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Higher education as a driver for sustainable transformation and leadership

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Article Info

Abstract

Higher Education plays an important role in laying the foundations for the development of competencies for sustainable leadership and entrepreneurship, capabilities that go outside disciplinal knowledge and include skills, knowledge, and attitudes regarding a holistic and approach oriented to sustainability. By preparing their students for the labour market, Higher Education Institutions (HEIs) are proactively responding to the wide range of challenges that the dynamic and uncertain environment of the 21st-century presents. The literature review is extensive about the expected competencies for the future, all indicating that they are critical success factors for individuals to ensure and sustain their career progression. Many of today's jobs and many more soon will require specific skills such as (i) technological knowledge, problem-solving and critical thinking; (ii) persistence, collaboration, cooperation, and empathy; (iii) communication, creativity, innovation, decision making, analytical skills, and leadership. These skills are key competencies to the progression of scanning 4.0. and work in Industry 4.0. The education system will necessarily have to move from a curriculum and evaluation-centered model to a pedagogical system that stimulates critical, reflective, creative, and adaptive thinking and reinforces cognitive and computational skills. The process of pedagogical innovation becomes not only revolutionary but above all crucial for a sustainable future.

Based on personal characteristics (attitudes and personality) as well as leadership style, this study aims to achieve a better understanding of the relationships between these factors. Using a quantitative approach, a questionnaire was carried out with third-year students of the Business Management degree course of the Management School of the Polytechnic Institute of Cávado and Ave to assess their perceptions regarding acquired competencies during the course. The results point to a relationship between pedagogical innovation and soft skills development, with particular emphasis on problem-solving skills, critical thinking, collaboration, and cooperation. The data were also analysed and discussed according to the possible impact of the leader's behaviour and the performance of the HEI where he or she is inserted.

1. Introduction

The world is changing remarkably quickly and with so many uncertainties provoking organizations the need to develop new and innovative solutions to fight against arising problems, while keeping being successful and sustainable competitive in their market (Sivam *et al*, 2019) [51]. Entrepreneurship and leadership are well-explored fields in the academy (Harrison *et al*., 2016) [29], but unfortunately, the knowledge about its connected dynamics is not well known (Jensen & Luthans, 2006; Mehta *et al*., 2020) [32, 38]. Countries who desire to be competitive in a global market based on knowledge (Penco *et al*, 2020) [44], innovation (Pradhan *et al*, 2020) [46], and creativity (Dieguez *et al*, 2020) [16] bet on entrepreneurship (Dieguez, 2021; Dieguez *et al*, 2021) [17]. The concept of entrepreneurship is complex (Hisrich *et al*, 2008) [31] and leaders can be triggers for stimulating the organization's innovative activity (Kozioł-Nadolna, 2020) [34]. Some parallels can be found between entrepreneurship and leadership (Cogliser, & Brigham, 2004) [11], especially when the environment, rules, and dynamics change (Fernald *et al*., 2005) [23].

In this sense, a new paradigm is known as "entrepreneurial leadership" joins entrepreneurship complexity with attributes of leadership across miscellaneous environments and contexts (Harrison *et al*., 2016; Bagheri, & Harrison, 2020) [29, 3]. Literature shows that entrepreneurial leadership is positively correlated to business performance through highlighting innovation (Van Zyl, & Mathur-Helm, 2007) [53], especially through open innovation (Dieguez *et al*, 2020) [16]. Entrepreneurial leadership presupposes a vision to be able to identify, explore and achieve strategic value creation (Gupta *et al*, 2004) [28]. In other words, it can be explained as a leadership style that is used to solve complex business, social, and environmental problems (Greenberg *et al*, 2013) [26]. However, it seems that there are no adequate tools in literature able to effectively measure a leader's entrepreneurial characteristics and behaviours (Renko *et al*., 2015) [48]. Furthermore, despite the recognition of important task that leadership skills of entrepreneurs play in developing individual, group and new venture functioning (Bagheri, & Pihie, 2011), few pieces of research have focused on the development of entrepreneurial leadership attributes and competencies (Bagheri, & Pihie, 2011). How to develop entrepreneurial leadership competencies specifically in university students is a recurrent question, even if it is not clear which entrepreneurial leadership attributes identified in the literature are relevant contexts (Harrison *et al*, 2018) [30]. These themes are particularly relevant if we add another factor to complexity and uncertainty: the digital revolution.

This paper focuses its research on a Portuguese Higher Education Institution, and on the perception of their students about the way is responding to the wide range of challenges that the dynamic and uncertain environment of the 21st-century demands. It is composed of three main sections. It begins with a literature review, followed by a brief presentation of the used research methodology. Comment and discussion on the obtained results are presented and, finally, the conclusions are shared.

2. Literature review
The literature on entrepreneurial leadership is a multifaceted concept that matches concepts of entrepreneurship and leadership while considering psychological approaches, contexts, and holistic perspectives (Roomi, & Harrison, 2011) [49]. However, in all reviews, little attention is paid to how entrepreneurial leadership is developed or taught (Bagheri *et al*, 2013) [4]. Even being entrepreneurship and leadership separate constructs, Cogliser and Brigham (2004) [11] pointed out four specific areas that are most relevant to both: vision, influence, the leadership of innovative/creative people, and planning. Later, Fernald *et al*. (2005) [23], presented a new set of similar "characteristics", namely vision, problem-solving, decision-making, risk-taking, and strategic initiatives. Leaders can exist at any organizational level (Cohen, 2004) [12] and how they influence climate will depend upon their position. The relevance of critical reflection in entrepreneurial leadership learning is strongly recognized by Densten and Gray (2001) [13], suggesting incorporating critical reflective practices into a leadership development programme through "critical lenses", with multiple perspectives that challenge future leaders to consider complex and uncertain environments, which they denote as "reflection-in-action", constituting for them good teaching practices (Roomi, & Harrison, 2011) [49].

For digital transformation, the impact on society will be dramatic. For HEI, the central task is to model the complex networks of digital skills like critical thinking, media literacy, and cross-cultural competence, to then develop corresponding contextualized learning scenarios in the disciplines. The crucial success factor is the recombination of the - traditionally separated - real world and the classroom (Mahlow, & Hediger, 2019) [37].

2.1 Digital transformation: jobs and skills – the future is now
Realizing future challenges to the labor market can be an effective way to predict the skills that will sustain that market. Interestingly, unemployment does not emerge as an identified challenge (objectively), although it corresponds to a cross-cutting fear when one perspective the progress of the fourth industrial revolution. Several studies have a non-direct relationship between technological advances and unemployment (World Economic Forum, 2020) [54]. Above all, they highlight the necessary conversion of employment because of the transition to digital. Also, automation will put an end to the functions of people today. It is anticipated that the jobs of the future will promote a need for recruitment in areas such as the green economy, cloud computing, big data, and artificial intelligence, among others (Schwab, 2016) [50]. In this scenario of great uncertainty, it is imperative to understand the jobs and skills necessary for the future.

For some researchers, the answer is science, technology, engineering, and mathematics (STEM) skills as well as coding so that people can develop or work with the technology. An alternative approach is being more critical about the kind of work that technology cannot replace. The Oxford Martin School, a university in the United Kingdom, argues that studies done about the vulnerability of automation jobs point out those that draw most on creative and social skills, complex perception, and manipulation. In this sense, future workers need to make them "immune" to automation as much as possible. Basic skills matter but high returns are linked to cognitive skills, especially non-routine skills, namely: i) Problem-solving skills to think critically and analyses, ii) Learning skills to acquire new knowledge, iii) Communication skills, including reading and writing, iv) Personal skills for self-management, making sound judgments and managing risks and v) Social skills for collaboration, teamwork, management, leadership, and conflict resolution. Preparing students for the workplace of the future implies both deskilling and the need for new skills (Patrinos, & Psacharopoulos, 2020) [43]. The Learning Challenge in the 21st Century. World Bank Policy Research Working Paper, (9214). The big question is "how to prepare and develop the autonomous, affirmative, creative, innovative, and supportive citizens that this Digital Age demands, and entrepreneurial leaders need?.

2.2 Competencies and skills to meet the entrepreneurial leaders' challenges of digital transformation
Competencies are "the set of knowledge, attributes, and capabilities that allows individuals to perform an activity or task successfully and consistently, and that can be constructed and improved through learning" (OECD, 2019) [42]. The term "skills" is broadly used and refers to what a person knows, understands and is capable of doing" (European Commission, 2019) [21]. These definitions are essential to realizing that skills are the result of function, capabilities, tasks, and learning, not a genetic predisposition,

but a process of accommodation of knowing how to do. In terms of extension, skills are of strategic importance for employability, growth, innovation, and social cohesion (Europarl, 2017) [20].

The study of the International Adult Skills Assessment Programme (PIAAC), carried out by the OECD (2019) [42], states that at the European level some 70 million adults do not have basic skills such as written comprehension, written expression, and numeracy, reverting to a huge limitation to find decent employment and an adequate standard of living (Europarl, 2017) [20]. The big question is "how to prepare and develop the autonomous, affirmative, creative, innovative, and supportive citizens that this Digital Age demands?" Accordingly to the World Economic Forum 2018 report, "The Future of Jobs", the 10 defining competencies of the 21st-century professionals are: i) ability to solve complex problems, ii) creativity, iii) ability to communicate and collaborate iv) curiosity, v) initiative, vi) persistence, vii) resistance to frustration, viii) adaptability, ix) leadership and x) sensitivity to social and cultural dimensions. Higher-level digital skills are not technological skills. They are mainly cultural skills and the great challenge of digital is to prepare students for full, mature, active, and autonomous cultural belonging (Figueiredo, & Scarboto, 2016; Leitch et al, 2013; Harrison, et al, 2018) [24, 36, 30].

One way for overcoming these difficulties (and technologies offer precious collaboration there) is to transform pedagogies from a model that overestimates explanation and passivity to a model that values initiative and autonomy (Van Laar et al, 2017, p. 578) [52]. According to the "Partnership for 21st Century" (P21), there are three types of skills: i) learning skills (creativity and innovation, critical thinking and problem solving, communication and collaboration), ii) literacy skills (information, media, and ICT literacy) and iii) life skills (flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, leadership, and responsibility). However for "Assessing and Teaching of 21st Century Skills" (ATC21S), for example, another categorization was made as follows: i) ways of thinking (creativity and innovation; critical thinking, problem-solving, and decision making; learning to learn and metacognition), ii) ways of working (communication; collaboration and teamwork), iii) tools for working (information literacy; information technology and communication literacy) and iv) living in the world (life and career; personal and social responsibility) (Binkley et al., 2012) [7]. For Education, the focus is on the teaching and learning practices to ensure students' 21st-century skills in the classroom as preparation for working life (Leahy & Dolan, 2010) [35].

The qualification of people to work is one of the primary requirements and can be considered a challenge for industries, knowledge institutions, and governments, which should create incentives and policies aimed at human work issues. Many of today's jobs and many more soon will require specific skills such as (i) technological knowledge, problem-solving and critical thinking; (ii) persistence, collaboration, and empathy; (iii) communication, creativity, innovation, ease of decision making, analytical skills and leadership. These skills are key to the progression of scanning 4.0. and for work in Industry 4.0. The education system will necessarily have to move from a curriculum and evaluation-centered model to a pedagogical system that stimulates critical, reflective, creative, and adaptive thinking and

reinforces cognitive and computational skills, predominantly in information technology, data analysis, and cloud computing. The process of pedagogical innovation becomes not only revolutionary but also necessary.

2.3 Active learning

Active learning is an approach to instruction in which all students are asked to engage in the learning process. It is strategic that became popular in the early 1990s (Bonwell & Eison, 1991; Meyers & Jones, 1993) [8, 39] and has proven itself a valid tool for helping students be engaged with learning (Mitchell et al, 2017) [41]. Although active learning has been around for over twenty years, active learning remains a valuable teaching strategy in that students gain knowledge and experience through talking and listening, writing, reading, and reflecting (Meyers & Jones, 1993) [39]. Active learning is generally defined to include any pedagogical method that involves students actively working on learning tasks and reflecting on their work, apart from watching, listening, and taking notes (Bonwell & Eison, 1991) [8]. It stands in contrast to "traditional" modes of instruction in which students are passive recipients of knowledge from an expert. Active learning can take many forms and be executed in any discipline (Prince, 2004) [47]. It is a key aspect of the flipped classroom and can be applied to any learning environment from online to standard lectures or as a blend of these (Dunlosky et al., 2013) [19].

Active learning aims to provide opportunities for learners to think critically about content through a range of activities that help prepare learners for the challenges of professional situations. Therefore, it is important to design activities that promote higher-order thinking skills such as collaboration, critical thinking, and problem-solving.

A class with successful active learning activities provides an opportunity for all students in a class to think and engage with course material and practice skills for learning, applying, synthesizing, or summarizing that material. Several strategies could be used to incorporate active learning into the classroom, namely (Active learning, n.d.; Felder & Brent, 1994 [22]; Paulson & Faust, n.d.): (i) Pause for Reflection; (ii) Writing Activities (Minute Paper); (iii) Self-Assessment; (iv) Large Group Discussion: Students discuss a topic in class based on a reading, video, or a problem. The instructor may prepare a list of questions to facilitate the discussion; (v) Think-Pair-Share; (vi) Cooperative Groups in Class; (vii) Peer Review; (viii) Group Evaluations; (ix) Brainstorming; (x) Case Studies; (xi) Interactive Lecture; (xii) Active Review Sessions (Games or Simulations); (xiii) Role Playing; (xiv) Jigsaw Discussion; (xv) Inquiry Learning; (xvi) Forum Theater; (xvii) Experiential Learning. There is a well-established evidence base supporting the use of active learning and the benefits to using such activities are many, including improved critical thinking skills, increased retention and transfer of new information, increased motivation, improved interpersonal skills, and decreased course failure (Prince, 2004) [47].

The Active Learning classroom is an implicit "contract" with students: "If you (the student) do the preparatory work before class, I (the instructor) promise to make in-class work meaningful and interesting, so you'll see the value of what you are learning." Students will feel the contract has been broken if they prepare for class but then are asked to sit through a lecture that repeats the same material they read beforehand (CIEL, 2019). The major characteristics

associated with active learning strategies include students' involvement, engagement, information transmission, exploration of attitudes and values, motivation, immediate feedback, and involvement in higher-order thinking (analysis, synthesis, evaluation).

In conclusion, it is believed that skills can be developed informal education with curricula, programs, workshops, laboratory work, training sessions, projects, business visits, and study days, in individual or group learning approaches (Cinque, 2016) [10], through active learning strategies. In turn, informal learning can help the development of skills, attitudes, and values by promoting the application of the capacities of trainees in problem-solving in non-academic situations, according to the real needs that are not structured a priori (Bamber, 2013) [6]. The complementarity of all these types of learning approaches presents itself as a challenge to be embraced by HEI to develop the appropriate skills for increasingly virtual and intelligent work environments. Active learning can provide a valuable contribution to implementing a cooperative institutional vision of learning and teaching in higher education, which educates active, well-educated, well-rounded, and responsible, global citizens. In doing so, universities observe their third mission and contribute to the achievement of the Sustainable Development Goals: in particular no. 4, Quality Education, but they contribute also to the other Sustainable Development Goals indirectly, through citizens that contribute to an open, inclusive, democratic and knowledge and evidence-based society. Active learning is a key approach to achieving this goal since it is based on the involvement of all stakeholders in higher education; a way to develop uniquely human skills, which are becoming ever more relevant to both employers and societies.

Establishing active learning across universities-as an approach used alongside lectures-would thus help to preserve universities' unique role as educators of active citizens and professionals fit for today's and tomorrow's societies. Active learning is also iterative, dialogical, and mostly collaborative; it is about the doing of understanding and, hence, about the application of knowledge in new and authentic situations (Perkins, 1998) [45]. Is performative and needs to be intentional, well designed, and framed. Active learning begins with the design of a curriculum that is student-centered, and that draws on students' intelligence (Gardner *et al*, 1999) [25] and on their prior knowledge and experience in determining how students should demonstrate their understanding of course content (Perkins, 1998) [45].

The greatest challenge faced by universities is a cultural one since active learning moves beyond tips and tricks that are immediate, instrumental, and remedial to learning patterns that are long-term, investigative, and incremental and that invoke a growth mindset. Active learning casts the teacher in the role of facilitator and coach and invites the student to take responsibility for learning. Hence, they need to enter a new contract and relationship and negotiate new ways of working and learning. There needs to be a cultural shift to accommodate an active learning stance and this shift is possible only in the context of nurturing and supporting learning communities for staff as well as students (Dieguez *et al*, 2019) [15].

3. Empirical Evidence and Results
3.1 Methodology
The methodology and the selection of the method were

developed according to the main aims of the study: share good practices from a Portuguese Higher Education: The Polytechnic Institute of Cávado and Ave (IPCA), a young HEI, with 25 years of existence. IPCA has 5 Higher Schools, namely Management, Technology, Design, Professional Technical, Hospitality, and Tourism. IPCA develops as an educational offer through 14 bachelor's, 16 master's degrees, 11 postgraduate courses, and 28 Professional Technical Courses.

Guided by the constructivist research paradigm, this is quantitative research, of descriptive nature, which uses the questionnaire for data collection (Grégoire *et al*. 2015) [27]. The assumption is that entrepreneurs and leaders act on building the future they believe in, developing and creating opportunities in line with their convictions and dreams (Karp, 2006) [33]. Based on emotions and perceptions about the reality that underlies the situations they have experienced, their subjective choices for entrepreneurial value creation, and their ability to understand the potential effects of those choices (Alvarez, & Barney, 2006; Grégoire *et al*, 2015; Karp, 2006) [2, 27, 33]. The population comprises all the master's students of IPCA, with a total of 581 students. The instrument for data collection was designed by adapting scales validated in the empirical and conceptual literature. The good practices that are intended to share in this article are linked with current methodologies used in IPCA for better understanding what the perceptions of the demand for digital workforce competencies are. For this purpose, a questionnaire was prepared with 3 main areas namely socio-biographic data, students' perception, and market needs. It was used a Likert scale from 1 to 5, representing from less to maximum levels. The questionnaire was sent by google form on February 2021 and has been previously evaluated by 3 students and 2 academic expertise. After one-week data were collected and analyzed.

3.2. Results
The sample is composed of 84 students, all attending the IPCA Masters in February 2021. The female gender is the most represented in the survey, with 71.4% of the answers. The great majority has between 20 and 25 years old (38.1%), even if there are students of all ages, as we can see in Figure 1.
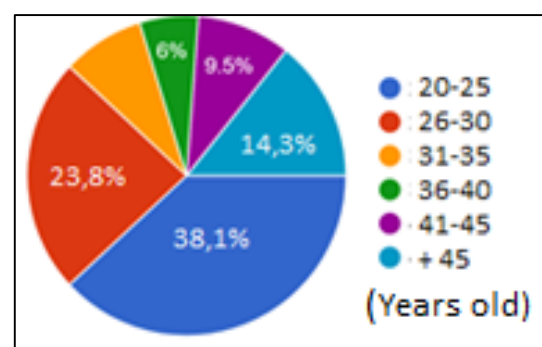

Fig 1: Age of inquired students (own elaboration)

Respondents are mainly from Management (57.1%), followed by Technology (22.6%). The design represents only 9.5%. The Master's areas are related to Audit, Accounting and Finance, Digital Design, Product Design and Development, Electronic and Computer Engineering Computer Science, and engineering. Engineering in Digital

Game Development. Taxation Management, Municipal Management (b-learning), Organizational Management, Tourism Management, Illustration and Animation, Marketing, Integrated QES Management Systems, and Solicitor. Most respondents attend the 1st year of the master's degree, representing 60.7% of the sample (Figure 2).
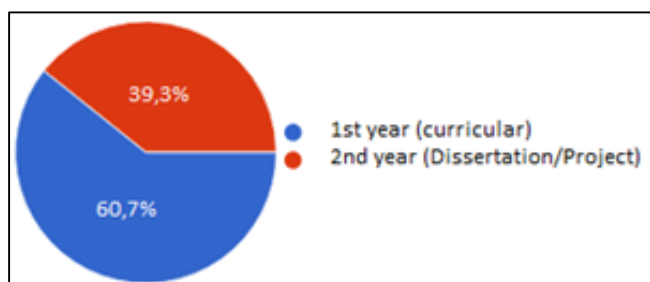

Fig 2:- Year of studies (own elaboration)

In what concerns professional experience, 77.4% of the respondents have a job. 13.1% have professional experience but are not currently employed and only 9.5% of students never had job experience. Respondents work in all sectors of activity, with a special focus on services (28.4%), industry, and public services in *exequo*, with 19.4%. They have as professional functions different levels, from the most operational ones to managerial positions. Some examples are

the following: industrial designer, software developer, certified accountant, management, banking, quality manager, technical assistant, physiotherapist, finance, tourism, logistics, and commercial.

The most frequent professional experience is between 1 and 3 years, representing 32.9%. It follows, with 31.6%, 10 or more years. In last appear he respondents with 7 to 9 years of experience (15.8%), as seen in Figure 3.
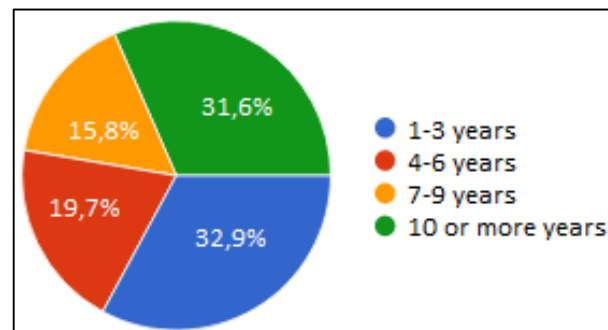

Fig 3: Professional experience (own elaboration)

Digital transformation is considered very important for the labor market in the opinion of 70.2% of the sample and considered important for 26.2%. No respondent considers the topic unimportant (Figure 4).
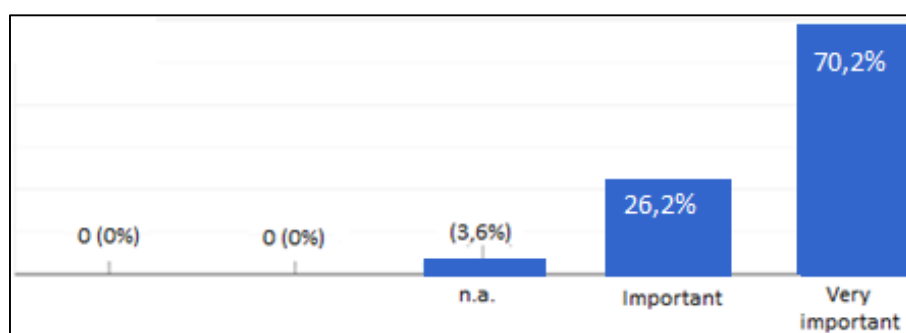

Fig 4: Digital transformation for the labour market (own elaboration)

The importance of new skills for the professional future given the evolution of industry 4.0 is perceived as very important for computer skills (68%), Quality Control (53%), Communication and Virtual Collaboration (52%), Analysis and Decision Making (51%), Computational Thinking and Creativity (48%), Problem Solving (47%) and People Management (41%). For Cognitive Flexibility (60%) and Negotiation (52%), the perception is that they are important. The most worked skills in the Masters are perceived as important for Coordination with others (44%), Critical thinking (43%), Virtual collaboration (40%), Literacy of the new media (39%), Cognitive flexibility (38%), Communication (37%), Emotional intelligence, Active listening, People management (36%), Analysis and decision making (28%).

The activities considered by the respondents as being the

most appropriate to train on how to adapt current skills to the needs of the digital transformation of the economy (60%), Guidance on new and emerging forms of employment (57%), Thematic workshops (face-to-face workshops focusing on topics related to digital transformation) (53%) and Case studies on digital transformation in the labor market (33%). The List of professions due to their susceptibility to digital transformation, with 43%, and the Support Manuals for training and counselling professionals on the subject, with 36%, are considered only adequate.

About the possibility that the master's degree will help them to grow professionally, 52.6% of the respondents say that it will help them a lot, and 30.3%. Only 1 respondent believed attending the master's degree will not help him much (Figure 5).
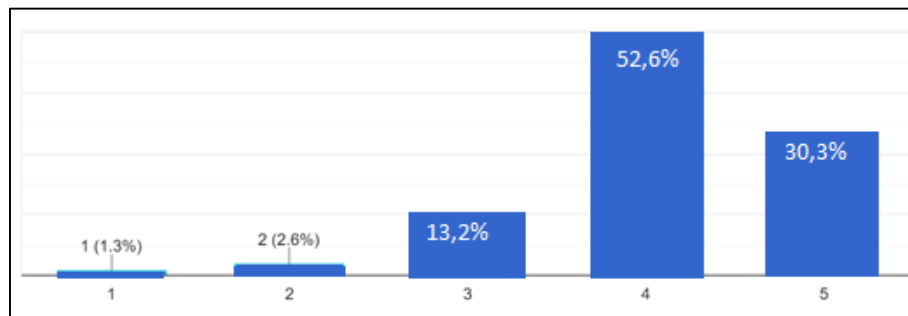
Fig 5: Master's degree as a possibility to grow professionally (own elaboration)

When inquired about what skills the labor market values, respondents refer to Ethics, People Management and Teamwork, Linguistic Competencies, Creativity, Adaptation and versatility, Availability, Computer skills, Responsibility, Interpersonal relationships, and empathy. They also point out Entrepreneurship, Initiative, Pro-activity, Communication, Problem-solving. Leadership and Critical thinking. When asked about their perception of the company's receptivity in terms of applying the new skills, 46.7% of respondents believe that there is a lot of receptivity, 28% that it is neutral, and 21.3% that it is all (Figure 6).
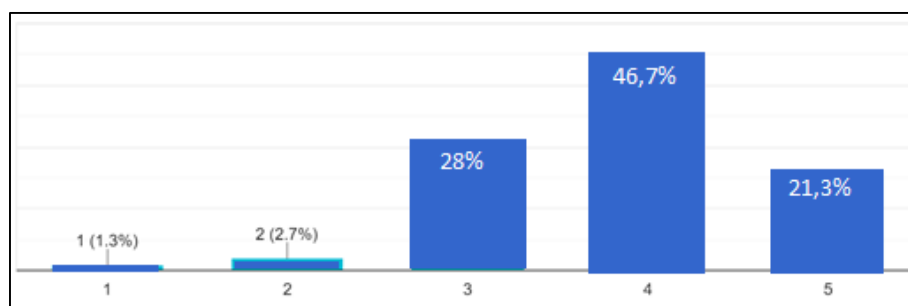

Fig 6: Perception of the company's receptivity in terms of applying the new skills

In the exercise of their duties, 54,7% of the respondents already have attended some training/action/event to reinforce some of the new skills (Figure 7).
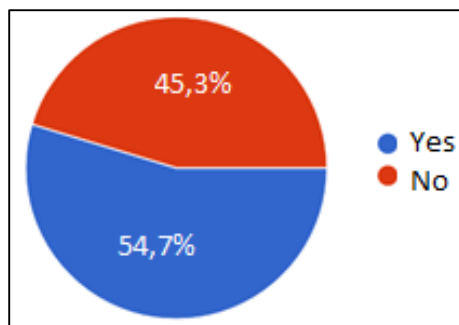

Fig 7: Training on the job to reinforce some of the new skills (own elaboration)

Regarding the need for more information/guidance/training on the impacts of digital transformation at work, 58.7% of the respondents already have sensitized some superior / manager/decision-makers.

3.3. Discussion and Results
Students on the sample seem to know market needs as well as challenges presented by Industry 4.0. The world is changing, entrepreneurial leaders are needed to build a better future and find solutions, but academies and society must be more proactive while developing methodologies for better and sustainable learning. Working with a multidisciplinary master's has been an option for researchers as it is highlighted as very fruitful in literature (Betting, 2016; Cai *et al*, 2019).

Respondents are mostly between 20 and 40 years old, representing 61,9% of the sample. They have different backgrounds and come from different Higher Schools belonging to IPCA. Almost all (97.4%) believe that digital transformation is important or very important for the labor market.

When comparing their perception of what concerns skills and evolution of industry 4.0 to how their masters are preparing them for the future, respondents only refer to Virtual collaboration, Cognitive flexibility, and Communication.

However, when respondents compare skills and evolution of industry 4.0 to how do they assess the use of skills in the performance of their duties, they refer to Virtual collaboration, Cognitive Flexibility, Communication, Computer Skills, and Problem-solving.

Results show that master courses are helping students with the use of skills in the performance of their duties in what relates to Coordination with others, Virtual collaboration, New media literacy, Cognitive flexibility, Communication, Emotional intelligence, Active listening, and Computer skills.

Finally in what concerns students' perception about skills and evolution of industry 4.0 to how their masters are preparing them for the future and how do they assess the use of skills in the performance of their duties, only Virtual collaboration and Cognitive flexibility are simultaneously referred to.

It seemed that master's students remain focused on the present skills even they are aware of the changes that are occurring and challenges that emerge from it. Masters are preparing students for the present market but should be more focused on soft skills, namely critical thinking, creativity, problem-solving, self-learning, ethics, communication, and leadership.

HEI has an important role in society, today, and in the future. Students of today are future leaders who can shape a better world if are well prepared and have the required skills to be entrepreneurial leaders. Professions and their skills profiles are not immutable, and professionals need to develop and be able to adapt themselves and be successful in a digital context transformation. Emotion, empathy, and ethics are presented as key differentiating competencies of robots. Entrepreneurial leadership skills must be truly developed especially through the HEI.

The presented methodology is a recurrent methodology used in IPCA, as it is important to adapt *curricula* and proactively respond to market and society challenges. IPCA master's students are aware of the changes that are occurring and the challenges that emerge from them. Masters´ courses seem to be preparing students for the present market but should be more focused on soft skills, namely critical thinking, creativity, problem-solving, self-learning, ethics, communication, and leadership.

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