Post-millennial Generation's Prudence on Employability Skills

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Abstract— Students of post-millennial generation are a hyper intellectual generation with different understudy profiles than previously. They are making pressures for change, and there is a developing rivalry of colleges for worldwide human ability and demand for qualified graduates to do occupations that don't yet exist. Indeed, even the very improvement of technology, which is accessible to many, has roused elite colleges to create inventive projects and novel plans to quicken and improve the teaching and learning process for information and abilities. This research focuses on understanding the level of awareness and readiness of the post-millennial generation student population towards Industry 4.0 employability skillset. The research design is conclusive in nature and follows a descriptive methodology. The study describes the perception of the post-millennial generation towards their level of awareness and readiness regarding the industrial revolution 4.0. Primary data's were collected from students of various colleges in Tamil Nadu. Respondents were identified using Random Sampling method. A structured questionnaire was prepared and circulated through online. This qualitative research had received around 300 responses from students of Business Administration and Commerce departments. The skillsets are being ranked from the most important to the least important in terms of awareness of the post-millennial generation as well as their readiness to with stand the tide.

I. INTRODUCTION

Industry today is jumping towards the 4th Industrial Revolution, which has prompted innovative patterns, for example, Automation, Big Data, Data Analytics, Data Integration, AI, Deep Learning, Quantum Computing and so forth India, is in the limit of picking up innovatively progressed region gave the segment profit of our country are furnished with the skills set expected to flourish in the 4 IR. In any case, the current arrangement of instruction and labor force advancement, including skills preparing, is falling behind and, without mediation, will keep on falling behind the pace of development later on. While some instruction foundations, and individual projects inside organizations, are adjusting in reaction to labor force changes, the area all the more extensively stays awfully inert to the moving necessities of the occupation market. As indicated by the World Economic Forum, 65 percent of the present younger students will graduate into occupations that don't yet exist. An examination by McKinsey and Company proposes that by 2030 up to 375 million laborers should switch word related classifications due to computerization. While the level of occupations that might be robotized is bantered among researchers, AI and mechanization will profoundly affect the fate of work. A few positions will vanish, others will develop and occupations that don't exist today will turn into ordinary. A few advances are in front of others. In the event that employees and graduates are definitely not refreshing their center skills, securing positions and getting by for a long haul would turn into a bad dream.

II. STATEMENT OF PROBLEM

The advancement of the industrial revolution infers social change in which people need information as well as likewise new aptitudes and capabilities, some eccentric, to confront new circumstances. Students of post-millennial generation are valid computerized locals who are a hyper intellectual generation with different understudy profiles than previously. They are making pressures for change, and there is a developing rivalry of colleges for worldwide human ability and demand for qualified graduates to do occupations that don't yet exist. Indeed, even the very improvement of technology,

which is accessible to many, has roused elite colleges to create inventive projects and novel plans to quicken and improve the teaching and learning process for information and abilities.

III. RESEARCH GAP

There was enormous number of research works conducted pertaining to Industry 4.0. But there were not many studies conducted with a focus of identifying the level of awareness and extent of readiness among the post-millennial generation population regarding the Industry 4.0 requirements. There are no studies conducted to analyze the gap in the perception of the post-millennial generation and their level of employability skills.

IV. OBJECTIVE OF THE STUDY

• To study the level of awareness among the post-millennial generation students regarding the Industry 4.0 requirements.

• To study the level of readiness among the post-millennial generation students regarding the Industry 4.0.

V. REVIEW OF LITERATURE

A. Skill set for the 4th Industrial Revolution

Marta Götz (2019) had mentioned few approaches to defining the skills needed in the age of Industry 4.0 as Generic Skills (creativity, entrepreneurial thinking, problem and conflict solving, decision making, analytical and research skills, quick adaptation to unexpected situations, the need for courageous action, the ability to fail fast and rebound quickly, joining forces with one's enemies, quick learning, unlearning, and relearning and the production of cross-over innovation) and Engineer 4.0 skills (strategic thinking, interdisciplinary teamwork, designing and developing algorithms intuitive for "ordinary people", coordinating human-machine cooperation, close monitoring of and learning from competitors and peers, analytical skills, ambition and curiosity (self-motivation), striving and being motivated by self-development rather than financial benefits, openness and activity, openness to diversity, both in terms of contacts with people and tasks, ability to communicate other very technical/detailed information with enthusiasm and optimism, which will prompt a positive response from listeners, great attention to details, striving for perfection, ensuring the high quality of work and compliance with standards, rules, and procedures).

Marijana Simic et al., (2019) had identified that Industry 4.0 is characterized by Cyber-physical systems (CPS), Internet of Things (IoT), Internet of Service (IoS), and Smart Factory and many more technologies that will require organizations with specific expertise.

Marta Pinzone et al., (2017) had summarized a set of technical skills for Industry 4.0 in each of the 5 organizational areas under investigation: 1) Operations Management, 2) Supply Chain Management, 3) Product-Service Innovation Management, 4) Data Science Management, 5) IT-OT Integration Management. They had also narrated that even though manufacturing is rapidly moving towards Industry 4.0, there is still a lack of knowledge about the consequent evolution of job profiles and skills, and how manufacturing companies should deal with the skills gap that is being created.

Barbara Motyl et al., (2017) conducted a study to investigate which are the necessary skills and expertise young engineers require to be ready for the Industry 4.0 framework. The results of the study highlighted the students' digital behavior and their consideration of the Industry 4.0 framework. In particular, the data describing the students' relationship with digital devices and their level of knowledge of some specific topics as Virtual, Augmented and Mixed Reality, 3D Printing, Smart Factories are very significant in understating what students think. These results suggest the need to create a broader and better-structured knowledge of the basic concepts related to this new industrial revolution. This knowledge can be improved and integrated, considering revising the educational contents of the curses, especially with regards to technical topics.

BRICS Skill Development Working Group had published a report on "Skill Development for Industry 4.0", in which they had categorized the core work-related skills into 3 categories and 9 sub-categories namely abilities, basic skills, and cross-functional skills. Cognitive analytics and physical abilities fall under abilities. Content skills and process skills are categorized under basic skills and social skills, resource management skills, technical skills, complex problem-solving skills, and system skills fall under cross-functional skills.

The global skills gap in the 21st Century report which was published by the QS Intelligence Unit (2018) had compared the importance versus satisfaction of the core skills. They had identified 15 core

skills required to survive in the 21st century. They had also proposed the top five priority skills necessary for employers as problem-solving, teamwork, communication, adaptability, and interpersonal skills. The data were collected through the QS Global Employer Survey from almost 11,008 respondents, QS Applicant Survey from 16,560 respondents, ISE 2017 Annual Survey from 200 responses, and ISE Development Survey conducted among 173 respondents.   From the above data's collected and analyzed they had indicated problem-solving, teamwork, communication, adaptability, interpersonal skills, data analysis, resilience, organization, technical, subject knowledge, creativity, leadership, language, negotiating and commercial awareness as the core skills required for employment in the 4th industrial revolution.

The India Skills Report (2019) had reached over 3, 10,000 students across 29 states, 7 union territories, and 100+ employers spread across major sectors like manufacturing, core, ITES, IT BFSI, etc in India assessing the students on parameters like knowledge, skill aptitude, and behavioral component. The employers were interviewed to get an idea of job demand and potential hiring intent for the upcoming years. It was evident from the report that the employability rate had increased compared to the previous years and engineers are still found to be more employable compared to the arts and science graduates. Technological companies are expected to pick up on hiring after a gap of three years. The India skills report had indicated seven skills as nationwide non-technical skills in demand, namely learning agility, adaptability, interpersonal skills, emotional intelligence, conflict resolution, self-determination, and communication skills.

ManpowerGroup® (2017) one of the world's workforce experts, creating innovative workforce solutions for nearly 70 years had reported that technology and digitization are transforming business models and will continue to do so. The real revolution will be a Skills Revolution — where finding the right balance of technology, talent, and human connection will be what enables both people and businesses to succeed. Individuals with in-demand skills continue to call the shots while those without will be at greater risk of being left behind. Helping people upskill and adapt to this fast-changing world of work will be the defining labor challenge of our time.

The future of jobs Report 2018, World Economic Forum had indicated the top ten factors which would trend set to impact business growth positively as increasing adoption of new technology, increasing availability of big data, advances in mobile internet, advances in artificial intelligence, advances in cloud technology, shifts in national economic growth, expansion of affluence in developing economies, expansion of education, advances in new energy supplies and technologies and expansion of the middle classes. It has been reported that analytical thinking and innovation, active learning and learning strategies, creativity, originality and initiative, technology design and programming, critical thinking and analysis, complex problem-solving, leadership and social influence, emotional intelligence, reasoning, problem-solving and ideation, systems analysis, and evaluation are the trending skill set required for employment in the 4th industrial revolution. As companies begin to formulate business transformations and workforce strategies throughout the 2018–2022 period, they have a genuine window of opportunity to leverage new technologies, including automation, to enhance economic value creation through new activities, improve job quality in traditional and newly emerging occupations, and augment their employees' skills to reach their full potential to perform new high value-added work tasks, some of which will have never before been performed by human workers. The business case for such an 'augmentation strategy' is becoming increasingly clear—and, will receive progressively more attention over the coming years, including through upcoming work by the World Economic Forum's Centre for the New Economy and Society.

Michael Rüßmann et al., (2015) had pointed out nine technology trends that are the building blocks of Industry 4.0, namely autonomous robots, simulation, horizontal and vertical system integration, the industrial Internet of Things, cybersecurity, the cloud, additive manufacturing, augmented reality and big data and analysis.

Industry 4.0 technology aims at enabling communicating, intelligent, and self-controlled systems. From a technological point of view Industry 4.0 is characterized by 4 fundamental conceptual approaches. They comprise cyber-physical systems, internet technology, components as information carriers, and holistic safety and security including privacy and knowledge protection. The combination of these conceptual approaches enables smart systems as a kernel feature of Industry 4.0 applications (Ing. Reiner Anderl, 2015).

Dr. Nataliya Koleva (2018) reveal the main features of the Fourth Industrial Revolution as vertical networking of smart production systems (smart cities, smart factories, smart products) and the networking of smart production and smart services, with strong needs-oriented, customized production operations, horizontal integration that is being considered to develop a new generation of global value-creation network, which includes integration of partners and customers, through-engineering throughout the entire value chain, taking in not only the production process but also the end product - that is the entire product life cycle and acceleration through exponential technologies (e. g. sensor technology).

Skills Toward Employment and Productivity report published by World Bank Group had conducted a survey among 2,000 to 3,500 samples to measures the skills of the working-age population (employed, unemployed and inactive), tracked skills acquisition and maintenance through detailed education and training history, including non-formal and formal apprenticeships, included information on transitions in the labor market, such as the first job, current and previous spells, provided information on the labor market success of self-employed workers (e.g., start-up capital, earnings, sales, business expansion, etc.). The survey had measured three broad categories of skills: Cognitive - self-reported reading, writing and numeracy, plus a direct assessment of reading proficiency, Socio-emotional - big-five, hostile attribution bias, growth mindsets, decision-making, risk and time preferences, Job-relevant - computer use, solving and learning, autonomy, physical tasks, job requirements and learning times.

Mckinsey Global Institute (2018) discussion paper had proposed a set of 25 skills across five broad categories: physical and manual, basic cognitive, higher cognitive, social and emotional, and technological skills. Within each category are more specific skills, for instance, within social and emotional skills, they have included advanced communication and negotiation, interpersonal skills and empathy, leadership and managing others, entrepreneurship, and initiative-taking, adaptability and continuous learning, and teaching and training others. They have also separated technological skills from higher cognitive skills, although some of the former requires higher cognitive capabilities. Therefore, they had identified physical and manual, basic cognitive, higher cognitive, social and emotional, and technological skills as the major categories to be concentrated for increasing the chance of employability in the 4th industrial revolution.

Manpower Group had published a report on "Skills Revolution 2.0 Skills Revolution 2.0" (2018), were 20,000 employers in 42 countries were interviewed on the likely impact of automation on their headcount in the next two years, which functions within their organization will be most affected, the human skills they value most and which they struggle to find. They were asked to rate the most valued soft skill that is hard to find, given the skill sets as communication, collaboration, problem-solving, organization, customer service, leadership, and management.

Manpower Group had conducted a survey in the year 2018 on talent shortage among 39,195 employers in 43 countries and territories on how much difficulty they are having filling roles compared to last year, which skills – hard skills and human strengths – are the most difficult to find, and why and what are they doing to solve talent shortages. It was inferred that soft skills – including communication, collaboration, relationship-building, creativity, empathy, and a desire to learn – will augment technological capabilities and reduce the risk of replacement by automation.

Janelle Cox (2019) had proposed 15 Professional Development Skills for Modern Teachers. As rapid developments in technology integrate into day-to-day lives, similarly it affects the way students learn and teachers teach. Modern teachers need to be competent in not only basic skills but new skill sets. The 15 21st century professional development skills, that today's teachers should possess are adaptability, confidence, communication, team player, continuous learner, imaginative, leadership, organization, innovative, commitment, ability to manage online reputation, ability to engage, understanding of technology, know when to unplug and ability to empower.

Josef (2019) explained that teachers are required to have specific skills and display certain characteristics to undertake the teaching profession successfully. He had listed the most crucial skills a teacher should possess to inculcate the 21st-century skill set in the students. The important skills for analyzing a faculties readiness for industry 4.0 are continuous learner, relationship builder, inclusive, reflective, researcher, digital designer, cooperative, creative and innovative, leader, storyteller, designer and decorator, and artist.The template is used to format your paper and style the text. All margins,

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VI. METHODOLOGY

The research design is conclusive in nature and follows a descriptive methodology. The study describes the perception of the post-millennial generation students towards their level of awareness and readiness regarding the industrial revolution 4.0. Primary data's were collected from students of various colleges in Tamil Nadu. Respondents were identified using Random Sampling method. A structured questionnaire was prepared and circulated through online. This qualitative research had received around 300 responses from students of Business Administration and Commerce departments. The collected data's were analyzed using SPSS software.

VII. RESULTS AND DISCUSSIONS

TABLE 1: AWARENESS AMONG THE POST-MILLENNIAL GENERATION STUDENTS REGARDING THE INDUSTRY 4.0 SKILLSET REQUIREMENTS

Skillset	Mean	Rank
Communication	4.6689	1
Job_Revelant_Skills	4.5920	2
Creativity_and_Originality	4.5719	3
Technological_Skills	4.5585	4
Self_Determination	4.5552	5
Innovation	4.5485	6
Leadership	4.5318	7
Learning_Agility	4.5184	8
Interpersonal_Skills	4.4649	9
Analytical_Thinking	4.4649	10
Relationship_Building	4.4615	11
Critical_Thinking_and_Analysis	4.4582	12
Work_Analysis	4.4448	13
Cognitive_Skills	4.4415	14
Domain_Knowledge	4.4415	15
Ability_to_work_for_societal_wellbeing	4.4281	16
Adaptability	4.3846	17
Socio_Emotional_Skills	4.3813	18

Empathy_to_customers	4.3411	19
Collaboration	4.3177	20
Conflict_Resolution	4.2676	21

From the above table it can be inferred that communication is being considered as the top skillset requirement to survive in the 4th industrial revolution by the post-millennial generation students. Likewise, Job-Relevant Skill, Creativity and Originality, Technological Skills and Self-Determination are considered as the next top priority skillsets required for the 4th industrial revolution by the Business Administration and Commerce students. Whereas Adaptability, Socio-Emotional Skills, Empathy to Customers, Collaboration and Conflict Resolution were considered as the least priority skillsets.

TABLE 2: READINESS AMONG THE POST-MILLENNIAL GENERATION STUDENTS
REGARDING THE INDUSTRY 4.0 SKILLSET

Skillset	*Mean*	*Rank*
Communication	4.5318	1
Self_determination	4.4950	2
I_can_build_relationship_with_customers_and_team_members	4.4883	3
I_can_pay_attention_learn_remember_and_solve_problems	4.4749	4
I_can_get_along_with_team_members	4.4615	5
I_can_understand_operations_and_procedures	4.4448	6
Creativity_and_Originality	4.4214	7
I_can_lead	4.4214	8
I_can_understand_and_be_sensitive_to_the_feelings_of_customers	4.4047	9
Innovation	4.3779	10
I_can_work_for_societal_wellbeing	4.3779	11
I_can_use_technology_to_solve_problems	4.3679	12
I_can_perform_the_assigned_job_efficiently	4.3579	13
I_can_analyze_information_objectively_and_make_a_judgments	4.3512	14
I_can_think_analytically	4.3445	15
Domain_knowledge	4.3244	16
I_can_adapt_to_new_situations_and_work_demands	4.3211	17
I_can_create_mutually_agreeable_solutions	4.3177	18
I_can_learn_unlearn_and_relearn_to_achieve_desired_results	4.3077	19
I_can_collaborate	4.2876	20
Socio_Emotional_Skills	4.2609	21

From the analytical table it can be understood that Communication is been considered as the skillset which maximum of the students possess to face the fourth industrial revolution. Self-Determination, Relationship Building, Cognitive Skills and Interpersonal Skills are considered as the next set of skillsets which superlative number of students own to withstand the tide. However, Adaptability, Conflict Resolution, Learning Agility, Collaboration and Socio-Emotional Skills are considered as the skills which the students aren't confident of acquiring.

Out of the blue its mesmerizing to witness that Communication Skills is being ranked as the first skillset required for employability in the 4th Industrial Revolution and it is also being accepted as the top prior skillset which the students possess. Self-Determination is also being considered as the skillset required in the 4th industrial revolution and it is also being accepted as the one which maximum of the students retain. Nevertheless, Adaptability, Socio-Emotional Skills, Conflict Resolution and Collaboration are the skillsets considered as the least important skillsets required to face the 4th

industrial revolution and it is also being considered as the ones which very minimal number of students latch on to.

VIII. SCOPE FOR FUTURE RESEARCH

The scope of the study is limited to undergraduate students belonging to select degree programs of Arts and Science stream of study offered in colleges located in Tamilnadu. The Arts and Science degree programs which was included in the study were Business Administration and Commerce.

IX. CONCLUSION

This research helped in identifying few statistical findings to understand the significant differences between the extent of awareness and perception of 4IR among the post-millennial generation students. The study reveals that "Communication skill" is being accepted as the primary one by the post-millennial generation students as a vital skillset required to face the technological revolution. However, there is significant between the student's opinion and the extent of importance of the skillset required for the students to work in the 4th Industrial Revolution Era. To survive in the 4IR the skillset required can be acquired only if there is a major transformation in the educational system as well as only if the methodology of teaching is changed according to the technically advanced environment.

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