

IR4.0 Skills Stability and Projection Index for Employability of Electrical Technology Graduates

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Abstract

The 21st century has come with the dynamism in the wave of doing things. This unstable scenario has resulted in instability and loss of jobs among varying classes of workers. The skills to match the existing and emerging jobs seems to be contrasted by authors and researcher. Therefore, this paper takes a deep look at the contrast in the opinion of the major players in the employability quest of graduates due to the emergence of IR4.0 to determine the specific skills that will be suitable for sustaining 21st-century jobs. There seems not to be an agreeable skill for 21st-century jobs. Document analysis of the literature was carried out for index stability. Skills domains were identified and analyzed using Excel Packages. Thematic analysis was employed for the merger and exclusion of skills due to the similarity in purpose and meaning. The analysis revealed that 50% of the skills are less important for 21st-century jobs. The study recommends a broader and deeper study of IR4.0 on a discipline-difference basis.

Keywords: Employability, Index, IR4.0, Projection, Stability, Technical Graduate

1. Introduction

The start of the 21st-century has accompanied the grievances from the employer of labour about the pool of unemployable graduates in the labour market. While research is progressing on the educational and sociological fronts on the best methodological way to prepare school graduates to meet the demand of the industry, the scientists too are not relenting in their quest for more advances either due to their self-interest to make more gain or improving the ease of doing business. The interest of the employees and graduates who have to learn new skills and techniques for doing things are not topmost in their consideration. This has brought a profound difference to the perception of the real players in the employability mission of graduates. For the graduate to be adaptable, a set of skills that will blend them with the challenge posed by the impending Industry4.0 and navigate them through the 21st-Century jobs are most important to avert redundancy (1). To prevent the worst situation, a technological change accompanied by talent shortages, mass unemployment, and growing inequality, reskilling and upskilling of today's workers will be critical (2). While much has been said about the need for reform in basic education, it is not possible to overcome this technological revolution by waiting for the next generation of the workforce to become better prepared. Therefore, there is no better time than now for the development of a 21st-century skills framework for the upcoming workforce in Electrical Technology.

Noting that the period between January 1, 2001, and December 31, 2100, is the period called 21st-century, the challenges of technology changes by the industrial players within the period has made the curriculum of most institution of higher learning obsolete and their certifications almost worthless(3). Just as is the case in most nations of the world, (4) noted that only one out of one hundred Nigerian graduates are employable. The scenario is becoming more worrisome now since most of these nations depend solely on the discoveries and advances made by the developed world. They are a ready market for finished goods and a dumping yard of the

sort for the developed economies. There is hardly little or no mechanisms are in place to mitigate the effects of new technologies on society and the workforce.

The advent of robotic automation will no doubt quicken technological unemployment(5). The rising advances can possibly eliminate a larger number of occupations than they will create(6). Technology is advancing in geometric progression with artificial intelligence, robotics, and 3Dprinting. Other innovations that have disruptive potential will soon arrive in the mainstream thereby displacing many workers and making the job markets impenetrable by ungruomed graduates (7).

Technological unemployment is an inevitable impending problem that will create greater inequalities and an increasing gap between employers and employees. Many experts have been proposing the refusal of innovations, the provision of welfare and public employment schemes, and the introduction of the basic minimum wage as short-term solutions (8). Others too have proposed granting of subsidies to small businesses and self-employed as a solution to the impending job catastrophic losses. This is because the rate of technological changes is making skilled workers obsolete and redundant(9). Consequently, the role of education is called to play here as efforts are still on in the search for an appropriate and adequate methodological approach to avoiding the menace of human adventures that is capable of rendering other humans redundant and useless in the world of work for inanimate objects like we now hear of driverless taxi in Singapore and flying taxi in Dubai. Disruptive changes to business models will have a profound impact on the employment landscape over the coming years if decisive pragmatic steps are not taken (7).

Towards this end, researchers have been working tirelessly to formulate sets of skills that would enhance graduate employability for the changing world order brought about by the advances and changes in the use and application of technology. However, it has been noted that there are divergent views in the opinion of authors and researchers about what constitutes an acceptable IR4.0 skill index for graduate employability for 21st-century jobs. However, the focus of this paper is not intended to go into literature about the theories and divergent views of early researchers in Industry Unemployment (IR4.0), but to analyze the skills put forward by researchers with the objective of identifying their stability. Consequently, the works of Peters, Nick, and Schwab were considered for this study.

1.1 Employability Skills and Electrical Technology

Researchers and experts the world over, are advocating for the study and introduction of employability skills into the course contents of schools' curriculum The course covered by employability has no limit and therefore, Electrical Technology is not an exception. (10)note that the development of the world economy brought about human and capital development. These developments are supported through the provision of skilled human resource impetus that enhances the socioeconomic status of a country. Therefore, developing countries, cannot afford to continue to sit back in the global race for technology breakthroughs, and innovations in their quest to solve the problems of hunger and poverty. The problem arose as a result of the lack of relevant skills (employability) needed for the world of work by graduates of Higher Institutions. This is more realizable with Electrical Technology students who are in a better position to be the engine room of national growth and development.

(11)opine that TVET programmes as it is currently implemented in many developing countries are based on the premise that the development of such a country's economic production capacity and employment opportunities can benefit significantly from the levels of knowledge and skills in the nation's workforce that is being raised. This assumption stresses the proposition that investment in the training programme and Education should raise the productive level of workers. For example, the government of Nigeria alluded to her specialized and professional Instruction program as Vocational and Technical Education (12). VTE, as contained in the Policy document(13), is utilized as a complete term referring to those parts of the instructive

procedure including, broad training, the investigation of advances and related sciences, and the attainment of practical skills, knowledge, comprehension, and learning identifying occupational areas of economic and social values. The skills are learned in the Junior and Senior Secondary schools. Technical Colleges are designed to prepare individuals as craftsmen as well as specialists at sub-proficient levels. While graduates of Electrical Technology from Colleges of Education form the crops of Technical Officers Cadre between the Craftsmen and the Engineers. The absence or non-qualification of these officers necessitated the worries of the employers and the need to bring in Foreigners who could fit into the jobs from outside the Country. In Nigerian contexts, it has been established that the jobs are there, but the human resources sector of the economy lacks the competently trained personnel to fill the vacancies (14). There is, therefore, the need to develop an employability skills framework that will match Electrical Technology students from Colleges of Education with the competencies required for jobs in this dynamic 21st century.

1.2 The Role of Electrical Technology in National Development

The main purpose of Technical Education is to provide gainful job opportunities for the youths who are preparing to enter occupations in agriculture, business, home-making, industrial, and Technical fields like Electrical/electronics(15). Technical Education plays a key role in the overall development of a nation (16). Electrical Technology is the driver of any technological breakthrough (17). Specifically, an Electrical technician is a person who is very good and versatile in Electrical works, has an in-depth knowledge of Analog electronics, good cost-cutting and circuit optimization, values time, self-confident, has adequate knowledge of Motor related apparatus, Transformers related core applications and mechanisms, High Tension (HT) related lines, and possess knowledge of power generation equipment and above all, he troubleshoots (18); (19); (20). Specifically, broad skills for electrical technology students to gain employment are classified into Technical and Non-Technical(21). However, the changing world order related to technology, policy, and political imperatives has made reliance on broad skills not fashionable (22).

2. Methodology

A peer-reviewed approach was used to search for literature and identify those that prescribe skills for industry unemployment. The purpose was to identify the similarities in the skills and determine the most commonly cited. Three kinds of literature were identified from different authors with each prescribing varying degrees of skills. They are shown in Table 1.

Table 1. List of skills for the 4th Industrial Revolution

Peters, M.A (2017)	Nick, H.M (2017)	Schwab, K (2016)
Critical thinking	Complex problem solving	Cognitive ability
Problem-solving	Critical thinking	System skills
Creativity	Creativity	Complex skills
Communication	People management	Content skills
Curiosity	Coordinating with others	Process skills
Initiative	Emotional intelligence	Social skills
Persistence	Decision making	Resource management
Adaptability	Service orientation	Technical skills
Leadership	Negotiation	Physical skills
Socio-cultural awareness	Cognitive flexibility	

As a result of the definition and similarity of purpose, merger, and exclusion were introduced to indicate relatively similar skills index by authors. Twenty-nine (29) skills were identified by the authors and four (4) were found to have as similarity of purpose through peer review. Therefore, those skills that are similar in purpose and have their difference in terminology were merged. The skills were then grouped into peers and analyzed using frequency counts and Excel packages.

2.1 Analysis and Discussion

In analyzing the review, charts were generated to give a pictorial representation of the results of the study. To conclude, the skills recommended by the authors were tabulated and a comparison of purpose and intention were done to determine the frequencies of occurrence of each of the concepts as very important, important and less important. Table 2 consists of the abridged skills stability index. Fig.1, 2 and 3 specifically show the relative percentage index level of the skills. The result of the exclusion and abridged skills generated sixteen skills (16). The findings show that only four (4) skills have the highest frequency of three (3) while another four skills (4) equally have a frequency of two (2) each. The number of less important skills is eight (8). This is shown in Table 2.

Table 2 Skills stability index

critical thinking	3
problem solving	3
creativity	3
communication	2
curiosity	1
initiative	1
persistence	1
adaptability	2
leadership	2
awareness	1
people management	3
emotional intelligence	1
decision making	2
technical skills	1
physical skills	1
resource management	1

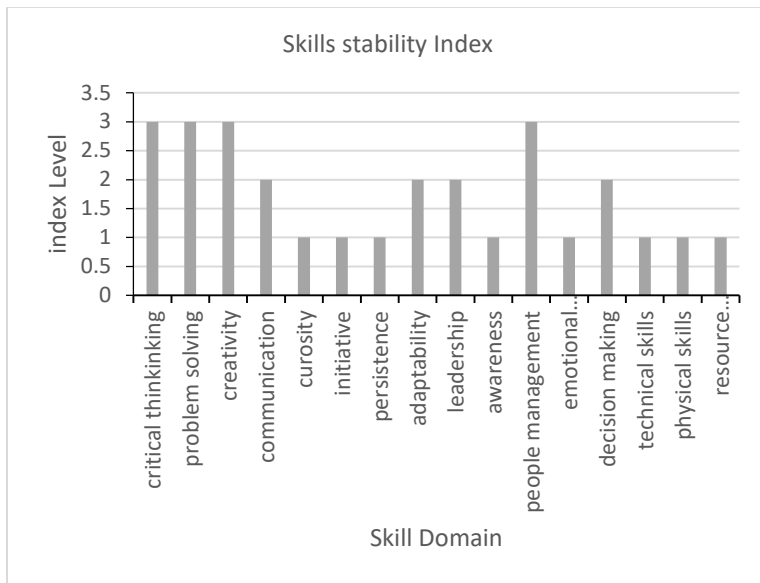


Figure 1: Emerged Abridged Skills level

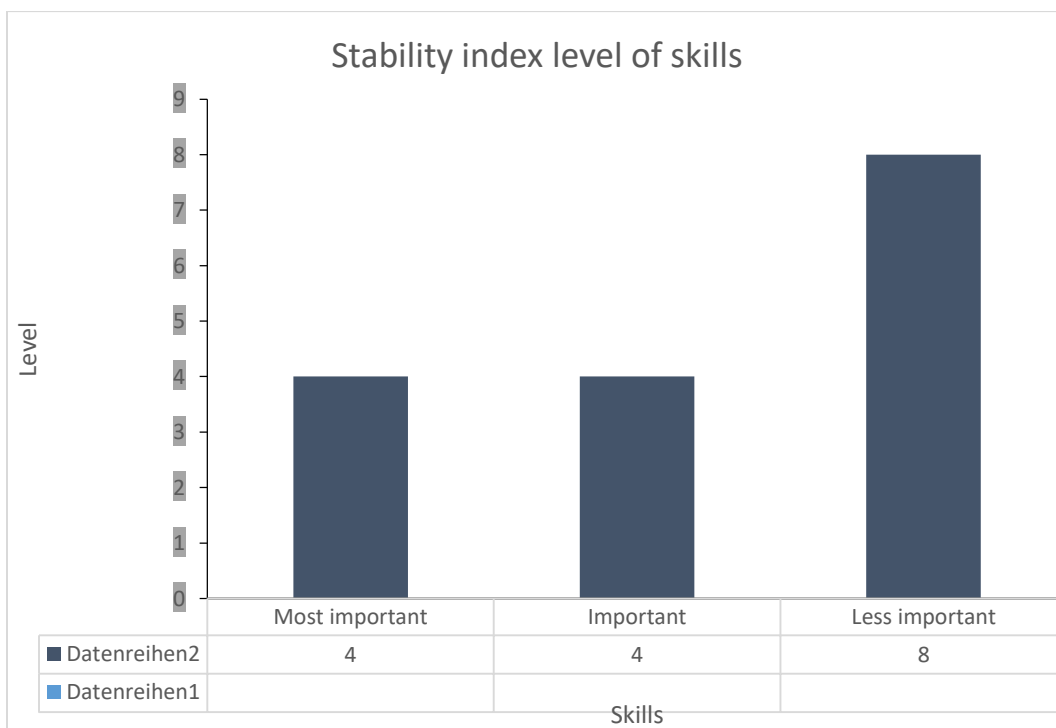


Figure 2: Graphical stability level

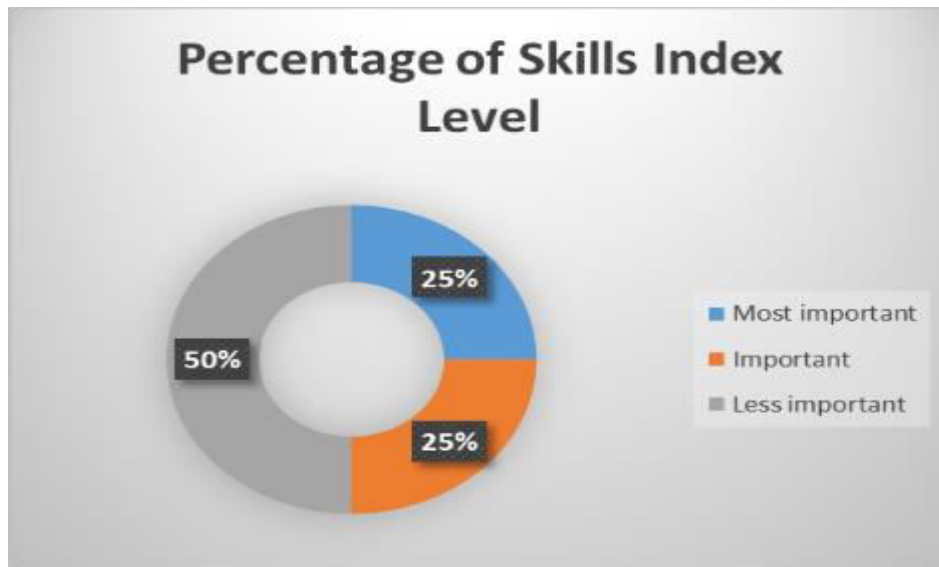


Figure 3: percent Skills stability level.

3. Results/ Discussion

Although there is a divergence in the views of stakeholders on the skills needed to cope with 21st-century jobs, this study has confirmed that not all frameworks of graduate employability meet the different discipline needs of graduates (25); (26). A person has a successful career when he is continuously employable (27). Thus, the level of unemployment has made the issue of reskilling to meet the job demand important (28). Judging in broad contexts, all the skills are important and useful, but with specialization. This confirms the assertion by (29) that certain skills possessed by graduates worldwide do not meet the needs of employers. Thus, the result of this study equally justifies the assertion that not all the skills put forward by research can be adopted for all courses or specializations. For example, only 50 percent of the skills were found worthy for Electrical Technology students to be employable. This means that not all skills are crucial for the 4th Industrial Revolution. This gives credence to the study of discipline-based employability to determine which skills deployment is required for a particular discipline (30). Practically, critical thinking, problem-solving, creativity, and people management skills are found to be most important with three levels of stability index. The equally important skills with an index of two are communication, adaptability, leadership, and decision-making. However, curiosity, initiative, persistence, awareness, emotional, technical, resource, and physical skills are considered to be less important than their ratings at one.

The skills are desirable for Electrical Technology studies cannot be the same as what is required by a scientist or computer operator to survive unemployment in the 21st century (31). It must be noted that IR4.0 skills are intricately connected and interwoven with the skills for 21st-century employability. Therefore, there is a need to holistically study employability skills based on discipline-difference. This justifies the fact that no one is sufficiently employed (32). There is always an aspect of a person's employability that would benefit from improvement as a result of new skills. Equally, the skills indexing for specializations like Electrical Technology guarantees poverty reduction, wealth and job creation, and innovation in the formal system needed to drive the economy (15). IR4.0 concepts emphasized employability skills; skills that are needed to cope with the emerging changing world order, caused by the advent of new technologies (33). The knowledge of technical skills for Electrical Technology should be studied distinctly (21). Therefore, since there has not been any stable agreement among stakeholders on the skills for combating unemployment as far as IR4.0 is concerned, the

employability skill framework for graduates in the 21st century should not be treated as accomplished. One has a successful career when he is continuously employable in the labour market during his working life (27). Employability is a lifelong process (32). Consequently, IR4.0 skills should be broad, deeply studied and implemented along disciplines with the aim of enhancing graduate employability. The broad framework of employability skills presented by researchers' best serves as a prelude to solving the problem of unemployment among graduates. A deeper study to screen the frameworks based on each discipline will give the graduates a better treatment. This is pertinent to ensure that the graduates are not only employable but also able to sustain their jobs to reduce the menace of unemployment in the society. Finally, Electrical Technology students in Colleges of Education will do well in their job search if the important skills are introduced into the school curriculum. However, the result of this study is not being generalized because IR4.0 is still at the early stage of its emergence. There is a high chance of more discoveries. More importantly, 2019 is just about 1/5th of 21-Century.

4. Conclusion

It has now become obvious that many graduates of the institution of higher learning are complaining about the lack of jobs because they lack the requisite skills to match the needs of employers. The findings of the studies show that the required skills for navigating IR4.0 do not receive the same level of importance. Some are very important and some are very weak. Those skills that received a "1" level of stability are considered to be very weak. While the "2s" and "3s" levels are important and very important respectively Overall, half of the skills representing 50% are not necessarily important as they do not frequently occur in the threshold of every author. This does not necessarily mean those skills are not relevant to today's job requirements. The importance of discipline-difference becomes very important in this regard. Consequently, research on IR4.0 must be focused and discipline-based.

5. Recommendation

More detailed research on IR4.0 based on discipline differences is recommended for researchers because skills development is evolving daily due to the expansion and evolution of new scientific and technological discoveries being deployed in the workplace.

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