A Work Project presented as part of the requirements for the Award of a Master Degree in Management from the NOVA – School of Business and Economics.

Education 4.0 and the Skills of the Future: Are Nova SBE graduates prepared?

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A Project carried out on the Master in Management Program, under the supervision of:
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January, 2019

Abstract
Education 4.0 and the Skills of the Future: Are Nova SBE graduates prepared?

This paper examines the effects of the labor market by the Fourth Digital Revolution, and how they will impact Higher Education Institutes, in particular. "Education 4.0" is the answer to the needs of "Industry 4.0", and the consequent importance of understanding what are the skills that are necessary for the future graduate. Additionally, this paper also has the purpose of understanding if graduates from Nova SBE feel that they are prepared with the skills that will be necessary for the future. Differences in perceptions were found across the type of master programs regarding the categories of Higher Cognitive, Social and Emotional, and Technological skills. The main finding of this paper is the urgent need for business schools to rethink their design for the experience of the future, in order to correspond to the fast-changing needs of all important stakeholders.

1. Introduction

The Fourth Digital Revolution is impacting not only our lives but also how we work and communicate, at a faster pace than any other industrial revolution before. In today's digital society, with the rise of smart machines and systems, a world debate has been created on whereas if robots are stealing our jobs, or if humans have a chance in the race against the machine.

The skill gap started fifty years ago and has been accelerating with the evolution of digital technology and the progress of automatization in the workforce (Levy & Murnane, 2003). "Education 4.0" is the response to the needs of "Industry 4.0", and along comes the importance of reconceptualizing the skills that are necessary for the future graduate.

This work project has the purpose to test if graduates from Nova SBE feel that they are prepared with the skills that will be necessary for the future. To fulfill this purpose, a survey was sent to previous students from Nova SBE.

2. Literature Review

The Fourth Industrial Revolution

The First Industrial Revolution, in the 18th century, marked a significant turning point in history, by utilizing water and steam capacity to automate creation. With electrical power, came the Second, almost one hundred years later, where it was possible to create large-scale manufacturing. The Third came with the rise of telecommunications and computer. Currently, a Fourth Industrial Revolution is expanding on the Third, the advanced transformation that has been happening since the middle of the last century. It is portrayed as a combination of innovations that are blurring the lines between the physical, digital, and biological spheres (World Economic Forum, 2018).

By the end of the 21st century, the economy and the society were transitioning from being based on production, where energy was the motor of progress, to one based on information, where data and information technologies will be the engine for evolution (Karoly & Panis, 2004).

The rise in accessibility of inexpensive computing power and storage capacity have made possible technologies like the Web, artificial intelligence, Big Data, and improved analytics (Rotman, 2013).

On the one hand, the explosion of many different mobile devices systems (such as smartphones or tablets), that being accessible and affordable, can deliver access to high-speed internet, anywhere and anytime. On the other hand, Big Data, that is characterized as "the combination of the data (personal, commercial, geographical, behavioral) available on digital networks – and exploitable as raw material" (Degryse, 2016). These two, especially, are changing how businesses create value, our methods and places of work, our interactions and our communications with each other (Cascio & Montalegre, 2016)

In sum, although, the phenomenon of the digitalization of economy was not precisely new, as it has been building up, and in progress, for several decades, there is an agreement that is has reached today a tipping point (Degryse, 2016). And while the unprecedented speed of current breakthroughs is fueling an on-going debate, between policy-makers, economists and industry leaders, on how significant and transformative their impact will be, and how quickly, or not, it is going to happen, there is a consensus through literature that seems to converge on the idea that digitalization will change jobs, wages, inequality, health, resource efficiency and security (Jepsen & Drahokoupil, 2017).

The Fourth Industrial revolution will create a new economy, and consequently a new universe of work. (Degryse, 2016).

Impact of the Fourth Revolution in the Labor Market

Technology allows economies to generate more value with less capital, either physical or human but also disrupts previous methods, skills, and organizational approaches, making them irrelevant (Manyka et al., 2013).

There is some controversy when it comes to the relationship between digitalization and employment. On one side, the technophobes believe in a pessimistic forecast, that we might be in front of a Stagnation Era, that is based mostly on the fact that technological advance will result in the pure substitution of humans for machines – Nomura Research Institute has predicted that, by the year 2050, half of the current jobs might be done by robots. Technological companies have already started to favor the skilled workers, increased the demand for new skills, and automating routine tasks (Acemoglu, 2003), destroying jobs faster than creating, and the increasing pace of developments has critically amplified the gap between "economic winners and losers", bringing into light income inequalities, something economists have feared for decades (Brynjolfsson & McAfee, 2014).

On the other side, a more optimistic approach, believes we are at the beginning of a Great Restructuring, and that technology is just one of the elements that shape the future of employment, together with "*work organization, reconstruction of occupational profiles, skills, and learning, human resource management, social dialogue, economic and social processes of diffusion and adoption of innovations*" (Valenduc & Vendramin, 2017).

It is consensual that the Fourth Industrial Revolution will have a significant impact on the labor market; however, it is essential to state that this will be extremely different across industries and sectors (Karoly & Panis, 2004). While an innovation in robotics, where we have a tangible machine that it is programmed to a specific job (e.g., a precision assembly robot), is destroying human "routine" jobs, the evolution of software automation will have a completely different effect, not particularly visible to the public, that probably only the organization and its employees will feel (Ford, 2015). Furthermore, as a result of new technologies, along with the shift in the necessary job skills through all industries, there will also be a creation of opportunities, in professional areas and skills, that will be a novelty and profoundly unlike anything that has been seen before (Goos et al., 2014).

However, as disruptive technologies, transform life, business, and the world economy, it is urgent to study and understand the impacts and implications, and design strategies that allow "human workers to race ahead with machines instead of racing against them" (Brynjolfsson & McAfee, 2011).

Impact of the Fourth Revolution in Higher Education

For a long time now, business schools and business education have been having commercial success, however at the beginning of the millennia, questions were starting to being posed about the significance of their education product, and uncertainties were created about their sustainability, and also the actual effects on graduates careers (Pfeffer & Fong, 2002).

The Fourth Revolution will impact education in all levels, from kindergarten to college, but when it comes to Higher Education Institutes (like Nova SBE), the challenge is much more substantial due to the growth of the influence of technology across all sectors. These shifts have resulted in an escalating pressure to produce employable graduates (Bridgstock, 2009).

Employability is defined as "pro-active adaptability that consists of three dimensions – career identity, personal adaptability, and social and human capital" (Fugate et al., 2004), or in a simpler way, the personal aptitude to perform successfully in the labor market. Other definitions of employability emphasize "skills and dispositions that might make an individual attractive to potential employers." For students and companies, two of the business school's most important stakeholders, this is especially critical.

It is clear, either from the literature or from what we are currently experiencing in our daily lives, that the jobs in the next one hundred years will be significantly different from anything that has preceded, and if "education should enable people in an advanced society to compete with the best in the world (NCIHE, 1997)" – then it is imperative to understand how can Higher Education Institutes help students to become graduates that can succeed not only in the current industry but also in a "fifth industrial revolution" that may be closer than expected (Brynjolfsson & McAfee, 2014).

Generation Y (1980 – 1995), the Millennials, have a healthy relationship with digitalization and with the online, in classrooms nowadays we can see laptops or an iPads where we used to see before pens and notebooks (The Economist Intelligence Unit, 2008), and especially in the Generation Z (1995 to present), the Centennials – and the possible future stakeholders of Business Schools, some probably learned how to swipe (a screen) before they even learned how to talk, having grown up in highly technological environments comparing to other generations, also commonly known as digital natives.

The question that arises for Higher Education Institutes does not stand exactly on the side of technology *per se*, as no generation is more at ease than today's young people, but yet on the continued worry about what are indeed the human skills and abilities that will be valued, as the rhythm of technology continues to increase.

Randall Bass once wrote that "any system of education, if it fulfills its purpose, clearly has two functions: to preserve and to provide for change." Business schools can come to suffer from outdated programs if they do not update their curriculum, and in order to teach the necessary skills and abilities, for graduates to be competitive in a fast-paced changing job market, changes need to happen in the business school programs (McNabb, 1993). However, there is a struggle when it comes to revision and update, because not only the business environment changes faster than change can happen in schools and universities, but also there is a whole background of policies that can delay this process (Tanye et al., 1999).

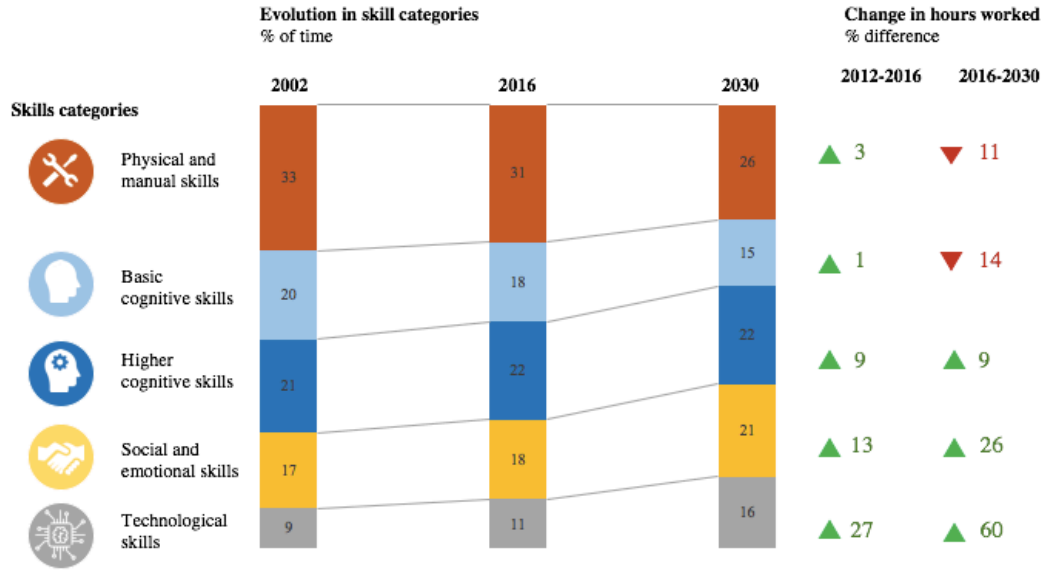
The new employment industry will be characterized by a lifelong learning process, and there is not an expectation for the next generation of graduates to be genius but yet willing to continually learn new skills. Therefore the solution for Business Schools to keep up to date, in the context of rapidly changing information and knowledge, is to give the students the tools so they can adapt quickly to the technical, social and digital change. This can happen on the side of 'hard-skills,' by keeping and developing technical skills that are specific to a certain area, but also 'soft-skills,' that can be transferable between occupations (Brigdstock, 2009).

The skills of the Future

As a result of the high-speed changing job market, there is an increase of evidence across research that there is a gap between the skills that current graduates have and what current employers are searching and needing (OECD, 2016). This is reflected by workers not having the qualifications to perform a particular job or the unused full potential of skills of employees

in their current jobs and consequently a mismatch of the skills of the workforce (DHI Group, 2016).

In 2018, the McKinsey Global Institute identified and defined a set of 25 skills, in five different categories (Physical and Manual, Basic Cognitive, Higher Cognitive, Social and Emotional, and Technological) – see Table 1 in appendices, and modeled the skill shift that will occur or be necessary by 2030, based on an automation adoption scenario.



Graphic 1 *– The evolution in skill categories over time (McKinsey Global Institute, 2018)*

Some skill categories will be in less demand than others: the categories of "Physical and Manual skills" and "Basic Cognitive skills" will have a reduction in the numbers of hours worked – consequences of job loss due to automation or due to non-AI productivity gains.

On the other hand, "Higher Cognitive", "Social and Emotional" and "Technological" skills will have a great increase in the numbers of hours worked – while the technological skills can be explained by the digital disruption and the second machine age, the growing demand for social and emotional skills just comes to prove that computers, in all forms, may be significant, but interpersonal competencies are just as essential, as they are, for now, the skills that distance us from a dystopian future where all have been replaced by artificial intelligence.

Nova SBE as top business school of the Future

Nova School of Business and Economics has forty years of history and growth, it is currently among the Top 30 Business Schools in Europe according to the Financial Times (2018), and it is accredited by the three leading institutions worldwide (EQUIS, AMBA, AACSB).

With initiatives such as the Nova SBE Digital Business & Technology Center, SingularityU Portugal Global Impact, that is a community with the goal of finding exponential technologies for mankind biggest challenges, or even the new campus in Carcavelos, designed thinking of the future, Nova has a clear mission that is tied with innovation, and aims to be in the vanguard of technological evolution, walking side by side with what are the current high-speed changes that technologies are provoking in education and in society in general.

As 60% of leaders believing that is easier to cultivate skills in students rather than in experienced employees (American Management Association, 2012), the research question in this work project is: do Nova SBE graduates feel they are prepared with the skills necessary for being successful in the Future?

In order for this study to be of importance, it is essential to understand the differences across the type of master program, as they have different curriculums and different experiences. Therefore, the hypotheses that will be tested in this paper are:

H1) The type of master program influences the perception of graduates in terms of being prepared in order to be a successful graduate in the future.

H2) The type of master program influences the perception of graduates regarding being prepared in a determined category of skills

H2.1) Higher Cognitive skills

H2.2) Social and Emotional Skills

H2.3) Technological skills

3. Methodology

Data Collection

The target demographics of the sample were former students from Nova SBE, from the three types of masters (Economics, Finance, Management), that had graduated, and that have between 6 months to 24 months of professional experience.

Data collection took place during the month of October of 2018. For the purpose of this study, an online based questionnaire was used as it gives a higher accuracy, increases response rates not only by reaching the target audience faster but also because it is easier for the demographics in study as it is more user-friendly. It was distributed via social networks, where it worked as an unrestricted self-selected survey, and also through personal networks, where it was used a snowball sampling technique, which is a nonprobability sampling technique, where first respondents are selected and asked to recruit other potential respondents, creating a snowball effect.

Sample

Demographics of the online questionnaire

Type of Master	*Gender*				*Total*	
	Female		*Male*			
	n	*%*	*n*	*%*	*n*	*%*
Msc. in Economics	6	50%	6	50%	12	12,8%
Msc. in Finance	7	33,3%	14	66,7%	21	22,3%
Msc. in Management	26	42,6%	35	57,4%	61	64,9%
Total	39	41,5%	55	58,5%	94	100%

The total number of responses recorded was 94 with the mean age of respondents being 24,1. 41,5% (n= 39) of the sample was female and 58,5% (n=55) was female. 64,9% (n=61) of the respondents were from the Master in Management, being the majority, and 22,3% (n=21) from the Master in Finance, and 12,8% (n=12) from the Master in Economics.

Measures

The list of skills used in this study were taken from the 2018 McKinsey Global Institute Report. The initial list comprised 25 skills across five different categories (Physical and Manual, Basic Cognitive, Higher Cognitive, Social and Emotional, and Technological) – see Table 1 in Appendices.

As seen in graphic 1 (see page 8 of this WP) – in order to understand the skills that are necessary to the future, the McKinsey Institute quantified the skills according to the number of hours workers spend performing activities that were mapped to those skills. Only three out of five categories had a positive change in the number of hours worked, in the period 2016 to 2030, meaning there will be an increase of need of these skills. Therefore, for the purpose of simplification and relevance, only those three categories with positive change, were analyzed in this study, remaining a list of 17 skills. The categories were: Higher Cognitive skills, Social and Emotional skills, and Technological skills.

The survey was built with three blocks of questions. The first block was composed by the introduction, explaining the purpose of the study, and a question were respondents were asked to choose the 5 skills they believe that would be the most important for the success of a business school graduate. The second block, had a rating question, for each of the skills on the list, where the respondents had to choose, using a 5-point Likert-scale, where "1" is "Terrible" and 5 would be "Excellent", how they feel about the preparation Nova SBE gave them.

In order to simplify the further analysis of our results, three composite variables were built with means of each category, where the names are the same as proposed, by McKinsey, and their alphas are: "Higher Cognitive Skills" (Cronbach's alpha = 0,847), "Social and Emotional Skills" (Cronbach's alpha = 0,835) and "Technological skills" (Cronbach's alpha = 0,738).

The third block was composed by several sentences regarding students perspective on Nova SBE as an educator, where the alumni had to choose their level of agreement, with a 5-point Likert scale where "1" is "Strongly Disagree" and "5" is "Strongly Agree". A new variable was created as a composite variable, now called "Future success" (Cronbach's alpha =0,771), using the answers of the questions "I believe the set of skills learned in Nova SBE will make a successful graduate in the future" and "I feel Nova SBE prepared me for the Future".

It's also important to mention that although a Likert-scale with more points gives more variability, and therefore increasing the precision on statistical tests, the 5-point scale was used in order to increase response rate and quality, and also to reduce respondents "frustration levels" (Babakus & Mangold, 1992).

4. Results & Discussion

Influence of the type of master program on the perception of graduates of being prepared in order to be a successful graduate in the Future

The n in the groups 2 and 3 (Msc. in Economics and Msc. in Finance, respectively) is inferior to 30, there is a violation of one of the normality assumption for ANOVA tests, however since the Welch test ($p=0,678$; $p>0,05$) converges with the ANOVA F test ($p=0,705$; $p>0,05$), it's possible to continue with the statistical analysis because the result is robust. So, to test if the three groups (Msc. in Economics, Msc. in Finance, and Msc. in Management) of Nova SBE graduates felt that Nova SBE had prepared them with the skills to succeed in the future, an ANOVA test was built, where the hypotheses are:

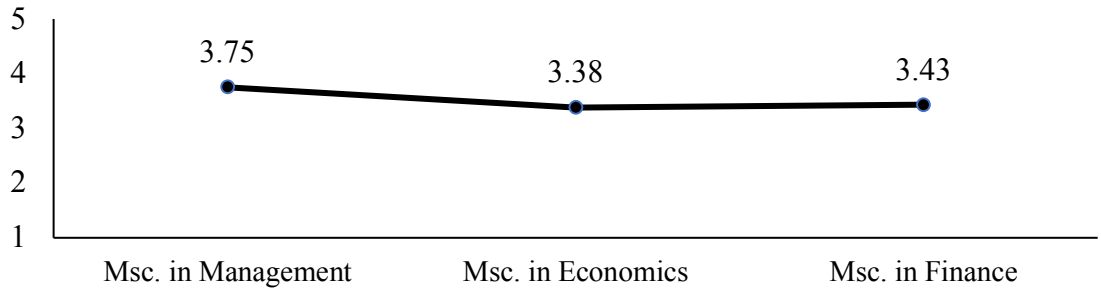
H1) There is at least one group that has a different mean (therefore the groups differ in opinions about the preparation given by Nova SBE to be a successful graduate in the Future)

Oneway ANOVA Means for the variable "Future Success."			
		Mean	*Sig.*[a]
1	Msc. in Management	3,7538	0,705
2	Msc. in Economics	3,3750	
3	Msc. in Finance	3,4287	
Total		3,5160	

[a] Between groups

As p>0,05, we do not reject the null hypothesis, and therefore we can assume that the type of master program taken by each graduate does not affect their perception on the contribution of Nova SBE for their success as a graduate in the Future. This is also confirmed by the post-hoc test (pairs comparison), where there is always p>0,05 in the three groups (of master programs), again stating that the means are equal.

Means of Variable "Future Success" according to Master type



Influence of the type of master on the perception of graduates regarding being prepared in a determined category of skills

When the category is "Higher Cognitive" skills:

Again, it's important to mention, that the normality assumption for ANOVA is violated in two of the groups, but it's possible to continue with the statistical analysis as the result is robust (since the Welch test (p=0,000; p<0,05) converges with the ANOVA F test (p=0,000; p<0,05)).

The hypotheses for this test are:

H2.1) There is at least one group that has a different mean (therefore the groups differ in opinions about the preparation concerning "Higher Cognitive" skills)

Oneway ANOVA Means for "Higher Cognitive" skills			
		Mean	*Sig.*[a]
1	Msc. in Management	3,7104	0,000
2	Msc. in Economics	2,7739	
3	Msc. in Finance	3,5735	
Total		3,5567	

[a] Between groups

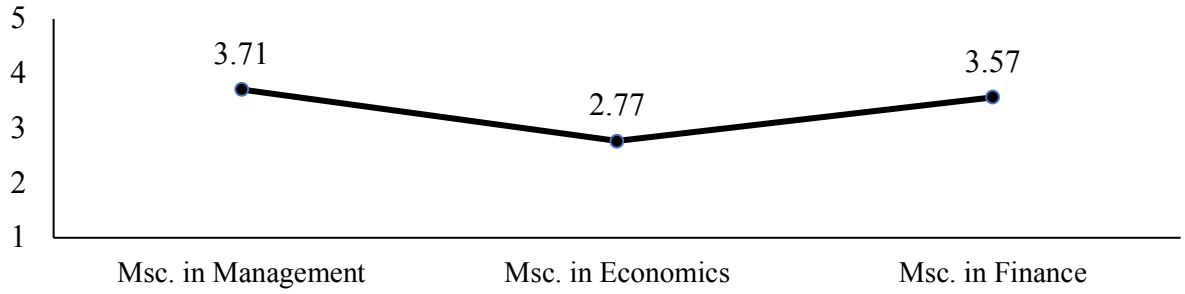
As p<0,05, we reject the null hypothesis, and therefore the mean is different at least in one of the three master groups. Although by merely looking at the results, it is possible to identify which group, in order for this analysis to be statistically relevant, it is essential to conduct a post-hoc test.

Post Hoc Test				
(I)	(J)	Mean Difference (I-J)	Std. Error	Sig.
1 Msc. in Management	2 Msc. in Economics	-,94649*	,18998	,000
	3 Msc. in Finance	-,14689	,15221	,629
2 Msc. in Economics	1 Msc. in Management	,94649*	,18998	,000
	3 Msc. in Finance	,79960*	,21770	,002
3 Msc. in Finance	1 Msc. in Management	,14689	,15221	,629
	2 Msc. in Economics	-,79960*	,21770	,002

*The mean difference is significant at a 0,05 level.

The post-hoc gives us a significant result for at least one of the three groups of master, confirming the previous analysis. That group is the Master in Economics, where the mean is different from Management (p=0,000) and Finance (p=0,020).

Means of Variable "Higher Cognitive skills" according to Master type



When the category is "Social and Emotional " skills:

The Welch test (p=0,000; p<0,05) converges with the ANOVA F test (p=0,000; p<0,05), so it is possible to continue the analysis as the result is robust (although the normality assumption for ANOVA is violated in two of the groups). The hypotheses for this test are:

H2.2) There is at least one group that has a different mean (therefore the groups differ in opinions of preparation regarding "Social and Emotional" skills).

Oneway ANOVA Means for "Social and Emotional" skills			
		Mean	*Sig.*[a]
1	Msc. in Management	3,8306	0,000
2	Msc. in Economics	3,0833	
3	Msc. in Finance	3,6508	
Total		3,6950	

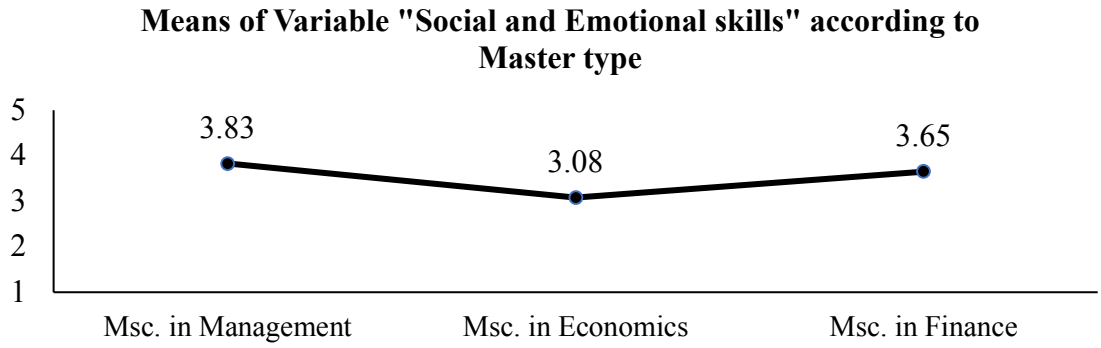
[a] Between groups

As p<0,005, we reject the null hypothesis, and therefore we can assume that there is at least one group that has a different mean.

Post Hoc Test				
(I)	(J)	Mean Difference (I-J)	Std. Error	Sig.
1 Msc. in Management	2 Msc. in Economics	-,74727*	,17928	,000
	3 Msc. in Finance	-,17981	,14363	,460
2 Msc. in Economics	1 Msc. in Management	,74727*	,17928	,000
	3 Msc. in Finance	,56746*	,20542	,026
3 Msc. in Finance	1 Msc. in Management	,17981	,14363	,460
	2 Msc. in Economics	-,56746*	,20543	,026

*The mean difference is significant at a 0,05 level.

By rejecting the null hypothesis, Post-Hoc gives us a significant result for at least one of the three groups of master, confirming that group of Master in Economics has different from mean from Management (p=0,000) and Finance (p=0,026).



When the category is "Technological " skills:

As mentioned before, the normality assumption for ANOVA is violated in two of the groups, but it's possible to continue with the statistical analysis, in this case, as the result is robust (since the Welch test (p=0,000; p<0,05) converges with the ANOVA F test (p=0,000; p<0,05)).

The hypotheses for this test are:

H2.3) There is at least one group that has a different mean (therefore the groups differ in opinions of preparation concerning "Technological" skills)

Oneway ANOVA Means for "Technological" skills			
		Mean	*Sig.*[a]
1	Msc. in Management	2,9444	0,000
2	Msc. in Economics	2,0208	
3	Msc. in Finance	2,5852	
Total		2,7420	

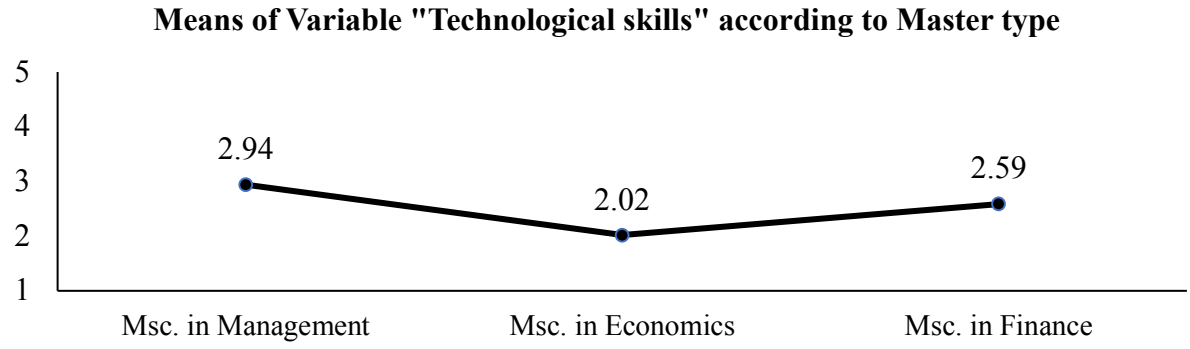
[a] Between groups

In similarity to what happened with the other categories, we also reject the null hypothesis as p<0,05, meaning that there is at least one group that has different means.

Post Hoc Test				
		Mean Difference		
(I)	(J)	(I-J)	Std. Error	Sig.
1 Msc. in Management	2 Msc. in Economics	-,91359*	,21192	,000
	3 Msc. in Finance	-,33919	,16978	,142
2 Msc. in Economics	1 Msc. in Management	,91359*	,21192	,000
	3 Msc. in Finance	,57440	,24284	,066
3 Msc. in Finance	1 Msc. in Management	,33919	,16978	,142
	2 Msc. in Economics	-,57440	,24284	,066

*The mean difference is significant at a 0,05 level.

With the post-hoc test, there is a significant result for at least one of the groups, but in contrary to the other categories of skills, in this one, only the pair Management/Economy is considered different (as p=0,000).



Discussion

Nova SBE graduates from across the three types of Master programs have the same perception when it comes to feeling prepared for the Future, by their alma mater, and this can possibly be explained by many factors such as the employability as recent graduates, how comfortable they were in their first job, their confidence in the institution, among many others. This does not depend exactly on their type of program, *per se*, as it can merely mean that they feel their program was a fit for their needs as a tool for their success. Since this reflects a personal opinion, it is not possible to know, at least with this study, which factors, in fact, influence their point of view. It is also essential to take into account, although this reflects a good level of

sense of preparation from graduates (with a total mean of 3,516, being the possible best score 5), it also shows that there is much room of improvement.

The graduates from the Master in Economics are the ones that feel the most unprepared, having the lower means (meaning the worst preparation perception) in all categories of skills. In contrast, the graduates from the Master in Management, have the higher means (meaning that they feel better prepared) in all categories. Finance graduates have very similar means to Management graduates. This can be explained by the fact that the different masters have different curricula and distinctive areas of focus, but it's also important to note, again, that since this is based on each graduate opinion, this presents itself as a limitation, as it does not reflect in reality if they are prepared or not, but yet they personal perception.

Furthermore, if we had to rank the categories according to the perception of preparation, this would be the result: Social and Emotional skills in first place with the lowest mean (mean=3,6950), followed by Higher Cognitive skills (mean=3,5567) and finally Technological Skills (mean=2,7420).

The "Social and Emotional" skills result might make sense when taking into account the fact that this category in contrary to the other two, it is only composed by soft skills instead of a combination of a majority of hard skills with a few soft skills. Nova SBE graduates throughout all their program have had a special incentive to focus on these, as they are harder to learn than hard skills, since they have little to do with knowledge or expertise but yet more closely linked to someone's character, harder to be trained, and is even what effectively sets apart candidates from each other.

The very different result for the Technological skills can be justified by the combination of the fast-paced change in technology with the high awareness of students of what it is indeed needed in this category, making them feel less confident or not at par with the current change. Also, it should be taken into account that some changes by Nova SBE such as the "Introduction to

Programming" course, or the Data and Business Analytics major (with courses like "Data Curation", "Computational thinking and Data science" or "Machine learning") were only implemented in the last year, and therefore none of the respondents were subject to it – as they had to had graduated at least 6 months ago, to participate in this study.

5. **Conclusion**

Limitations & Further Research

There is still very little literature when it comes to the impacts of the Fourth Industrial Revolution in Education, especially when it comes to empirical studies, and this paper touches only in what is the "tip of the iceberg." The future skills are only one of the drivers of Education 4.0, and therefore there is still much necessary research to be done, not only in this theme but also in other drivers such as the Millennial mindset, Digital and Devices, Talent Investment or Collaboration Platforms. All of the previously mentioned, and much more will have an impact in the future of learning, in school, but also throughout life.

Moreover, the time available for this work project was also a limitation, and it would be interesting to study, in the particular case of Nova SBE, the understanding, of not only graduates but faculty and other stakeholders, in the previously mentioned subjects.

Finally, it is also important to mention that in this study, the combination of the fact that only 94 graduates responded (being the size of the alumni population much bigger), and the fact that the answers are perspectives and opinions, this might not represent the population, needing further studies, in especial for recent graduates.

Managerial implications

In this work project, the proposed goal was to study if the Nova SBE recent graduates felt that their alma matter prepared them with the skills necessary for being successful in the future. The data obtained highlights the need to introduce some changes in the programs, in order to better respond to the changing needs of the job market, as well as the changing attitudes and

preferences of the younger generations that will be the current and future students of NOVA SBE. The search for new approaches and ways in learning management is crucial, for Nova SBE to keep *at par* with the top tier universities of management. This demands that Nova SBE rethink its learning processes to an extent where it better corresponds to the fast-changing needs, as learning is expected to disrupt our old mindsets in the close coming years.

The best possible way to shape this is to have a partnership with students, companies and other relevant stakeholders to design the experience of the future. The "Stanford 2025" is a great lead example of this, where from the result of almost 3,000 submitted ideas from students, staff, faculty, and alumni, they reimagine the future of Higher Education and challenge it by proposing a purpose learning, with declared missions instead of majors, an "open-loop" university, that embraces lifelong learning instead of the conventional system where education is usually confined to the early years of our adult life, or a paced education where the "class year" is replaced by adaptive learning, where each student moves along based on their pace instead of age.

Nova SBE will be bound to undergo significant transformations, as new skills and competencies are needed in order for graduates to be competitive in the new virtualized, flexible, automatized and global market – but also to thrive as a top business school and educator.

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Appendices

Category	Skills
Physical and Manual	General equipment operation and navigation
	General equipment repair and mechanical skills
	Craft and technician skills
	Fine motor skills
	Gross motor skills and strengths
	Inspecting and monitoring skills
Basic Cognitive Skills	Basic literacy, numeracy, and communication
	Basic data input and processing
Higher Cognitive Skills	Advanced literacy and writing
	Quantitative skills and statistical skills
	Critical thinking and decision making
	Project management
	Complex information processing and interpretation
	Creativity
Social and Emotional Skills	Advanced communication skills and negotiation skills
	Interpersonal skills and empathy
	Leadership and managing others
	Entrepreneurship and initiative-taking
	Adaptability and continuous learning
	Teaching and training others
Technological Skills	Basic digital skills
	Advanced IT skills and programming
	Advanced data analysis and mathematical skills
	Technology design, engineering, and maintenance
	Scientific research and development

Table 1 – McKinsey Global Institute workforce skills model