewey's philosophy of education, together with inspiring viewpoints on traditional and vocational education, provides a solid foundation for this study.

This study aims to uncover insights regarding awareness, influences, and opinions on various educational styles within the ICT sector. Predominantly, it seeks to assess and evaluate the differences, similarities, benefits, and limitations between the two main educational paths prevalent in the field. These paths include academic/traditional education, which in Malta is primarily offered by the University of Malta (UoM), and vocational education, mainly provided by the Malta College of Arts, Science & Technology (MCAST). Subsequently, this dissertation also examines studies conducted by professionals within the same field to identify any similarities between the current general and local educational systems.

By reviewing existing research, and collecting new data, the study aims to gain a broader understanding of the subject and its relevance to the local context. It ultimately allows for the discovery of new perspectives on the topic in question.

In an effort to assess the expertise and viewpoints of various scholars and professionals on the subject under investigation, Chapter 2 analyses the body of existing literature. The collected literature covers a wide range of subjects, including but not limited to, the purpose of education and existing forms, Industry 4.0 and its effects on society, literature on bridging the gap between classroom and workspace environments, and the link between today's education and tomorrow's profession.

Chapter 3 describes the selected data collection strategy, which was purposefully divided into three viewpoints through a mixed-methods research design. The initial viewpoint consists of data processing through the researcher's perspective by using a LinkedIn web scraper which gathers data based on the chosen jobs and educational sectors of diverse individuals. The second viewpoint is based on the general perspective of ICT students and ICT professionals, this entails the collec-

tion of quantitative data through online surveys, whereas the last viewpoint stage consists of conducting eight (8) qualitative interviews to ICT professionals. This methodology was deemed fit for the analysis of the gathered data since it enabled the collection of different insights and observations on the ICT field within local educational settings, and beyond. Chapter 4 presents and analyses the acquired data, while the concluding chapter, Chapter 5, presents conclusions and offers recommendations for additional research in this area.

[4] articulately imply that, "the responsibility for creating a high-quality education should collaboratively be shared among university students and the industries". In the quest of learning new trends and ideas, the ensuing research intends to foster a knowledge-sharing culture, aimed to explore, and ultimately celebrate the role of local education within the ICT field.

Chapter 2

Literature Review

2.1 Defining Education

Education has always been one of the main pillars of society. Dewey [2] states that education is the central focus of development since it aims to provide different opportunities to diverse individuals in preparation for the world of employment. In agreement with Dewey's philosophy of education, Jackson [5] states that, "Education is a socially facilitated process of cultural transmission". This statement, together with other concepts was noted in his book What is Education? [5] which aims to define the role of education in society. Since education is ever-changing, delving into further research and investigation has always been key to implementation and growth.

2.2 What is the purpose of education?

As previously suggested, education is a valuable asset to society since it aims to create better futures by improving personal developmental skills and shaping communities worldwide. In his book Deweyan Inquiry, Johnston [3] implies that "growth" is Dewey's direct interpretation of education. In fact, Dewey refers to

education as, "the development of habits of inquiry" done by diverse individuals to achieve specific outcomes. Research proves that as individuals, we have different ways of approaching and implementing the process of thinking and learning. Hence, the purpose of education, as a fundamental component for progress and development, is to provide relevant knowledge which caters for diverse learning needs and approaches [6].

2.3 Traditional Education vs Vocational Education

Scott [7] states that education must aim to, "provide stability and meaning to social life". Hence, by keeping different pedagogical approaches to learning in mind, educational institutions must thrive to understand the impacts of education in current contexts as a means to reform and adapt accordingly. In agreement with Scott [7], Agrawal [8] implies that, "Human ingenuity, supported by an instinctive urge to explore and learn, manifests itself in dynamic creativity". Similarly, in order to enable diverse students to learn and develop innovative ideas and workable solutions, the main role of education has always been to timely update, evolve, and stay relevant to meet contemporary needs. As a result, different types of educational programmes, such as traditional and vocational education, were established. Additionally, Howard Gardner's [9] theory presents other factors which also add on to the educational process. Within his multiple intelligence theory Gardner [9] has acknowledged and analysed the multiple intelligences the human being displays. Gardner [9] has identified nine intelligences which include: linguistic, logical, musical, visual, kinaesthetic, interpersonal, intrapersonal, naturalistic and existential. This theory unveils how different individuals are from one another, which indicates how different learning approaches should be undertaken within a classroom.

2.3.1 Traditional Approach

"The use of theory offers the opportunity to help organize, in a coherent way, an increased understanding of how something works and what it means" as stated by Dubin [10].

As described by Dubin [10], traditional education aims to encourage students to learn and understand a specific subject. Hence, the main focus of lecturers teaching theoretical education is to cover any academic elements to provide students with a solid foundation of knowledge. [11] argues that although the theoretical model is not always the ideal teaching method, traditional education encourages discipline among students. [11] also imply that traditional classrooms focus on integration and inclusion since it provides diverse individuals with the same learning opportunities.

Meanwhile, [12] addresses the real-life scenario of a fast-changing world and its requirements. Undoubtedly, change is inevitable and hence, [12] argues that in today's society, education should focus on providing learners with the right tools to enhance their creativity, adaptability, and leadership skills. This aims to promote cohesiveness, innovation, and a collaborative learning culture [12]. Such arguments shed light on the importance of adaptability as a means to ensure quality and relevance in education. Indeed, this also instigates researchers to investigate the impact of blended learning in different educational settings.

2.3.2 Vocational Approach

Vocational education, or, as often referred to, practical education, implies that learning is done through application and usage rather than only through reading or memorization [13]. Research suggests that vocational education is particularly

effective since through this method of learning, students have the opportunity to internalise the knowledge while engaging in an activity. Since education aims to build a future for all, the adaptation of practical approaches in diverse classrooms is rapidly and extensively being applied to different educational institutions. [14] explains that in general, learners, "prefer hands-on, practical experiences" since it allows them to learn by doing.

2.3.3 Blended Approach

In his book Democracy and Education [2], John Dewey discusses, "the relations of mind and matter; body and soul; humanity and physical nature; the individual and the social; theory—or knowing, and practice—or doing". As previously established, Dewey understood the connection between humanity and education. Simultaneously, as an educational reformer, he strongly believed in blended education, thus linking theory to practice. Correspondingly, Meylan [15] implies that blended education is specifically designed to prepare students for the world of work, hence making learners, "work ready upon graduation". He therefore implies that by providing blended learning programmes, students will be presented with the prospect of developing specific industry skills which allows them to jump right into their preferred job occupation.

In line with the national policy for inclusive education, the Framework for Education Strategy for Malta 2014-2024 [16], specifies that students must be provided with, "different tracks and opportunities to increase the relevance of learning to the labour market [in] preparation for highly skilled jobs through post-secondary education while ensuring that every learner becomes an active member of a democratic society". Hence, in order to establish a society that is competent, resourceful, and competitive in an international economy, the key goal of education is to remodel and stay up to date with the objective to prepare learners for the workplace. This sheds light upon a fundamental matter to this study: What

is the role of education in the ICT field?

2.4 Industry 4.0 and its Impacts

The Fourth Industrial Revolution, or as frequently referred to, Industry 4.0, represents change and adaptation in a rapidly changing world. Schwab [17] implies that Industry 4.0 (IR4.0) refers to, "the concept of automation technology that is carried out by machines without requiring human labour in its application". In agreement to Schwab [17], [18] succinctly clarify that IR4.0, "focuses on automation and digitalization such as Artificial Intelligence, Internet of Things (IoT), and Big Data". Schwab [17] also proceeds to refer to IR4.0 as, "a vital thing needed by industry players for the efficiency of time, labour, and costs". Since one of the main goals of IR4.0 is to establish results without human involvement, [19] also discusses the importance of innovation and technology. Companies are under pressure to redesign their business model as to be part of the current competitive environment which has been brought on by globalization and the development of new technology. This highlights the fact that although many institutions and firms, both locally and internationally, are still in denial about the impact of IR4.0, society needs to open up to possible adaptations by embracing revolutionary problem-solving strategies. This sheds light upon another important matter to this study: What is the impact of IR4.0 on education today?

2.4.1 IR4.0: A local approach

In an article on Times of Malta, which was published in the year 2021, Mifsud [20] specifies that, "MCAST has identified the increasing need for teachers in vocational education and training (VET) in this time of Industry 4.0". Within the same article, he further elaborated that if, as educational institutions, "we

wish to nurture a society with sound values, we need motivated and adequately trained teachers" in response to the needs of IR4.0. In line with the educational trends of UoM and MCAST as a higher education institution, strive to recognise current needs in an attempt to bridge the gap between local education and the industry. Another article by UoM [21] speaks about how diverse individuals, as 'project partners', come together to, "discuss the challenges faced by educators and learners within higher education institutions when teaching subjects relating to Industry 4.0". During a seminar on the 26th of July, 2022, which was also documented in the UoM official website, Prof. Joseph Cacciottolo, Pro-Rector for Academic Affairs at the University of Malta, spoke about the positive impacts of having local universities that strive to meet current industry demands. During this event, the Malta Chamber CEO, Dr Marthese Portelli, addressed the same topic and specifically stated that in order to bridge the gap of Industry 4.0, academia and industry must work hand-in-hand, in an attempt, "to make the local manufacturing industry more competitive" [22] This also correlates to another article by Malta Daily [23], entitled, "PwC join forces with MCAST to make students industry ready". This article [23] addresses MCAST's endless endeavours to "ensure the offering of more industry-relevant study programmes" by building, "strong connections with the business world where teaching and learning activities have a professional and entrepreneurial focus".

2.5 Bridging the Gap Between Education and Industry

Several studies underline the importance of preparing learners for the work world. This calls for curriculum adaptation, making sure that diverse educational settings are relevant to current needs.

Often referred to as "the machine learning-driven future of learning" [24], Education 4.0 intends to cater for lifelong learners who are eager to learn new critical

thinking, creativity, cooperation, and communication skills. [18] imply that, "Education 4.0 is a global movement to shift the traditional model of passive learning pedagogies to a new model that incorporates more advanced and modern digital technologies to enhance personalized learning". Hence, emphasis is being made on the impact of ICT on society at large since it leads to the creation of new roles which are reshaping the workplace environment.

2.5.1 Uncertainty Theories

[11] discusses a number of uncertainty theories and practices in an attempt to cope with various forms of uncertainty in real-life scenarios. Specifically, [11] imply that uncertainty stems out into two main branches: Aleatory and Epistemic Uncertainty. Aleatory uncertainty mainly focuses on uncertainties which are beyond human understanding and capabilities. On the other hand, Epistemic uncertainty revolves around the ambiguities which are created due to a lack of knowledge and information.

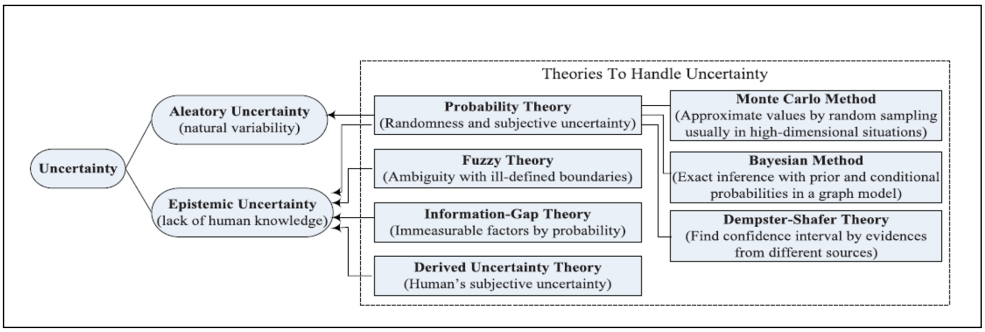

Figure 2.1: Uncertainty Theories.

With reference to Figure 2.1 above, Probability Theory is the only principle derived from Aleatory Uncertainty theory, while Epistemic Uncertainty is further branched into four different theories: Probability Theory, Fuzzy Theory, Information-Gap Theory and Derived Uncertainty Theory. Since this research aims to investigate the impact of education in preparing students for the work world, delving into the Information-Gap theory is essential.

2.5.2 Information-Gap theory

In the book, Decision Making under Deep Uncertainty [11], professor and researcher Yakov Ben-Haim eloquently explain the Information-Gap theory by implying that "An info-gap is the disparity between what you do know (or think to be true) and what you need to know for making a reliable or responsible decision (though what is needed may be uncertain)". Hence, in education, this can be described as the gap between what learners are already knowledgeable about and what they are currently being taught.

To understand the perceptions and impact of education on preparing students for the workforce, it is also necessary to discuss the theory-practice gap in education and elsewhere, which is an instance derived from the Information-Gap Theory of Uncertainty.

2.5.3 Theory-practice gap in education

In an attempt to redesign the idea behind the theory-practice gap in K-12 educational leadership, Roegman and Woulfin [14] address this principle by referring to it as a crucial requirement for adaptation and learning. Through their research, they outline the importance of having educators that seek innovative ways to deliver educational practice-based experiences that are built upon a theoretical framework.

A study was conducted by Rochelle Lewis, a student in her final year of Blue University's Principal Preparation Programme (PPP). Her observations revolved around a number of different pedagogical concepts, namely on how both theory and practice-based applications can be applied [14]. Above, Figure 2.2, provides an example of how different theories in the PPP coursework are being approached

Course	Theory	Practice-based applications
Administrative leadership	Transformational leadership (Bass, 1990)	Aspiring leaders gain skills in creating a transformational vision
Education policy	Framing theory (Benford and Snow, 2000; Goffman, 1974): sensemaking theory (Weick, 1995)	Aspiring leaders gain skills in framing a new instructional program
Supervision	Adult learning (Mezirow, 1997)	Aspiring leaders gain skills in designing informal professional learning opportunities for teachers
Organizational leadership	Data-based decision making (Mandinach, 2012); organizational change (Argyris, 1993)	Aspiring leaders gain skills in analyzing evidence on educational practices and planning activities to improve results
Curriculum and instruction	Constructivism (Vygotsky, 1978)	Aspiring leaders gain skills in analyzing the strengths and weaknesses of a curriculum for meeting the needs of all learners
School climate and culture	Critical race theory (Ladson-Billings and Tate, 1995); culturally relevant pedagogy (Ladson-Billings, 1995)	Aspiring leaders remain attuned to a community's assets and how they contribute to students' educational experiences

Figure 2.2: Summary of theories embedded in the coursework of a sample principle preparation programme.

in an attempt to improve the quality of teaching and learning in educational settings.

Through the gathering, analysis and implications of this paper, Roegman and Woulfin [14] concluded that the theory-practice gap is in fact a functional application since it provides a spectrum of opportunities to improve the learning experience. With evidence, they implied that "K-12 leaders and leadership candidates engage theory and practice as more or less tightly coupled concepts to function as legitimate leaders." They also take it a step further by viewing "theory-practice gap not as a deficit in leaders' knowledge but as a functioning of the institutional contexts in which they work".

2.5.4 Theory-practice gap within the industry

To further investigate the subject at hand, another paper which focuses on the gap between theory and practice - specifically within the professional accounting industry in Australia and Germany - was investigated. This enabled the researcher to understand different perceptions in diverse scenarios, be it in an educational

setting, or at the workplace. In their paper, [10] P. Tucker and Schaltegger shed light on the importance of comparing and contrasting perceptions when focusing on the "gap" between research and practice. The findings of this study were branched out into 3 different sections: convergent themes, divergent themes, and a final section which questions the said notions. P.Tucker and Schaltegger [10] explain that one of the most significant findings through field research was that the gap between theory and practice "exists" and it, "needs to be narrowed". They imply that this will enable transparency, understanding, and application of useful data to inform a functional practice. In spite of this, P.Tucker and Schaltegger [10] also established that even though the gap is there, it does not infer that it should always be viewed as a shortcoming yet rather as an opportunity for improvement to explore different ways of understanding and solving real-life challenges. Hence, since the gap is evident, professionals must strive for continuous improvement by, "providing access to research", hence enabling members/employees to "update their knowledge and expand their skill base" through collaboration and acceptance.

This is also in line with John Dewey's philosophy of education [2] where he underlines the significance of linking knowledge to practice in an attempt to bring academics and practitioners together.

2.6 In Summary/Moving Forward

Through the analysis of diverse articles and studies, it was established that, education, as a continuous process, is fundamental for development and progress. As previously suggested by [12] it must also be recognised that in an attempt to stay relevant, learning institutions must offer programmes that are applicable to today's working environment. The next section presents the research methodology adopted for the study in order to analyse and evaluate corresponding data.

Chapter 3

Research Methodology

This chapter seeks to explain and clearly justify the chosen research methodology. The aim, questions, and hypothesis of this study are presented. Additionally, the decisions taken during the methodology of this research, are presented in a research onion structure. [25]

3.1 Aim of Research

Through desk and field research, this study aimed to present, assess, and evaluate the differences and similarities between two predominant educational paths: vocational and academic/traditional education.

The research questions leading this study were the following:

- What is the student opinion before and after taking each educational path?
- What is the perception of ICT organisations on the two different educational styles?
- How does the difference in impact of the educational styles ware off?

- Is there a correlation between an educational path and job or entrepreneurial opportunities?

The hypothesis of this research was to primarily focus on the local perceptions and impacts of educational styles within the local ICT sector. In Malta, academic/traditional education is predominantly invoked by the UoM, while vocational education is mainly implemented by MCAST. In addition, this study aimed to consider and investigate the impact of various educational styles on graduates and their professional careers.

3.2 Research Onion

The research onion framework demonstrates several layers of research, where each layer depicts an additional perspective to the research [25]. The research philosophy used in this study, interpretivism, is represented in the first layer, enabling the process of comprehending subjective and socially created experiences through research [26]. Additionally, the research followed an inductive approach, aimed to develop new theories. This also enabled the researcher to assess the relevance of the hypothesis for this research.

An inductive approach was deemed useful since the main research objective was to clarify any misunderstandings or outdated theories that were not supported by facts, and to furthermore highlight the advantages of different educational approaches within the ICT field. This study adopted an action research strategy since primary data was gathered in a collaborative and participatory approach which involved different stakeholders within the field. In addition, a mixed-methods design was adopted, aiming to increase validity, reliability, and provide deeper insights into complex questions through quantitative and qualitative approaches. Since this research aimed to investigate what is happening at the

present moment within the field, a cross-sectional study approach was applied.

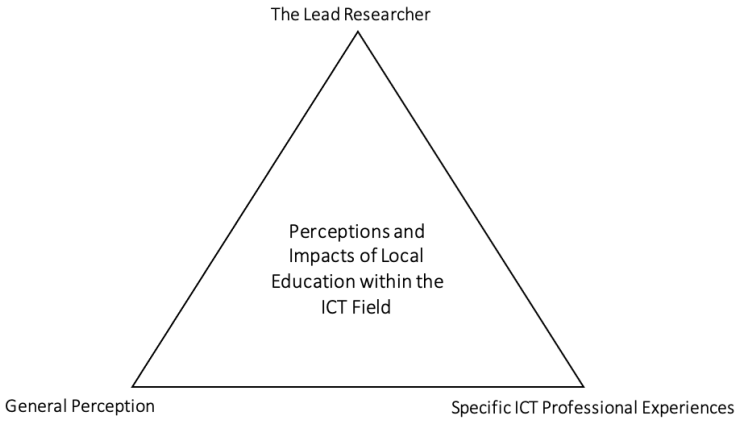

Figure 3.1: Triangulation of Viewpoints

As shown in Figure 3.1 the chosen data collection strategy was purposefully divided into a triangulation of viewpoints. The first viewpoint focused on gathering data from the lead researcher's perspective: this consisted of data collection using a LinkedIn web scraper which gathered data, based on the chosen jobs and educational sectors of diverse individuals. This data was then analysed using Factor Analysis of Mixed Data (FAMD) and MaxQDA. The second viewpoint entailed gathering the general perception from ICT professionals and students. The ideal research method identified for this was two quantitative online surveys: one targeting current undergraduate ICT students within MCAST and UoM, while the other one targeting ICT professionals. The third viewpoint concentrated on delving into the experiences of ICT professionals and therefore consisted of eight (8) interviews which were conducted using a combination of convenience and purposive sampling methods. It is important to note that due to technical issues only seven (7) interviews were recorded. The said qualitative interviews were also analysed through MaxQDA. The chosen methodologies enabled the collection of meaningful data, aimed to document different insights and observations on the ICT field within local educational settings, and beyond.

[27] claims that research generates significant knowledge through the encouragement of communication and understanding. In a global setting, it also fosters

tolerance and communal development.

This study aimed to shed light on any misconceptions or old perceptions which may not be in line with facts about local education within the ICT field. It also revealed the benefits and limitations of different educational paths. To best address the research hypothesis and research questions of this study, and enhance validity and reliability, a combination of quantitative and qualitative approaches was deemed appropriate. With that in mind, opting for a triangulation of viewpoints was deemed appropriate for this study.

3.3 Quantitative and Qualitative Research Approach

This study employed the approach of conducting both quantitative and qualitative approaches to research.

3.3.1 Quantitative Research

[28] implies that quantitative research aims to produce knowledge and foster comprehension of the social world. Since this study aimed to collect valuable data on the insights and effects of local educational styles within the ICT field, the implementation of quantitative research was deemed necessary and sufficient.

In agreement with the above mentioned, [29] states that quantitative research deals with data that can be translated into numbers or that has a numerical, statistical value. She also states that quantitative research uses scientific inquiry to address the necessary questions by using data that can be observed or measured. On account of this, through quantitative methods, the researcher was able to collect numerical data from the intended group of participants.

3.3.2 Qualitative Research

As opposed to the collection of numerical data, a qualitative approach facilitates the collection of descriptive and meticulous forms of research [30].

In contrast to quantitative research, a qualitative method aims to promote in depth understanding and interpretation. Since the main goal of qualitative research is to comprehend a study question from a humanistic or idealistic perspective [31], this method was deemed necessary for the collection of significant data.

Although a quantitative approach is often considered to be more reliable, research proves that since it gathers statistical data, it can also present itself as being less flexible than qualitative research. The integration of qualitative research enabled communication and expression; this method was used to comprehend people's attitudes, interactions, and beliefs. It therefore enabled the researcher to collect personal and individualistic insights, hence, it allowed the discovery of new perspectives on the topic in question.

This mixed-method approach enabled the researcher to obtain a more comprehensive and realistic understanding on today's position of the local education within the ICT field, based on the experiences and observations gathered from diverse individuals.

3.4 First Viewpoint: The Lead Researcher

Public data was gathered using a web scraper, specifically by scraping profiles of individuals currently working in ICT jobs in Malta. The data collection process involved scraping 100 profiles from individuals with a vocational background, specifically MCAST, and another 100 profiles from individuals with a traditional

academic background, focusing on UoM. Prior to data analysis, extensive data cleaning was conducted to ensure data quality.

The cleaned data was then loaded into the MaxQDA program. The documents were segregated based on the two predominant universities in Malta, UoM and MCAST. Subsequently, a coding system was created, and the documents were labelled according to various observed themes. This process facilitated the generation of a code matrix browser and two case models for analysis.

To further analyse the LinkedIn data, FAMD was performed. FAMD is a variation of multivariate exploratory analysis that enables insights from the combined quantitative and qualitative data.

3.5 Second Viewpoint: Generic Perception

The second viewpoint consisted of the distribution and collection of two separate quantitative surveys, aimed to collect anonymous data in relation to the topic understudy. [32]implies that apart from being efficient and cost effective, online surveys can help to reduce bias through standardisation. Hence, through this method, target participants were asked the same questions as to enable validity and increase reliability in research.

As previously suggested, two independent quantitative surveys were designed and distributed to two different cohorts. Although the number of questions were different A & A.2, the same four (4) sections were presented. Both surveys enabled the collection of demographics; it also requested information about the participant's education and employment background. The final section of each survey presented rating questions based on reflections on personal experiences in relation to the ICT field.

One online survey was distributed to students undergoing an ICT qualification A. This research method enabled the researcher to gather significant findings on insights provided by ICT students based on traditional and/or vocational education.

The second online survey was aimed at ICT graduates who are either working within the field or have previous experience working in the ICT industry A.2. This process facilitated the collection of data based on diverse individuals who are currently or were previously employed in the ICT industry, hence, are more knowledgeable about the world of work in the field.

Since the researcher wanted to ensure easy access and collaboration, Google Forms was used to create the required online surveys. This also increased the possibility of reaching a diverse range of participants during this study. This research approach allowed for the collection of diverse perspectives from individuals with different views on education and experiences within the ICT field.

3.6 Third Viewpoint: Specific ICT Professional Experiences

The third viewpoint of data collection consisted of one-to-one qualitative interviews. [33] stated that one-to-one interviews allow for in-depth investigation and personalised attention to research contributors. It also enables flexibility in research, given that questions can be adapted based on the participant's response. All interview participants were ICT professionals coming from different backgrounds and experiences. These interviews were conducted in private; this method allowed the researcher to provide a safe space for interviewees to share details about their thoughts, feelings, and experiences. In contrast with quantitative research, this method also enabled the researcher to observe non-verbal cues, which provided the researcher with valuable insights into diverse mental and emotional

states during said interviews.

3.7 Ethical Considerations

Ethical guidelines and procedures were followed during this study. As previously stated, during the process of conducting primary investigations, a mixed methodology research approach was taken into practice. Personal data, and information gathered from students, graduates, or individuals who work within the ICT industry, were kept anonymous, aiming to preserve confidentiality of participants.

Anonymity and confidentiality were ensured during the collection of quantitative studies. Qualitative interviews with open-ended questions were distributed to diverse individuals coming from different organisations within the ICT field. Aiming to avoid any possibility of moral offence to the target participants, research questions were reviewed thoroughly before the intended interviews.

Given that research was undertaken on the corporate perception of professionals and/or students coming from different educational backgrounds, ethical attentiveness was considered and abided by, aiming to reduce any bias which could result into business harm. Consent forms were distributed as to assure that the data gathered will be entirely used for the purpose of this research. Additionally, transparent communication with the participants was upheld throughout the whole research process. Participants were also made aware that they are free to withdraw from the research at any time, and without prejudice.

3.8 Evaluation Stage and Conclusions

Primary and secondary sources were adequately and thoroughly studied through research.

The chosen research methods facilitated the process of collecting and informing decisions based on the impacts, perceptions, benefits, and drawbacks of the local education within the ICT field. Following its compilation, the data was thoroughly examined in order to promote personal growth and, ultimately, offer light on both professional and personal development on the topic in question.

The next chapter presents the analysis and discussion of findings.

Chapter 4

Analysis of Results and Discussion

This chapter aims to present and analyse the results obtained through the triangulation of viewpoints in the context of this study. While desk research has been conducted as part of the research process, the primary focus of this chapter is to extend new theories and insights derived from the analysis of secondary data. The research questions, together with the hypotheses that guided the study, are also addressed.

4.1 Insights Gathered from the First Viewpoint

The LinkedIn dataset was imported and coded in MAXQDA, a qualitative data analysis software. To compare and contrast two individual cases, namely UoM and MCAST, a two-case model, Figure 4.1 was created. This two-case model is further supported by the code matrix, Figure 4.2, which enhances the understanding of the similarities and differences between the two cases. The purpose of this model was to identify patterns, similarities, differences, and relationships between the two cases. By systematically examining and analysing the data using predetermined criteria, the researcher aimed to uncover valuable insights.

Using MAXQDA's tools and features, the researcher organised and coded the

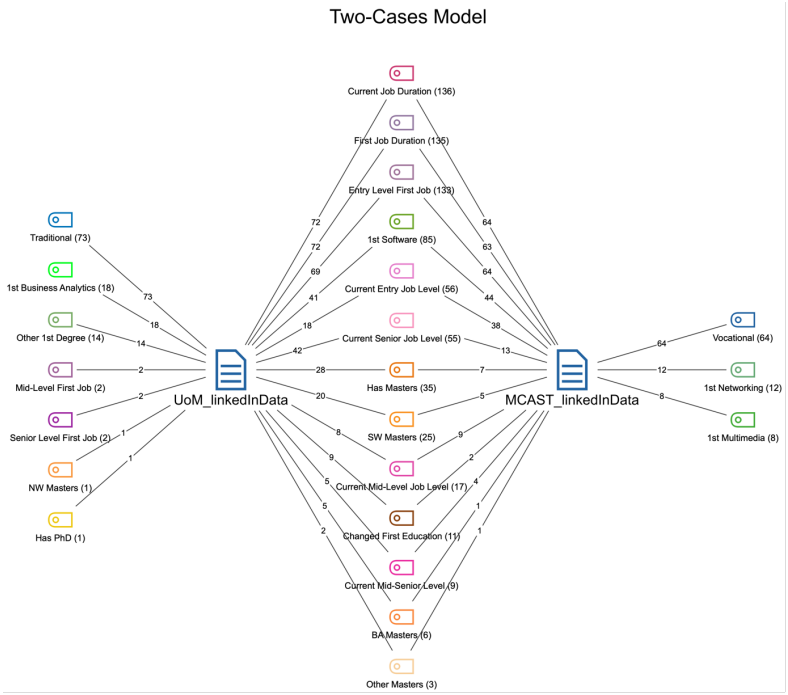

Figure 4.1: Two-Case Model

LinkedIn data, allowing for a comprehensive analysis of each case. The two-case model provided a structured approach to compare various aspects of UoM and MCAST, shedding light on their unique characteristics. By employing this methodology, the researcher aimed to understand the similarities and differences between UoM and MCAST, revealing any significant relationships or trends.

After careful data cleaning, the LinkedIn dataset, initially comprising information from 200 individuals, underwent a cleaning process. This reduction aimed to refine the dataset by eliminating any irrelevant or incorrect data points.

Upon initial examination of the data, several observations were made. As anticipated, all individuals from UoM had pursued traditional academic pathways, while those from MCAST had followed vocational routes. This distinction suggests the fundamental differences in the educational learning styles between the two institutions.

Regarding the attainment of the first degree, the majority of the degrees obtained

	UoM_linkedInData	MCAST_linkedInData
First Job	0	0
First Job > First Job Duration	72	63
First Job > Entry Level First Job	69	64
First Job > Mid-Level First Job	2	0
First Job > Mid-Senior Level First Job	0	0
First Job > Senior Level First Job	2	0
Current Job	0	0
Current Job > Current Job Duration	72	64
Current Job > Current Entry Job Level	18	38
Current Job > Current Mid-Level Job Level	8	9
Current Job > Current Mid-Senior Level	5	4
Current Job > Current Senior Job Level	42	13
Masters	0	0
Masters > BA Masters	5	1
Masters > Other Masters	2	1
Masters > NW Masters	1	0
Masters > SW Masters	20	5
Has PhD	1	0
Has Masters	28	7
1st Degree	0	0
1st Degree > 1st Networking	0	12
1st Degree > 1st Software	41	44
1st Degree > 1st Multimedia	0	8
1st Degree > 1st Business Analytics	18	0
1st Degree > Other 1st Degree	14	0
Types of Education	0	0
Types of Education > Vocational	0	64
Types of Education > Traditional	73	0
Changed First Education	9	2

Figure 4.2: Code Matrix

by both UoM and MCAST students are common. This indicates that there is an overlap in the fields of study pursued by students from both institutions. However, it is interesting to note that there were no occurrences of business analytics students within the MCAST dataset. This may be due to the business analytics course being a small course. Furthermore, a closer look at UoM revealed a range of degree courses beyond business analytics. These include various mathematical/statistical courses and engineering degrees. The discovery of a diversity of programmes at UoM implies a broader academic spectrum. In contrast, MCAST appears to have a stronger emphasis on ICT-specific degrees, such as networking and multimedia degrees. This observation highlights a specialisation in these areas within the MCAST curriculum.

Both UoM and MCAST shared a common trend where the majority of graduates started their careers in entry-level positions. However, it is noteworthy that among UoM graduates, four individuals were able to secure mid-senior or senior level

positions as their first job. This finding suggests that individuals from UoM may have greater opportunities to entrepreneurship opportunities or pathways to higher-level positions early in their careers.

Additionally, with reference to the individuals' current level of education, an interesting observation was that approximately 68% of individuals in entry-level positions studied at MCAST, while 76% of individuals in senior-level positions come from UoM. This difference could be attributed to the fact that MCAST began offering degrees relatively recently, in 2010, whereas UoM has a much longer history in education. It is also evident in the profile of the individuals, as those from UoM tend to belong to older generations. This historical context and the experience of UoM graduates may contribute to their higher representation in senior positions compared to MCAST graduates.

Another noteworthy observation is that while obtaining a master's degree is gaining popularity at MCAST, UoM still has a higher tendency among its students to pursue further studies and opt for a master's degree. Additionally, it was observed that individuals from UoM exhibit a greater inclination to change their educational path and begin focusing on a new area of study.

After analysing the data in MaxQDA and extracting initial theories, the same data has been analysed via Factor Analysis of Mixed Data. The first part was to generate the eigen values and generate the scree plot as shown in Figure 4.3. Using the elbow rule, the first four principal components (PC) where chosen. To understand the level of contributions of each variable for each of the four PC, the contribution bar graphs were generated as shown in Figure 4.4, Figure 4.5, Figure 4.6, Figure 4.7. This provides a better understanding in how to interpret subsequent plots. The direction and placement of individual variables were subject to two sequential PC, thus the correlation circle for all 4 PC in a pairwise fashion was generated and illustrated in Figure 4.8, Figure 4.9, and Figure 4.10. Through this information, it was possible to interpret the plots of each individual

observation as represented by the four PCs in a pairwise fashion. The individual observation plots are illustrated in Figure 4.11, Figure 4.12, Figure 4.13, Figure 4.14, Figure 4.15.

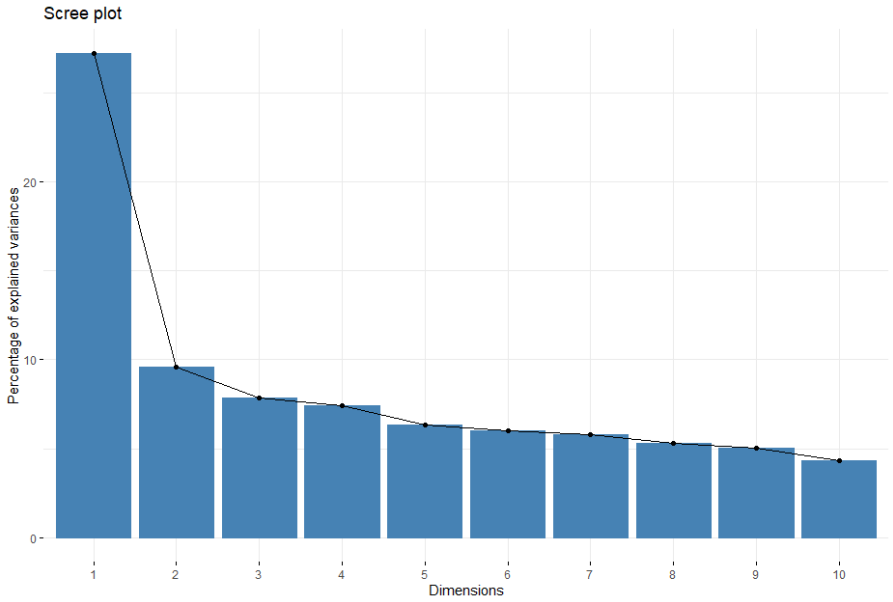

Figure 4.3: Scree Plot

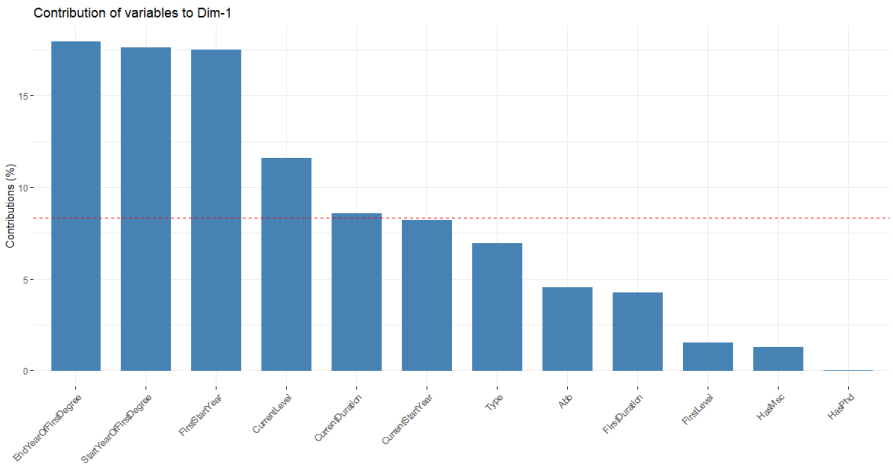

Figure 4.4: PC 1 contributions

Upon analysing the data in Figure 4.11, where observations are plotted across PCs 1 and 2, it is evident that there is a clear segmentation based on the two educational approaches. Values over 1000 are displayed in red, representing data from UoM, while values under 1000 are displayed in teal representing data from MCAST. The symbology represents the job level of the current position. When referring to the corresponding correlation circle, it must be pointed out that ob-

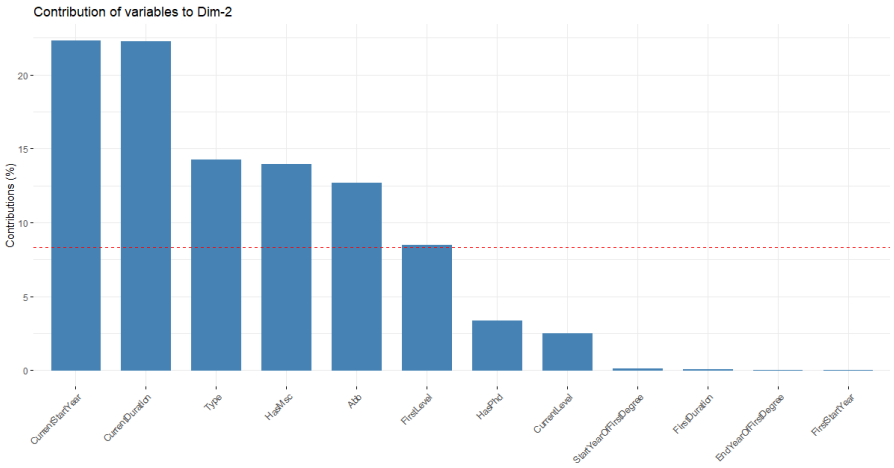

Figure 4.5: PC 2 contributions

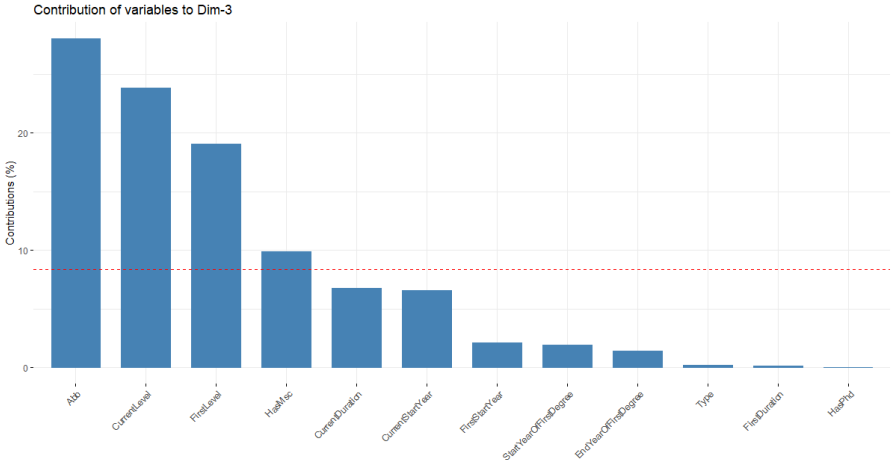

Figure 4.6: PC 3 contributions

servations placed on the right have larger starting year of first degree and first IT job, meaning that they are the younger generation. Whilst graduates that have graduated earlier are positioned more to the left. This is consistent with the young age of MCAST as an institution being founded in 2001 and undergraduate degrees being first introduced in 2010.

This distinction allows for a preliminary understanding of the job distribution between the two institutions. An interesting observation is that senior-level jobs are primarily associated with UoM, indicating that individuals who graduated from UoM have progressed in their careers and obtained higher-ranking positions. This finding suggests that UoM may provide a strong foundation and opportunities for

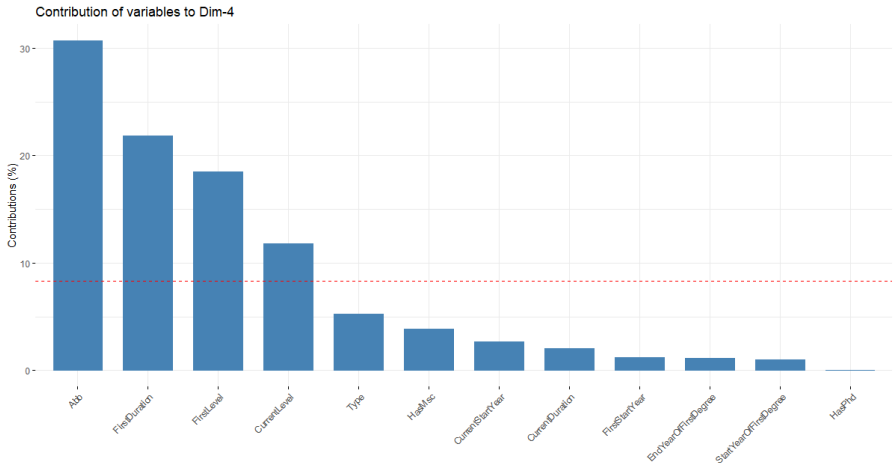

Figure 4.7: PC 4 contributions

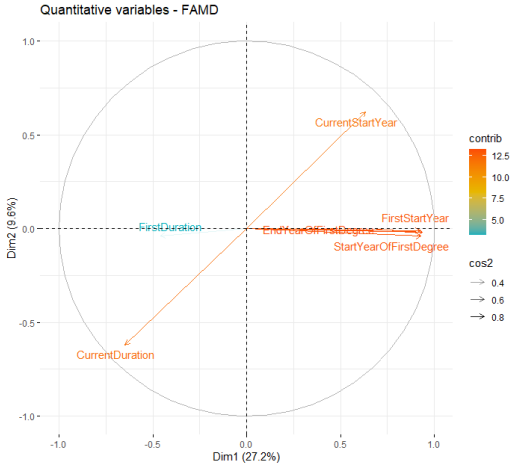

Figure 4.8: Correlation Circle PC 1 and PC 2

career growth and advancement.

However, it is important to note that while MCAST may have a higher concentration of entry-level jobs, there is still evidence of mid-level to senior-level positions within their cluster. This finding suggests that despite being established later and offering degrees for a comparatively shorter period, MCAST graduates are starting to achieve career progression and can secure higher-level positions.

When analysing the principal component interpretation, it became apparent that individuals from UoM have been in the industry for a longer duration. Therefore, the correlation between experience and career advancement is evident as

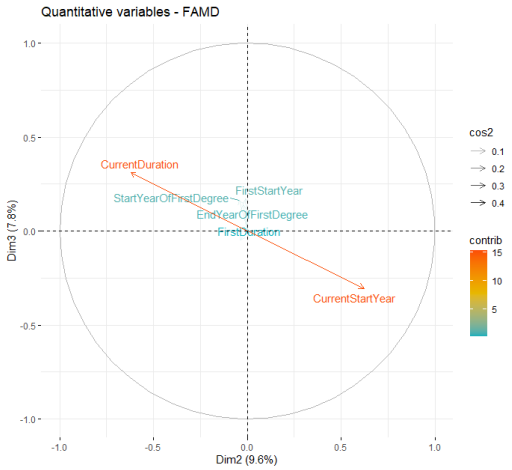

Figure 4.9: Correlation Circle PC 2 and PC 3

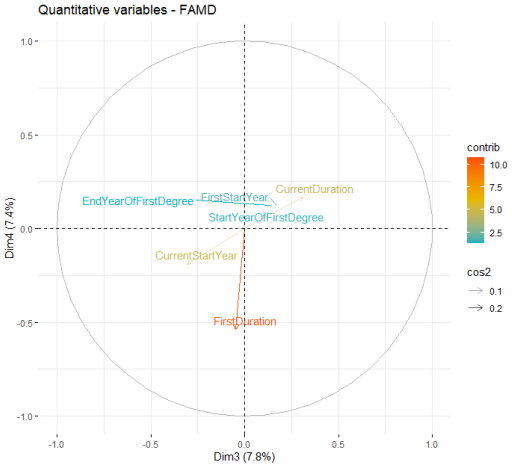

Figure 4.10: Correlation Circle PC 3 and PC 4

individuals from UoM, who have been in the industry for a longer period and tend to hold senior-level positions.

In addition, when changing the symbology to the current job level, it was identified that individuals 1027 and 1042 are outliers, since they have progressed through job levels at a notably rapid pace. When compared to others within the dataset, their career advancement seems to have been accelerated.

Furthermore, individual 1014 is also considered an outlier as they have ventured into entrepreneurship instead of following the traditional job level progression. This unique career path demonstrates the individual's ambition in entrepreneur-

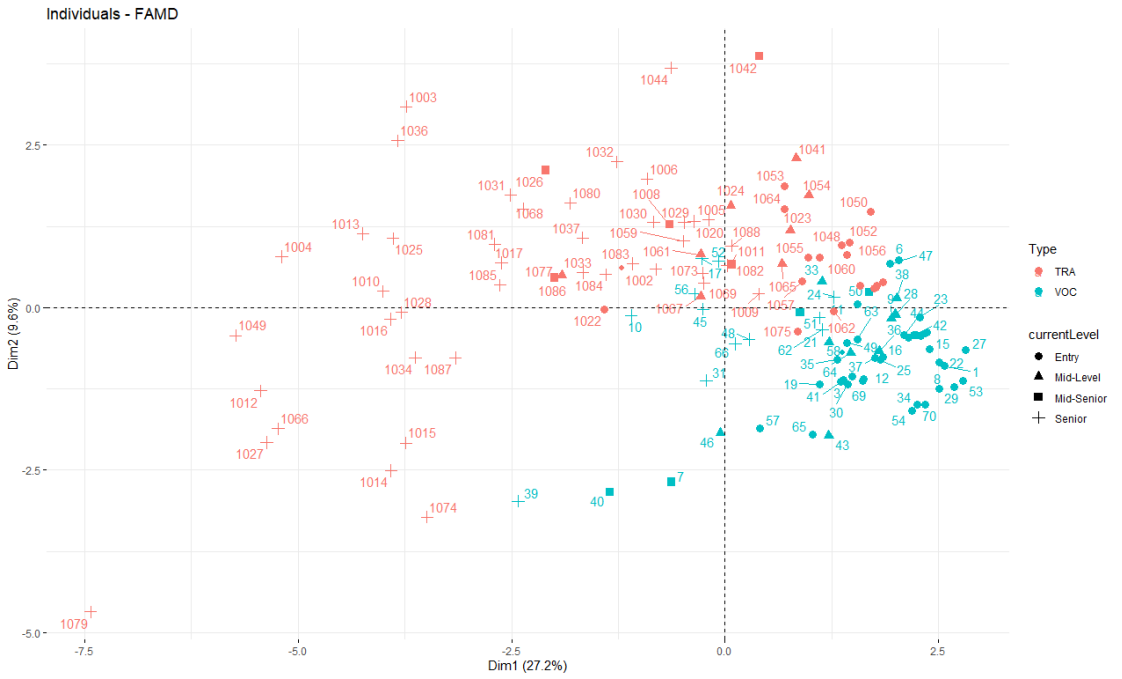

Figure 4.11: PC1 & PC2: Individual Analysis Based on Current Job Level

ship.

It is also important to mention that all outliers are coming from UoM and thus have a traditional education background. By identifying these outliers and understanding their distinct career routes, the analysis sheds light on exceptional cases within the dataset and highlights the variety of career paths individuals can pursue after graduation.

An additional aspect to PC 1 and 2 is changing the symbology to identify whether individuals obtained a master's degree level education. Upon examination, it is predominantly observed that the majority of individuals with a master's degree come from UoM. This finding suggests that UoM may have a higher proportion of individuals who have pursued and completed master's level education compared to MCAST.

However, apart from this pattern regarding master's degree attainment, no other significant patterns or insights emerged from the analysis of PC 1 and 2. It is

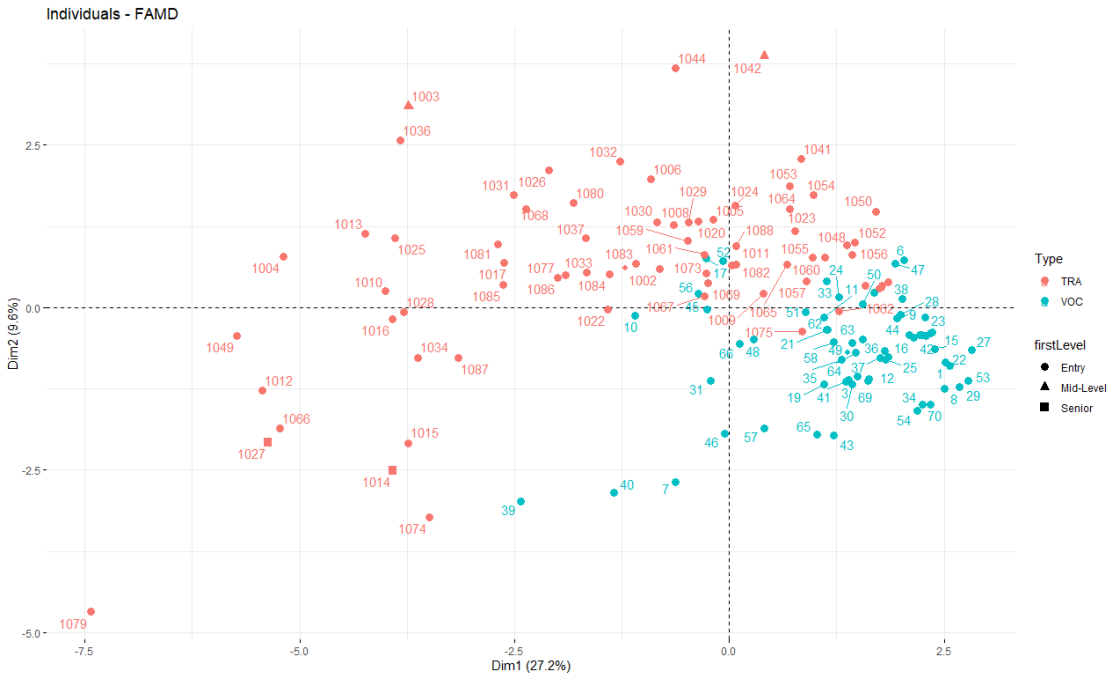

Figure 4.12: PC 1 & 2: Individual Analysis on First Job Level

important to keep in mind that MCAST has only recently begun offering Master of Science (MSc) programmes, with limited options available. This limitation may contribute to the difference in the representation of individuals with master's degrees between the two institutions in the dataset. Additionally, individuals coming from a vocational background may perceive an MSc as theoretical and would rather opt to start working hands-on.

When considering PC 2 and 3, the correlation circle shown in Figure 4.9, it is understood that observations on the right show that their current start year is recent while individuals who have been in the same role are placed on the left since they have a longer current duration. In this analysis, the symbology represents the level of experience.

Similar to the findings in PC 1 and 2, a segregation between the two cohorts is evident. Senior-level positions are primarily occupied by individuals with a traditional education background. However, this observation can be attributed to the fact that UoM has been established for a longer period of time, resulting in

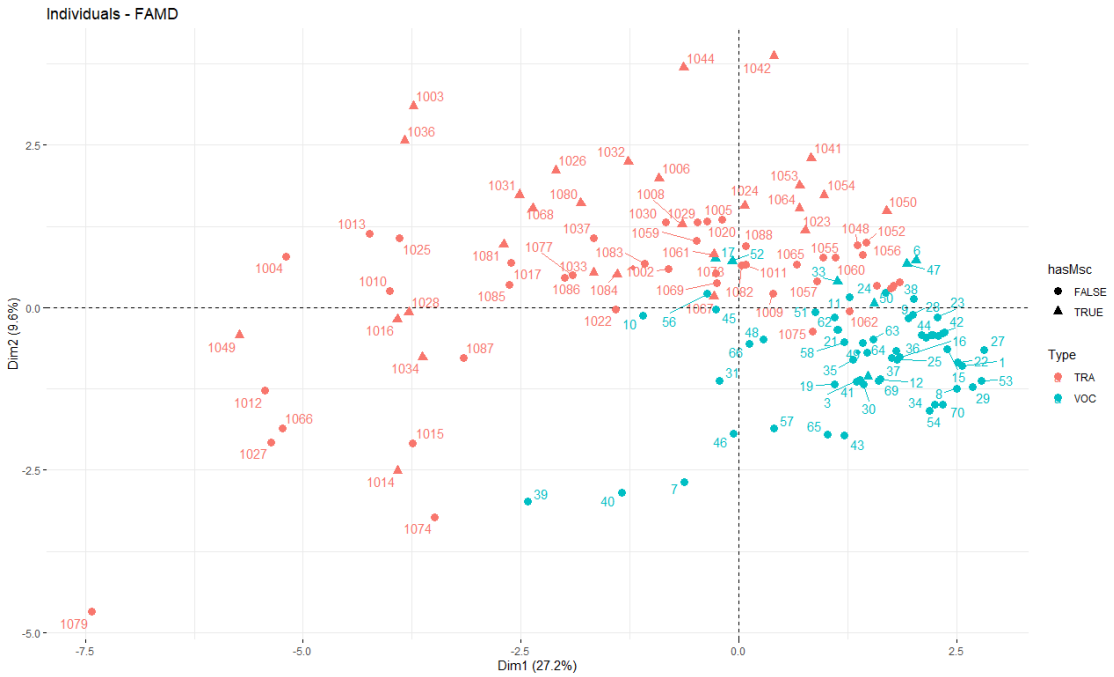

Figure 4.13: PC1 & PC2: Individual Analysis of Master's Degree Attainment

a larger number of graduates who have completed their degrees in earlier years. Furthermore, it is worth noting that the current duration of a job is influenced by the job position. Entry-level positions tend to have a shorter duration, while mid-senior and senior-level positions exhibit longer durations. This trend suggests that individuals progress and stay longer in higher-level positions, indicating career growth and stability in those roles.

Analysing Figure 4.10 with regards to the correlation circle. It can be noticed that PC 3 and 4, reveal that the majority of individuals in the dataset launch their careers in entry-level positions. However, similar to previous observations, outliers are present. Individuals 1014 and 1027 stand out as seniors, indicating that they have rapidly progressed to high-level positions. Similarly, individuals 1003 and 1042 are outliers as mid-senior levels, suggesting that they have achieved significant career advancement. This finding highlights the diversity of career paths within the dataset, showcasing instances of exceptional career growth and entrepreneurial pursuits among individuals from UoM.

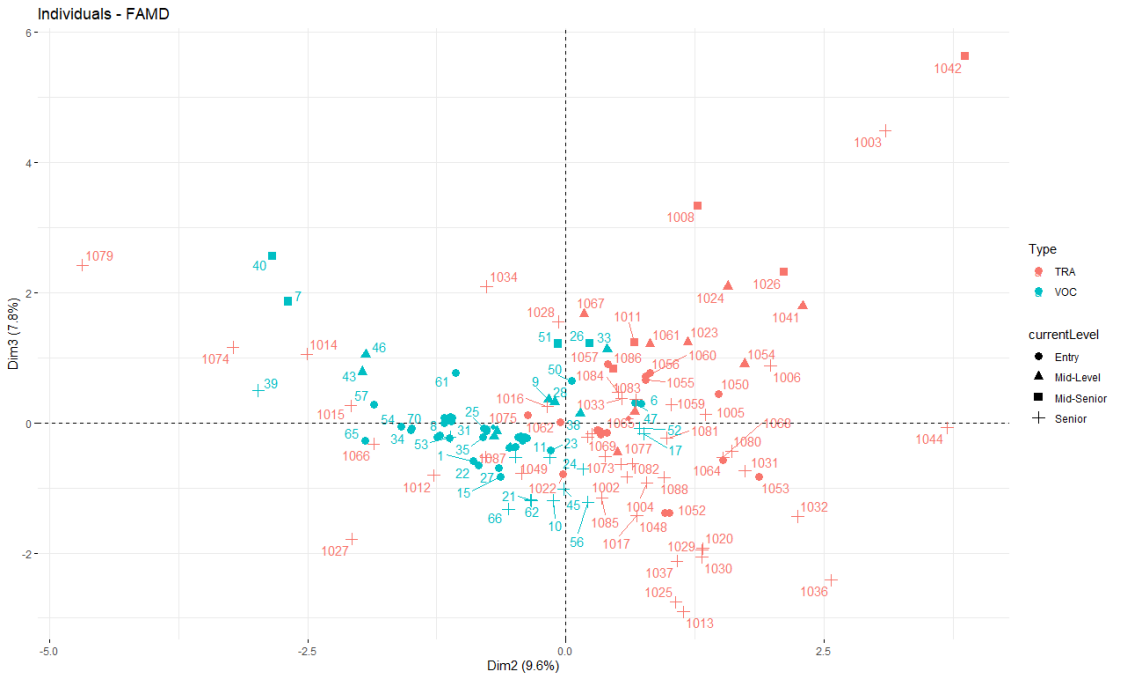

Figure 4.14: PC2 & PC3: Individual Analysis on Current Job Level

4.2 Insight Gathered from the Second Viewpoint

In order to comprehensively examine the research question and achieve a triangulation of viewpoints, this study employed two types of online surveys as vital tools to gather diverse perspectives and contribute to a holistic understanding of the topic.

The survey respondents demonstrated a diverse distribution across age groups, with the majority falling into their 20s, accounting for 46% of the participants. The next significant group were respondents in their 30s, comprising 30% of the total. Those in their 40s represented 20% of the respondents, while individuals in their 50s constituted 4% of the sample. In terms of gender, male predominance was evident, with 64% of the respondents identifying as male, while the remaining 36% identified as female.

Examining the highest qualification attained by the participants, it was observed that a significant portion, 60% of the respondents, held a bachelor's degree. Ad-

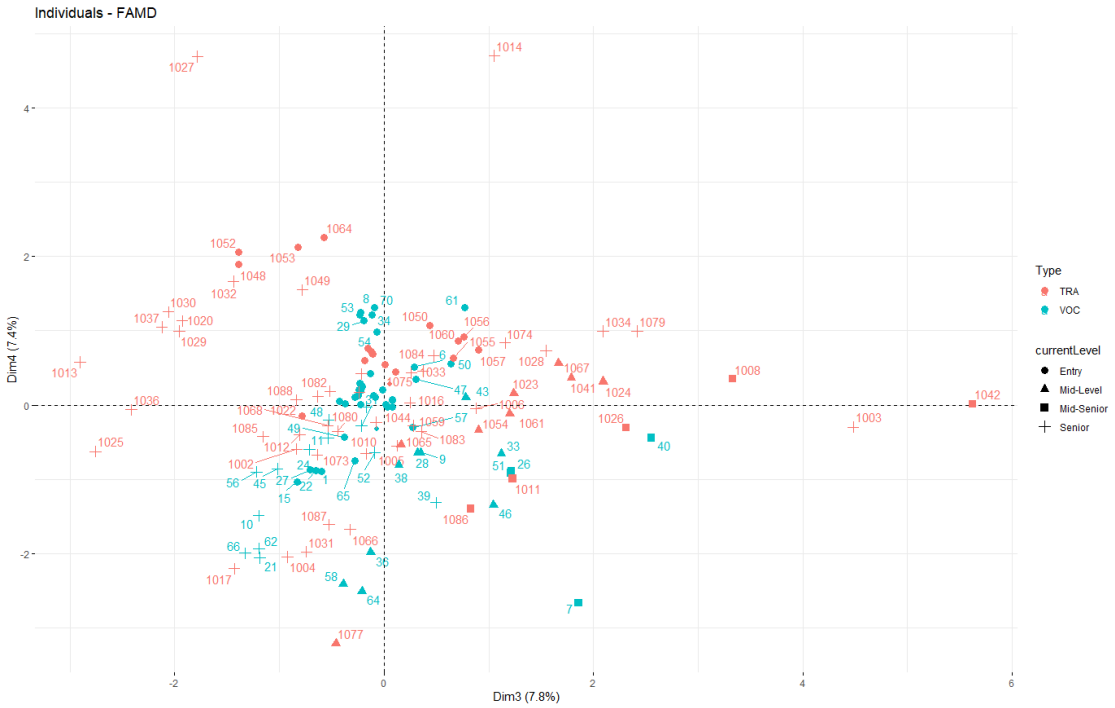

Figure 4.15: PC3 & PC4: Individual Analysis on Current Job Level

ditionally, 26% had obtained a master's degree, while the remaining minority held a Level 5 qualification, but were still actively working in IT roles. This indicates that a blend of individuals coming from different backgrounds were presented.

The survey respondents consisted of a diverse mix of individuals, with 56% originating from Maltese universities and the remaining portion from universities abroad. Among the respondents from Maltese universities, the majority were affiliated with the two predominant institutions in Malta, namely the University of Malta (UoM) representing 32% and the Malta College of Arts, Science, and Technology (MCAST) comprising 20% of the total respondents. This observation could be attributed to the fact that MCAST, comparatively newer in offering degree programs, has gained traction among the respondents.

Analysing the highest level of qualification attained by the participants, it was found that a significant majority, 60% of the respondents, had obtained a Bachelor's degree. Furthermore, 26% had achieved a Master's level of education, while the remaining 14% had obtained a Level 5 qualification.

When considering the timeframe of graduation, approximately 80% of the participants had graduated from 2010 onwards, suggesting a relatively recent pool of respondents. Additionally, within this group, 72% had graduated within the ICT field, highlighting the prevalence of ICT-related backgrounds among the participants.

In terms of professional levels, the survey respondents displayed a distribution with 36% at the senior level, 34% at the intermediate level, and 30% at the entry level. This indicates a diverse range of experience levels within the surveyed population.

In spite of the fact that the majority of the students experienced a traditional learning approach when undergoing their bachelor's degree, 70% of the respondents have experienced vocational learning. Moreover, it was highly evident that ICT professionals value vocational learning and believe that it is highly beneficial to incorporate practice to theoretical principles. This is due to the individuals being more prepared for their first position.

Figure 4.16: General Survey Question: Optimal Educational Style for First Position

The second survey specifically targeted students pursuing an ICT degree, where a sample size of 50 surveys was collected. It must be pointed out that during the data cleaning process, it was necessary to discard three respondents who did not meet the criteria of being part of the target audience. All participants in this survey fell within the age range of 19 to 24 years old. Even though nowadays there are more women working within the ICT field, the results proved that it is

still a male-dominated industry, with males constituting 62% of the sample, while females accounted for the remaining 38%.

In terms of educational background, the majority of participants were pursuing their first bachelor's degree. Among them, 12.8% were from the University of Malta (UoM), while the remaining 87.2% were enrolled at the Malta College of Arts, Science, and Technology (MCAST). It is worth acknowledging that this uneven distribution of participants from different institutions might have introduced some degree of bias into the results.

Furthermore, it was observed that for most participants, the ICT degree they were pursuing would be their highest qualification attained so far. This indicates that a significant proportion of respondents had not yet obtained any other higher qualifications beyond the bachelor's level.

91.5% of the participants were currently employed in an ICT-related job. These individuals had accumulated between 0 to 5 years of work experience and were predominantly at the entry level in their careers.

It has also resulted that approximately 72.1% of the respondents, perceived their work experience as beneficial in enhancing their understanding of the subjects studied at educational settings. This suggests that gaining practical experience in

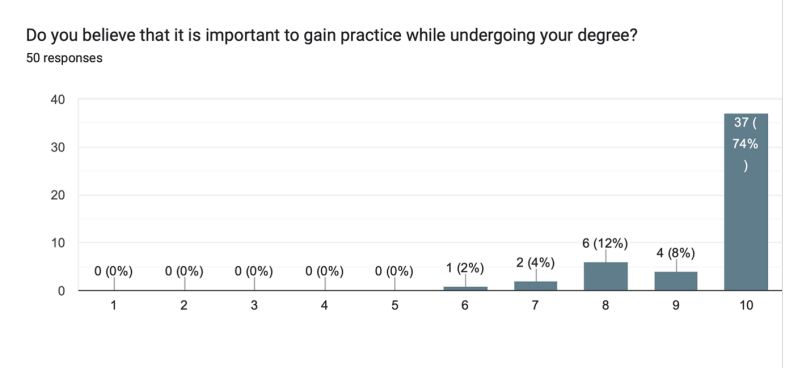

Figure 4.17: General Survey Question: Importance of Practice while undergoing Bachelor Level Degree

the ICT field has positively influenced their academic knowledge. On the other hand, 23.3% of the participants expressed a neutral standpoint regarding the impact of work experience on their studies, while a small percentage of 4.6% felt that it did not have a significant effect.

Considering the background of the participants, the majority had undergone vocational learning rather than traditional academic pathways. Specifically, only 27.9% of the respondents had experienced traditional learning methods.

The participants in this study were asked to rate various statements to assess their skills and beliefs. The results were analysed using the Net Promoter Score (NPS) to measure the level of agreement or disagreement with each statement. Table 4.1 presents the NPS scores obtained from the analysis.

Interestingly, when examining the detractor scores, it was found that the lowest average score came from the traditional education group for the statement "gained teamwork skills." On the other hand, the lowest average score among detractors in the vocational learning group was for the statement "I learned how to communicate my ideas and thoughts better."

However, both educational paths had their highest scores among promoters for the statement "it is important to gain practice while undergoing a degree." This suggests that participants from both the traditional and vocational education groups highly valued the practical experience gained during their degree programs.

Finally, it is worth noting that the majority of participants, as depicted in Figure 4.18, strongly agreed that gaining practical experience while pursuing their degree was in fact, beneficial. By acknowledging the significance of practical experience, these individuals emphasised the need to bridge the gap between theoretical knowledge gained in the classroom, and real-world application.

Statement	T	NPS	V	NPS
I gained teamwork skills	6.64	Detractors	7.06	Passives
I learned how to be self-disciplined	7.27	Passives	6.71	Detractors
I learned how to communicate my ideas and thoughts better	7.27	Passives	6.55	Detractors
I gained critical thinking skills	7.27	Passives	6.61	Detractors
I was able to apply theory to practice	7.18	Passives	7.06	Passives
It helped me to grasp theoretical concepts	6.55	Detractors	6.81	Detractors
Do you believe that it is important to gain practice while undergoing your degree?	9.45	Promoters	9.61	Promoters

Table 4.1: NPS scores for Traditional (T) and Vocational (V) education

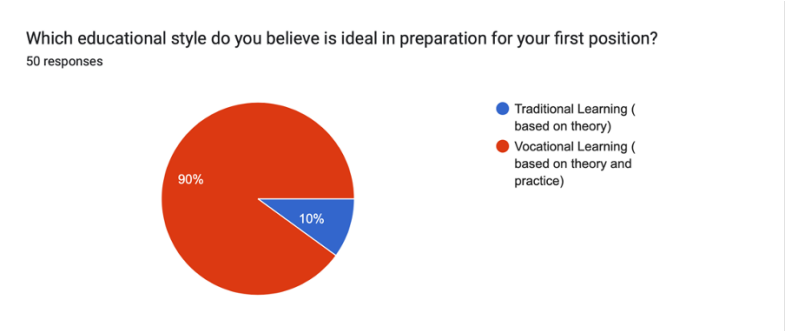

Figure 4.18: Student Survey Question: Optimal Educational Style in Preparation for First Position

4.3 Insight Gathered from the Third Viewpoint

During this study, a total of eight (8) qualitative one-to-one interviews were conducted to gather valuable insights on the topic at hand. While it was originally planned to transcribe all eight (8) interviews, some technical issues unfortunately led to the transcription of only seven interviews. Despite this minor setback, the transcribed interviews still provided meaningful data for analysis.

The sample leaned towards a male-dominated representation, with only two female participants. While the gender distribution was imbalanced, this diversity allowed for exploring potential variations in perspectives and experiences related to the research topic. However, it is worth mentioning that this imbalance was expected due to this industry being male dominated.

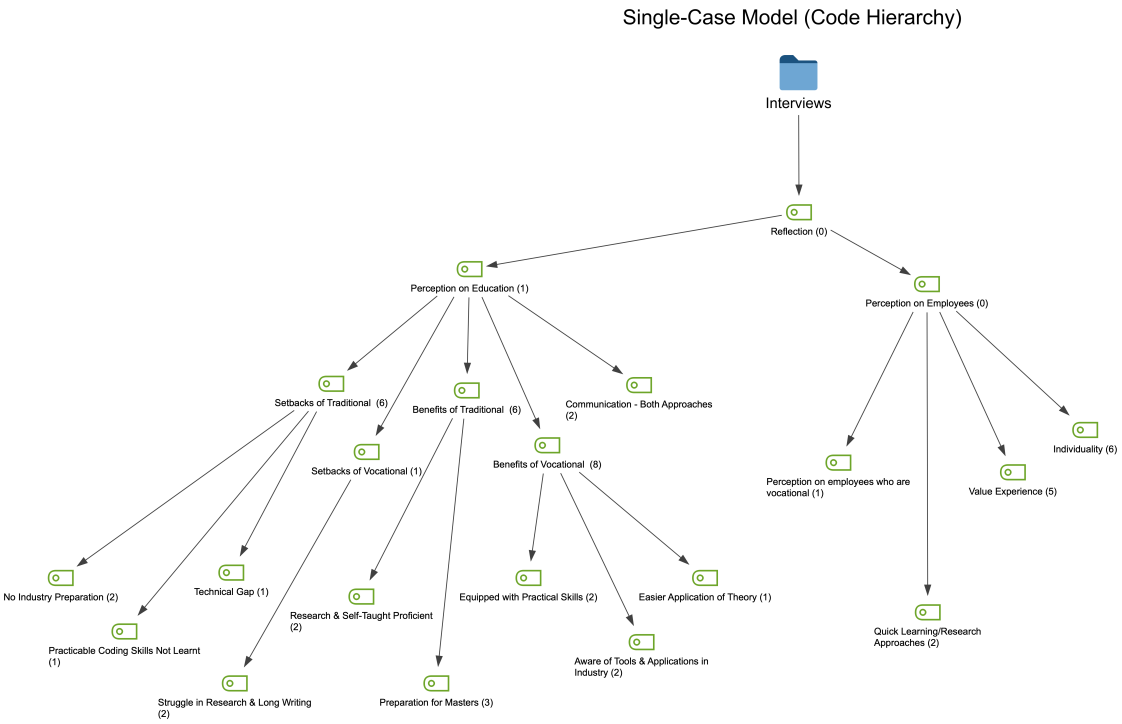

Figure 4.19: Interview Analysis

Moreover, the participants' job levels exhibited an interesting variation. The male participants held mid-senior/senior level positions, reflecting their extensive professional experience. On the other hand, the female participants occupied entry-level positions, mainly due to their relatively younger age. This contrast in job levels offers a unique opportunity to examine insights from individuals at different stages of their careers, potentially uncovering varying viewpoints and contributing to a well-rounded analysis.

The majority of participants had a software development-related degree, which aligns with the research focus. This shared educational background provides a common foundation and specialised knowledge that may influence their perspectives on the research topic. Furthermore, one participant held a mathematical related degree, which introduced a different academic discipline to the sample. Lastly, it is important to highlight that two participants in the sample did not obtain a degree. Their practical experience and alternative pathways have offered valuable insights that complement the findings from participants with academic

backgrounds.

Another aspect of the sample was the mixture of participants with master's degrees. The inclusion of individuals with diverse educational backgrounds was deemed to be useful since it led to a more comprehensive exploration of the research topic.

In this study, the findings derived from the interview process exhibited two primary branches, namely the perception on education and the perception on employees. These branches, as depicted in Figure 4.19, provided a framework for analysing and understanding the participants' viewpoints on these distinct aspects.

The transcriptions of the interviews served as the foundation for further analysis. Through the utilisation of MaxQDA, a qualitative data analysis software, a systematic coding process was employed to identify and categorise various themes and patterns within the data. This coding process allowed for a comprehensive exploration of the participants' responses, enabling a deeper understanding of the underlying insights and perspectives related to education and employees.

By employing MaxQDA to code the themes, the researcher was able to identify recurring ideas, concepts, and opinions across the interviews. By employing a systematic approach to data analysis, the researcher was able to identify common themes, difference and even patterns from the data collected.

During the analysis of the data, a common theme emerged regarding traditional education. Participants consistently highlighted several key benefits associated with this form of education. One of the primary benefits identified was that students graduating from traditional education were perceived to be highly proficient and capable of conducting research. The emphasis on research skills was seen as advantageous for individuals entering the workforce, as it equipped them with the ability to critically analyse and problem-solve in various professional contexts.

Another significant benefit identified was the perceived capacity of traditional education to foster self-learning. Participants expressed that students who undergo this form of education develop the skills and motivation to independently acquire knowledge in diverse areas. This self-learning ability was considered valuable for individuals navigating an ever-changing work landscape, as it enables them to adapt and acquire new skills throughout their careers.

Furthermore, participants highlighted that traditional learning tends to encourage students to pursue further education, particularly at the master's level. The degree obtained through traditional education tends to be seen as a steppingstone rather than a final destination, with participants recognising its role in facilitating higher education aspirations. This finding suggests that traditional education not only imparts knowledge and skills but also instils a desire for continuous personal and professional growth.

In contrast to the benefits discussed earlier, participants also emphasised certain setbacks associated with traditional learning. One prominent issue identified was the existence of a technical gap between the technologies used in the workplace and those taught in traditional educational settings. Participants noted that traditional education sometimes fails to keep pace with rapidly evolving technologies, resulting in graduates lacking proficiency in the specific tools and software used in their respective industries. This gap in technical knowledge was viewed as a potential limitation to individuals' preparedness for their initial positions in the workforce.

Another setback highlighted by participants was the limited practical experience gained during a traditional degree. They expressed concern that individuals may not acquire certain practical skills that are fundamental and highly relevant for their prospective jobs.

Consequently, participants acknowledged that transitioning into the workforce af-

ter completing a traditional education program could be more challenging due to these setbacks. Graduates may face difficulties in demonstrating their readiness for their first positions, particularly in terms of technical proficiency and practical skill application. By highlighting these setbacks, the analysis sheds light on the potential limitations of traditional learning in preparing individuals for the demands of the modern workforce.

The analysis of participants' perceptions on vocational education revealed several key benefits associated with this form of education. Graduates from vocational backgrounds tend to possess more practical skills that are directly applicable to the workforce.

Based on participants' experiences and observations of the workforce and employee onboarding, it became evident that vocational education plays a crucial role in equipping individuals with the essential hands-on experience and technical proficiencies demanded within this industry. The practical skillset gained through vocational learning was seen as a significant advantage, making graduates work-ready and capable of immediately contributing to their respective fields.

Furthermore, participants highlighted that vocational education provides students with a deep understanding of how the workforce operates. The theory taught in vocational programs is perceived as highly relevant and applicable to real-world scenarios, allowing graduates to have a straightforward and smooth transition into the workplace.

This connection between theoretical knowledge and practical application was seen as a strength of vocational education, as graduates were considered more adept at applying their learned skills and concepts directly within industry settings.

Moreover, participants noted that individuals from vocational backgrounds tend to have a greater understanding of the industry they are entering. The specific

knowledge and industry-focused training acquired through vocational education were viewed as valuable assets that facilitate a smoother transition into professional roles. This familiarity with industry practices, standards, and expectations was seen as an advantage in terms of adapting quickly to the work environment and understanding the specific requirements of the job.

One significant setback of vocational learning approaches is that individuals from this background may encounter challenges when grasping new concepts, often requiring more time compared to those with a traditional education background. Participants noted that vocational learners may struggle to quickly adapt, comprehend new ideas or technologies.

Moreover, participants highlighted limitations in research skills and self-directed learning abilities among individuals from vocational education backgrounds. Vocational education primarily focuses on acquiring practical skills, which may result in less emphasis on developing independent research capabilities or self-teaching skills. These observations suggest that individuals from vocational learning backgrounds may experience a slower learning curve when confronted with new concepts or emerging technologies.

During the interviews conducted, a common theme emerged regarding the perception of employees, with the majority of participants highlighting the importance of individuality. According to the participants, while education plays a significant role, the opportunities for career advancement and personal growth are not solely dependent on one's educational background. The participants stressed that individual character traits and qualities are vital in achieving success.

Ambition, courage, and determination are key attributes for individuals to fulfil their potential and make progress in their careers. Participants stressed the fact that having a strong drive to excel, being willing to take risks, and continually being highly motivated contribute to professional growth and success.

Furthermore, participants acknowledged the significance of experience in the workplace. Since practical experience enhances an individual's skills and competence in their respective roles. The participants believed that experience allows employees to refine their abilities, gain valuable insights, and become more proficient in their work.

4.3.1 Final Remarks

This analysis has led to discover the perspectives of various individuals both prior to and following their choice of educational paths. Consequently, the research encompasses the perceptions originating from diverse viewpoints regarding various educational styles, the enduring effects of these styles, and the relationship between educational paths and opportunities in employment or entrepreneurship.

In addition to summarising the findings and discussion, the following chapter highlights the study's limitations and proposes avenues for future research.

Chapter 5

Conclusions and Recommendations

Following the results obtained through desk and field research, different perspectives on the topic in question were observed. The findings were aligned to the research questions and hypothesis of this study. This chapter also addresses the limitations of the study and identifies potential areas for improvement.

5.1 Implications of Findings

The findings resonate with the previously mentioned educational philosophy put forth by John Dewey [2], emphasising the importance of experiential learning and the integration of theory and practice in education. According to Dewey, experience plays a crucial role in preparing individuals for work. However, while this study confirms the significance of experiential learning in the ICT industry, additional insights were also obtained. The study revealed that distinct educational approaches, represented by traditional and vocational paths, offer unique benefits and opportunities for career progression in the local context.

This study has revealed that students value practical experience and recognise the benefits of gaining practice while undergoing their first ICT degree. Both traditional and vocational education paths have been perceived positively, with UoM

graduates showcasing a strong foundation for career growth and MCAST graduates also achieving career progression and venturing into entrepreneurship. These findings indicate that both educational approaches offer valuable opportunities for ICT professionals.

While the perception of ICT organisations regarding the two educational styles was not directly addressed in the study, the emphasis on practical experience and the recognition of vocational education's benefits by experienced individuals were taken into consideration. The key themes that emerged suggest that organisations value candidates with a vocational background since these individuals possess practical skills and industry knowledge that will help facilitate a smooth transition. It was also pointed out that candidates coming from a traditional background tend to grasp new approaches and engage in research more efficiently after settling in. This indicates a balance between the benefits of vocational education and the strengths of a traditional educational background in the ICT industry.

Regarding the long-term impact of educational styles, the study suggests that as experience and career progression become more influential factors, the initial impact of the educational path may diminish over time. Both UoM and MCAST graduates have the potential for career advancement, indicating that the educational paths provide opportunities for success in the ICT field.

Additionally, a correlation between educational paths and job or entrepreneurial opportunities has been identified. Senior-level roles are typically dominated by UoM alumni, while MCAST graduates also advance in their careers and consider starting their own businesses. It is also worth mentioning that since UoM was established earlier, there is a higher tendency to have a sample with more senior positions, which has impacted the dataset. However, this still demonstrates the adaptability and potential of both instructional approaches in influencing a range of career paths in the ICT sector.

5.2 Limitations of Research and Further Recommendations

With regards to limitations, considering each viewpoint separately, a limitation identified from the researcher's perspective is that the study relied on scraped data without verification. This approach posed the risk of including inaccurate or incomplete information, as individuals may have omitted or added details to their profiles. Additionally, the research was limited to individuals with LinkedIn profiles, which could introduce a bias in the sample. Furthermore, data cleaning was performed as part of the data processing, but it should be noted that cleaning of data is subject to human error and bias, although efforts were made to ensure consistency across all observations.

When taking into consideration the second viewpoint, the general perception's viewpoint, it must be recognised that another limitation stemmed from the online surveys used to collect data. The online surveys were based on a convenience sample, which resulted in an imbalance of students from different educational backgrounds, with a greater representation of individuals coming from a vocational background. This imbalance limited the representation of various educational paths in the study. Additionally, the exclusion of age brackets in the sample could have hindered a more direct comparison among individuals with similar demographics.

From the third point of view, a limitation of the study was that the majority of ICT professionals included in the sample were primarily from audit companies. This resulted in a lack of diversity in terms of industries represented, which may have biased the findings towards the experiences and perspectives of individuals in the audit industry. As a result, the generalisability of the research to other industries within the ICT sector may be limited.

In terms of further recommendations, it is suggested to involve additional universities in order to obtain a more comprehensive perspective on the topic. This would allow for conducting the research on a larger and more diverse sample, including students from both traditional and vocational educational backgrounds. By including a broader range of universities, the study can capture a wider range of experiences and perspectives.

Additionally, it is recommended to conduct two types of interviews: one for junior-level individuals and another for senior-level individuals. This approach would enable a direct comparison of the perspectives and experiences of individuals at different stages of their careers. By gathering insights from both junior and senior professionals, a more comprehensive understanding of the educational paths and their impact on career progression can be obtained.

The ever-evolving ICT industry is undeniable in its impact on our world. Therefore, let us fulfil our societal role by embracing these changes, acknowledging the successes we have achieved thus far, and ultimately supporting educators in reimagining education for future generations.

References

[1] Communications. Future ict professionals to benefit from state-of-the-art mcast building in 2023, Jul 2022.

[2] John Dewey. *Democracy and education: An introduction to the philosophy of education*. Aakar Books, 1915.

[3] James Scott Johnston. *Deweyan inquiry: From education theory to practice*. State University of New York Press, 2009.

[4] H Md Abdul. Higher education in the era of ir 4.0. *NEW STRAITSTIMES*, 2018.

[5] Philip W Jackson. What is education? In *What Is Education?* University of Chicago Press, 2011.

[6] Janelle Cox. Teaching strategies that enhance higher-order thinking, 2017.

[7] Shelleyann Scott, Charles F Webber, Judy L Lupart, Nola Aitken, and Donald E Scott. Fair and equitable assessment practices for all students. *Assessment in Education: Principles, Policy & Practice*, 21(1):52–70, 2014.

[8] Poonam Agrawal. *Traditional and Transitional TVET Systems*, pages 188–202. Springer Netherlands, Dordrecht, 2009.

[9] Alan Pritchard. *Ways of learning: Learning theories for the classroom*. Routledge, 2017.

[10] Basil P Tucker and Stefan Schaltegger. Comparing the research-practice gap in management accounting: A view from professional accounting bodies in australia and germany. *Accounting, Auditing & Accountability Journal*, 2016.

[11] Yiping Li, Jianwen Chen, and Ling Feng. Dealing with uncertainty: A survey of theories and practices. *IEEE Transactions on Knowledge and Data Engineering*, 25(11):2463–2482, 2012.

[12] Andrea G Forster and Thijs Bol. Vocational education and employment over the life course using a new measure of occupational specificity. *Social Science Research*, 70:176–197, 2018.

[13] Olessya Akimenko. Teaching approaches: Theory and practice. *NUGSE Research in Education Journal*, pages 2–6, Dec 2016.

[14] Rachel Roegman and Sarah Woulfin. Got theory?: Reconceptualizing the nature of the theory-practice gap in k-12 educational leadership. *Journal of Educational Administration*, 2019.

[15] Christophe Meylan. What is vocational education? `https://hospitalityinsights.ehl.edu/what-is-vocational-education#:~:text=The%20vocational%20type%20of%20education,your%20profession%20and%20get%20started`.

[16] Ministry of Education and Employment. *Framework for the Education Strategy Malta 2014-2024: Sustaining Foundations, Creating Alternatives*. Ministry of Education and Employment, 2014.

[17] Viva Arifin, Mohamed Razi Mohamed Jalaldeen, Mira Kartiwi, and Lili Marziana Abdullah. Investigation of it competence and readiness of it students facing the industrial revolution 4.0. In *2020 8th International Conference on Cyber and IT Service Management (CITSM)*, pages 1–6, 2020.

[18] Siti Hajar Halili, Shukri Sulaiman, Hamidah Sulaiman, and Rafiza Razak. Embracing industrial revolution 4.0 in universities. *IOP Conference Series: Materials Science and Engineering*, 1088(1):012111, feb 2021.

[19] Nai Yeen Gavin Lai, Kok Hoong Wong, Dunant Halim, Jiawa Lu, and Hooi Siang Kang. Industry 4.0 enhanced lean manufacturing. In *2019 8th international conference on Industrial technology and management (ICITM)*, pages 206–211. IEEE, 2019.

[20] Rueben Mifsud. Teacher education at mcast in the context of industry 4.0. https://timesofmalta.com/articles/view/teacher-education-at-mcast-in-the-context-of-industry-40.898318, Sep 2021.

[21] Addressing the industry 4.0 skills gap. https://www.um.edu.mt/newspoint/news/features/2019/11/addressingtheindustry4skillsgap, Nov 2019.

[22] Bridging the industry 4.0 skills gap in malta. https://www.um.edu.mt/newspoint/news/2022/08/bridging-the-industry-4.0-skills-gap-in-malta, Aug 2022.

[23] MaltaDaily MaltaDaily. Pwc join forces with mcast to make students industry ready. https://maltadaily.mt/pwc-join-forces-with-mcast-to-make-students-industry-ready/#:~:text=On%20its%20part%2C%20PwC%20has,gain%20industry%20experience%20with%20PwC., Oct 2022.

[24] Naveen Joshi. Understanding education 4.0: The machine learning-driven future of learning. https://www.forbes.com/sites/naveenjoshi/2022/03/31/understanding-education-40-the-machine-learning-driven-future-of-learning/?sh=61830065bc2d, Oct 2022.

[25] Derek Jansen. Saunders' research onion explained (+ examples), Apr 2023.

[26] Gemma Ryan. Introduction to positivism, interpretivism and critical theory. *Nurse researcher*, 25(4):41–49, 2018.

[27] A. Jameson. Six things that help students love to do research. *Education Digest*, 84(9):56–58, 2019.

[28] M. Allen. *The SAGE Encyclopedia of Communication Research Methods*. SAGE Publications, Inc, Thousand Oaks, CA, 2017. Vols. 1-4.

[29] Judithe Sheard. Quantitative research. In *Research Methods*. Publisher, second edition, 2018.

[30] L. Nutov. Learning experiences of pre-service teachers and the lecturer's role in a qualitative research methods course. *Qualitative Report*, 24(1):31–54, 2019.

[31] D. F. Balmer and B. F. Richards. Longitudinal qualitative research in medical education. *Perspectives on Medical Education*, 6(5):306–310, 2017.

[32] R. Kumar. Survey as a quantitative research method. *Journal of Humanities and Social Science Research*, 1(1):1–9, 2018.

[33] Karin Crawford. *Continuing professional development in higher education: Voices from below*. PhD thesis, University of Lincoln, 2009.

Appendix A

Online Surveys

A.1 Perceptions and Impacts of Local Education within the ICT Field. (Aimed at students within the ICT Department)

Demographic Questions

- Q1 - Age
- Q2 - Gender

Education Related Questions

- Q3 - Are you currently undergoing a bachelor's degree?
- Q4 - Is this your first bachelor's degree you are undergoing?
- Q5 - What is your field of study?
- Q6 - Which University are you attending?
- Q7 - What is your highest obtained qualification?
- Q8 - When is/was your year of graduation?
- Q9 - Which Bachelor's Degree are/did you undergo?
- Q10 - Which field did you focus on in your dissertation?

Employment Related Questions

- Q11 - Do you work in an ICT related position?
- Q12 - How long have you been working in an ICT related position?
- Q13 - What is your current job level?
- Q14 - What is the title of your job position?

Reflection Questions

- Q15 - Do you feel that your work experience has helped you gain more understanding of your studies at university?
- Q16 - Which forms of education have you experienced?
- Q17 - Rate the following statements in regards to your first work experience which relates to your first degree, on a scale from 1 (strongly disagree) to 10 (strongly agree):
- Q18 - Do you believe that it is important to gain practice while undergoing your degree?

A.2 Perceptions and Impacts of Local Education within the ICT Field (Aimed to ICT Graduates - working in the field)

Demographic Questions

- Q1 - Age
- Q2 - Gender

Education Related Questions

- Q3 - From which university did you obtain your first Bachelor Degree?
- Q4 - What is your highest qualification?
- Q5 - When did you graduate with your first Bachelor Degree?
- Q6 - What is your field of study?

Employment Related Questions

- Q7 - What is your current job position level?
- Q8 - What is your current job title?

Reflection Questions

- Q9 - Rate the following statements in regards to your first degree, on a scale from 1 (strongly disagree) to 10 (strongly agree)
- Q10 - How would you measure the information gap between your first degree and your first position after graduating?
- Q11 - Which forms of education have you experienced?
- Q12 - Which educational style do you believe is ideal in preparation for your first position?
- Q13 - Do you believe that it is important to gain practice while undergoing your degree?

Appendix B

Interview

B.1 Perceptions and Impacts of Local Education within the ICT Field

Background Info

- Which is the field of your study?
- From which university did you graduate?
- How long have you worked in this industry?
- What is your role?

Reflection

- Were you ever involved in the recruitment process or dealt with new employees coming from traditional educational or vocational education background?
- Have you ever worked with employees who have been working with the company for more than a year and are coming from different educational backgrounds (traditional and vocational)?
- What is your perception of professionals coming from different educational backgrounds, meaning traditional or vocational?