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Bridging the Employability Gap Among Recent University Graduates in Tunisia: Mitigating Mismatch Between Acquired Skills and Real Labor Market Needs

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Abstract: Our aim is to highlight on the mismatch between acquired skills and the real needs of the Tunisian labor market, while discussing the case study of experience of Higher Institute of Technological Studies of Kef (ISET Kef), in terms of improving the employability rate of its students according to real needs in the north-west of country. Within the framework of this study, we have opted for a descriptive approach based on data obtained through two surveys carried out by ISET Kef, in January 2022. A survey was conducted among 100 graduates, at least one year after graduation. A second field survey was carried out with 13 industrial and agricultural companies based in the Kef governorate, to understand which skills really need to be developed during university studies. The employability rate of ISET Kef's graduates is declining from one year to the next. The main factors determining the "employability gap" among recent university graduates include poor coordination between the higher educational institutions and employers, absence of quality training programs, low entrepreneurial and innovative opportunities, as well as underinvestment in research and development

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1 Introduction

Over the past two decades, Tunisia has witnessed the emergence of a new social phenomenon known as " the employability gap among recent university graduates", which would be explained as follows: recent university graduates had often struggle to find jobs that match their qualifications, while employers struggle to find candidates with the skills actually required to fill their vacancies, Belchior-Rocha,H. & all (2022) ; Kthiri,W.(2019) .
Then, graduating from university with a degree in pocket gives student a sense of pride, but he will suffer from unemployment, as it is not as easy as he think to find a job that matches acquired skills and the real needs of the labor market. This situation highlights the mismatch between the real needs of the labor market, both regional

and national, and acquired skills by recent university graduates, which it has been recognized as an important concern in Tunisia's national employment strategy, Kthiri, W. (2019).

Limited access to quality education and training programs, limited opportunities for entrepreneurship and innovation, a lack of coordination between educational institutions and employers, and a lack of investment in research and development are the determining factors contributing to the mismatch between skills and labor market needs, Sanchez Puerta, M. & all (2015) ; Doray, P. & all (2017) ; Michaud, R. & all (2020) ; Ghouati, A. (2016) ; Grundkei, R. & all (2022) ; Idlhadj, Y. & all (2020) ; Ammari, F. (2016) ; Benyahia,S. (2019). Remedying this mismatch will require a concerted effort on the part of the government, higher education institutions and the private sector, to promote sustainable economic growth of Tunisian country, Kthiri, W. (2019) ; Samet, K. (2014) ; Vérez, J.C. (2013) ; Doray, P. & all (2017) ; Michaud, R. & all (2020).

Our problem is how to bridge the gap between acquired skills by recent university graduates and the actual job requirements? We focus, here, on the reasons and repercussions of this problem and the strategies that should to be implemented, by highlighting the experience of ISET Kef in terms of improving the employability of its graduates, and reducing the gap resulting from acquired skills mismatch with both regional and national labor market needs.

To achieve this objective, ISET Kef resorts to, firstly the creation of a co-constructed degree in Renewable Energy in Agriculture and Industry (REAI) as part of the partnership with the Assembly of Directors of University Institutes of Technology (ADUIT) and secondly the creation of a co-constructed degree in ecotourism as part of the partnership with Colleges and Institutes Canada (CICAN)and as part of the EPE AL NAJAH Canada-Tunisia project.

This research paper contains four sections, organized as follows. The first section corresponds to an overview of the employability situation of recent university graduates in Tunisian, Moroccan and Algerian countries. The second relates to reasons of employability gap among recent university graduates and the skills gap in the Tunisian labor market. The the third covers the strategies to be implemented in order to bridge the employability gap among recent university graduates.

The last section put on the spotlight the experience of ISET Kef in terms of improving the employability of its graduates and reducing the gap resulting from the mismatch between the skills acquired and the needs of the regional and national job market, while proposing, based on the results of the surveys carried out by ISET Kef, elements for reflection and courses of action for university establishments.

2 Overview of the employability situation of recent university graduates in Tunisia, Morocco and Algeria

The massive expansion of higher education has led to a sharp rise in the number of university graduates, without being accompanied by sufficient job creation to meet labor market demand, therefore, we can infer that finding a job is difficult both academically and professionally in Tunisia as well as in Algeria and Morocco ,Ghouati, A. (2016) ; Grundkei, R & all (2022) ; Idlhadj, Y & all (2020) ; Ammari, F. (2016) ; Benyahia, S. (2019).

Therefore, it is important to point out the finger at this social phenomenon and to understand the specific factors influencing employability of recent university graduates in Tunisia Algeria and Morocco in order to develop effective initiatives to improve the economic and social situation of this category of society.

As a result of this state of affairs, the unemployment rate among recent university graduates is relatively much higher, which is a problem that must be brought to an end and that we need to have repeatedly pointed the finger at the "explosive" social situation in Tunisia, Algeria and Morocco and the existence of glaring inequalities, due to a number of shortcomings and the failure of government services to take charge of the juvenile fringe in particular, who are left to fend for themselves in the final outcome of the crisis, Bellatreche, Y. (2021) ; Benhabib, L. (2017) ; Labaki, B. (2009) ; Fahssis, L. & all (2017) .

It turns out that a significant proportion of the employment rate varies greatly from one country to another (Tunisia, Algeria and Morocco), so, we can say that, this remains one of the main problems facing recent university graduates and illustrate the difficult situation faced by this section of society on the labor market and its marginalization, Ghouati, A. (2016) ; Idlhadj, Y. & all (2020) ; Ben yahia, S. (2019) .

We take firstly Tunisia as an example and based on the statistics of National Institute of Statistics (NIS Tunisia), we check that the unemployment of recent university graduates has shown an increased rate to about 23.7%, in the second quarter of 2023, compared in the second quarter of 2022 showed a decreased rate by about one percent, standing at roughly 22.8%, NIS.(2023). In a similar vein, many researches which deal with the Tunisian employability situation , which are headed by Boudabbous, S. & all (2011) ; Ben Halima, M.A.& all (2010) ; Grundkei, R. & all (2022) ; Touhami, H.(2010) and the World Bank. (2014),have continuously shown us that recent university graduates are faced with high levels of unemployment ,compared with that of non-graduates, which represents a major challenge not only for Tunisia, but also for all the countries mentioned previously.

Regarding the Moroccan country, the statistics from the High Commission for Planning (HCP) show us that the proportion of unemployed graduates with a higher education qualification[1] is around 40,3%, which is considered very high and urgently requires solutions , that of with a medium-level qualification[2] (20,7%) and that with young people without a qualification (7.9%); HCP (2023 b). In addition, we notice that the rate of recent university graduates who are unable to find job has already reached a high rate over 23% (23,8%) in the second quarter of 2023 ; HCP (2023 a). However, we should pointed out that the gradual increase of this rate was accentuated and more marked particularly in rural areas, with rate of 26.3%, than in urban areas, with rate of 22,4% ,over period from in the second quarter of 2022 to in the second quarter of 2023); HCP (2023 a). This statistics shows us the difficulty of integrating these graduates into the labor market which reflects a "serious crisis" in the Kingdom of Morocco, Pellegrin, C. & all (2020) ; Saadi, A.& all (2021) ; Idlhadj, Y;& all (2020).
As regards the case of Algerian country, according to the National Office of Statistics (NOS) ,it is possible to note that the unemployment rate among university graduates rose from 14.1% in 2015 to 18% in 2019, with an increase of 27.65% between 2015 and 2019; NOS.(2019). However,we should mention that, firstly the unemployment rate for women was relatively higher ,which was reached a level of 23,9% in 2019 , compared with a level reached around 20,2% in 2015, and secondly the unemployment rates for the population without qualifications and for graduates of vocational training institutes and schools are relatively low and were reached a level of 8,7% and 13,5% respectively in 2019, NOS.(2019) ; Benyahia, S. (2019) ; Benhabib, L. (2017).
Factors influencing the employability of recent university graduates varied from country to country, Ghouati, A. (2016). In Tunisia, the factors include the quality of training, the competitiveness of the labor market and the low demand for certain fields of study Grundkei, R .& all (2022) ; Boudabbous, S. & all (2011) ;Touhami, H. (2010) ; Ben Halima , M.A. & all (2010). In Morocco, university programs are not always adapted to the real needs of the labor market, Idlhadj, Y. & all (2020) ; Ammari, F. (2016) ; Fahssis, L & all (2017), which can make it difficult for graduates to find a job in their field of study on the one hand. On the other hand, limited employment opportunities in certain fields and regions are another challenge. In fact, some fields of study are not suited to labor market demand, Pellegrin, C. & all (2020).
Moreover, in Morocco, some regions offer few job opportunities for recent university graduates, which may encourage them to look for work elsewhere, Ammari, F. (2016) ; Saadi, A.& all (2021). In Algeria, Benyahia, S.(2019) ; Ahouari, Z. (2022) ; Mestour, C. & all (2018) and Bellatreche, Y. (2021) emphasize the fact that the recent graduates of the Algerian University are deprived of certain skills, due to a disconnection between labor market needs and the university system. While, Labaki, B. (2009) and Hammouda, N.E. & all (2014) suggested that the recent graduates has to face a poor employment situation in wake of the economic crisis and lack of opportunities within private sector. In contrast, there is large body of evidence indicating that recent university graduates face significant barriers to employment due to the lack of job opportunities and increased competition on the labor market, Djeflat, A. (2022) ; Benhabib, L. (2017).

3 Reasons of employability gap among recent university graduates and the skills gap in the Tunisian labor market

3.1 Reasons of employability gap among recent university graduates

The skills mismatch between graduates and the actual job requirements can arise for a variety of reasons. One of the main reasons is recent university graduates' lack of work experience, which prevents them from taking up positions according to their level and field of study, Salas-Velasco, M .(2021). In fact, they do not take advantage of work placements during their university course, introductory and advanced placements which are seen as opportunities to develop skills that can only be acquired in authentic and real work situations Dominique, G.(2014) ; Eneau, J. & all (2014).
Similarly, the dichotomy between university and the labor market can be seen as one of the causes of this mismatch, indeed, during implementing or revising studies programs, universities aim to update the skills developed during the student's course without taking into consideration the real needs of professionals and, above all, the specific economic features of the regions, Touhami, H. (2010) ; Steed, S. (2018) ; Mestour, C. & all (2018). Therefore,

[1] Higher level : Baccalaureate, Middle Management Diploma and Higher Education Diploma (faculties, high schools and institutes).
[2] Middle level : Basic Education Certificates, Professional Qualification or Specialization Diploma.

different programs provide different stocks of human capital, resulting in a mismatch of skills by recent university graduates, who will latter often accept a position below their level of education to gain skills and practical experience that can be used in different positions or jobs at a higher level ; Boudabbous, S. & all (2011); Salas-Velasco, M. (2021).

In addition, universities are often seen as the problem, taking an 'ivory tower' approach to learning, and even sought-after graduates, such as engineers, need additional skills to manage the jobs available in the new digital age and to satisfy employers, LinkedIN .(2023) ; Sanchez Puerta, M. & all (2015) ; Organization for Economic Co-operation and Development (OECD).(2022. Furthermore, recent university graduates, who embark on careers that do not match their knowledge and skills, have fewer prospects and lower incomes, according World Economic Forum. (2017) ; Steed, S. (2018). Finally, the lack of an effective process to assess skills can be seen as one of the determining factors generating skills mismatch, World Economic Forum (2014) and Puckett, J. & all (2020). Thus, understanding the magnitude and potential impacts due to mismatch in the labor market is a crucial issue when designing education and labor policies, World Economic Forum. (2017 and 2014).

3.2 The skills gap in the Tunisian labor market

The labor market in Tunisia has undergone profound and rigorous changes in recent years, with a growing mismatch from one year to the next between the skills acquired by recent university graduates and the real needs of the economy, Samet, K. (2014) ; Vérez , J.C.(2013) ; Kthiri, W.(2019). Indeed, the Tunisian economy has become unable to create enough jobs to meet the demands of its young, educated population, resulting in high levels of unemployment and underemployment because of lack of investment and financial insecurity especially after the January 14 revolution revolution, Kthiri, W.(2019) ;Vérez, J.C.(2013).

The acquired skills by university graduates are supposed to prepare them to enter the labor market successfully. However, it is essential to understand which skills should actually be developed during university studies, Kthiri, W.(2019). Often, universities focus more on acquiring theoretical knowledge than developing practical skills, graduates may therefore end up with solid academic knowledge, but without the skills needed to meet the real needs of the labor market ; Prévost, P.& all (2010) ; Touhami, H.(2010) ; Steed, S.(2018) ; Mestour, C. & all (2018). The study of Kthiri, W (2019) pointed out that the labor market, both regional and national in Tunisia, like in the other similar countries, is facing a major problem: the "employment gap", with a mismatch between the skills possessed by recent university graduates and the requirements of the jobs available.

As a result, this situation creates deep challenge for both recent university graduates and employers during recent decades, which it has been recognized as an important concern in Tunisia's national employment strategy: recent university graduates often struggle to find jobs that match their qualifications, while employers struggle to find candidates with the skills actually required to fill their vacancies, International Labor Organization (ILO) (2017 a and b). Furthermore, based on study conducted by the International Labor Office (2015) ; Vérez , J.C.(2013) ; Doray , P.& all. (2017); Michaud, R.& all (2020), we can highlight the need for a better match between skills supply and demand labor market ,both regional and national, in order to provide effective remedies for this persistent problem, because the mismatch between graduates' skills and job requirements contributes to high unemployment rates, particularly among recent university .

The result is a gradual trend of brain drain, highly skilled workers and recent university graduates leaving the country in search of better opportunities, a phenomenon not unique to Tunisia , has become a major concern, because it represents a loss of valuable human capital and skills, Samet, K. (2014) . The loss of "high-potential talent", highly qualified managers and certain profiles coming out of higher education institutions, which constitute a "skills

pool", could lead to a shortage of skilled labor and also a decline in innovation and research, which can further slow down economic progress and consequently hinder the country's growth and economic development, Samet, K.(2014) .
In addition, we can base ourselves on statistics of National Institute of Statistics (NIS), we show that, in the third quarter of 2022, the unemployment rate among Tunisian university graduates will continue to rise, reaching 24,3% ; NIS .(2023). Narrowing the skills gap in key occupations and strengthening collaboration between stakeholders are important steps in addressing this problem, Grundke, R. & all (2022) ; ILO. (2022) .

4 Strategies for bridging the employability gap

To ensure that university graduates have the skills and knowledge required by industry, it has become essential to implement various strategies, Ghouati, A. (2019) ; Fahssis, L. & all (2017). A revision of university curricula is a priority strategy for higher education institutions and requires regular consultations with industry to identify emerging trends and gaps in terms of skills demanded in order to better meet the real needs of the labor market, as highlighted by Armoogum, N.& all (2022) and Kalla, S.(2017).
Hence, it is evident that aligning university curricula with the requirements of employers enables graduates to be better equipped and seamlessly enter the job market as suggested by the Future Skills Council. (2020), while incorporating experience into education, through internships and other work integrated learning opportunities, represent a crucial approach to enhance the employability of recent university graduates according to Arias, O. & all (2020). Furthermore Internships enable students to apply the knowledge they have acquired during their university studies in a professional context ,the result is an improvement in university education, enabling graduates to better match the demands of the labor market, Glaymann, D. (2014) and Eneau, J. & all (2014).
Moreover, harmony between the professional world and academic institutions has become a concrete reality. For this reason, collaboration between industry and universities has become necessary, and it is an effective strategy for reducing the mismatch between acquired skills and professional requirements, by taking various forms, such as consultations with industrial companies, co-construction of study programs and internships, Dominique, G. (2014) ; Eneau, J. & all (2014). On the one hand, companies are increasingly positioning themselves as training centers, through concepts such as sandwich courses or learning companies or qualifying organizations, and expect university graduates to be well trained for working life, Boutte, J. L. (2019). On the other hand, universities use training engineering to establish skills, assessment and training frameworks, and pedagogical engineering to build the necessary and effective teaching tools, Prévost, P.& all(2010). By collaborating with industrial professionals, academic institutions can obtain valuable information on real needs and job market trends, enabling the development of appropriate programs that certify that university graduates possess the skills required by job demand, Prévost, P. & all (2010) ; Armoogum, N & all (2022) ; Kalla, S. (2017).
In addition, integrating technology training into the university curriculum is an effective strategy for improving the employability of recent university graduates, by offering certification programs and courses in technology which include courses on programming, data analysis and digital marketing, among others, Nolan, A. (2018) ; Boutte, J.L. (2019) ; Bell, A. (2019 ; European Training Foundation (2019). Thus ,universities by adopting this approach will have the ability to equip their graduates with the skills to thrive in the digital-era workplace firstly, and secondly their graduates ,who obtained these certifications ,will be more competitive not only in technological fields but also they will be more appealing to potential employers and more engaging in a competitive job market , Bell, A. (2019) ; Boutte, J.L.(2019) ; European Training Foundation (2019) ; Ghouati, A. (2022) ; AUC/OECD (2021).
Finally, integrating practical skills and real-world experience into the university curriculum and promoting internships and cooperation opportunities with technology companies is another effective strategy for improving the employability of recent university graduates, Armoogum, N. & all (2022) ; Grundke, R. & all (2022) ; LinkedIN (2023) ; World Economic Forum (2014). These programs offer students practical experience in a real environment, enabling them to apply the knowledge they have acquired to real-life work scenarios, Mestour, C.& all (2018) ; Djeflat, A.(2022) ; Bellatreche, Y. (2021). Higher education institutions must strive to equip students with the skills and knowledge in demand on the labor market by incorporating courses relevant to cutting-edge industry (aeronautics, agri-food, nuclear, automotive, medical devices....) providing practical training and offering students opportunities to work on real projects, Salas-Velasco, M. (2021) ; World Economic Forum. (2017) ; Ghouati, A. (2016) ; Saadi, A. & all. (2021). By doing so, institutions can help to ensure that recent university are well prepared to integrate easily into the region's labor market and that they have the skills they need to succeed in their chosen fields.

5 Experience of ISET Kef in terms of improving the employability of recent university graduates according to the needs of the labor market in north-west Tunisia

Faced with the problem of the employability gap for recent qualified university graduates, it has become essential to understand the real and specific needs of the Tunisian labor market in each region of the country. Industries and business sectors are evolving rapidly, which means that the skills required can change. Professionals are exploring their needs for university graduates with the technical and practical skills required for immediate recruitment. Identifying these needs can help universities and educational establishments to adapt their programs and courses in line with labor market demands.

5.1 Analysis of the employability of recent university graduates of ISET Kef

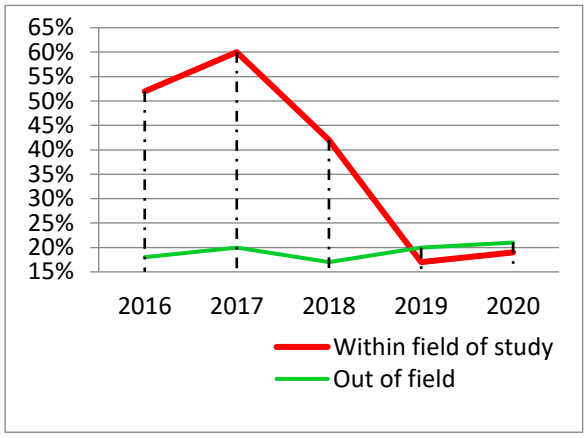
In order to assess the employability of recent university graduates of the ISET Kef at least one year after graduation, we led to carry out a telephone survey, which was conducted in January 2022 on a total sample of 100 university graduates, with at least 8 graduates from each specialty.

Noting that, we have underline here firstly that the size of the sample varied according to the total number of graduates from the different field of study because of unavailable information , and secondly we had selected five academic year's graduating class from 2016 to 2020, for the different field of study offered by the ISET Kef through its departments: Economics and Management Department; Mechanical Engineering Department; Technical IT Department and Electrical Engineering Department.

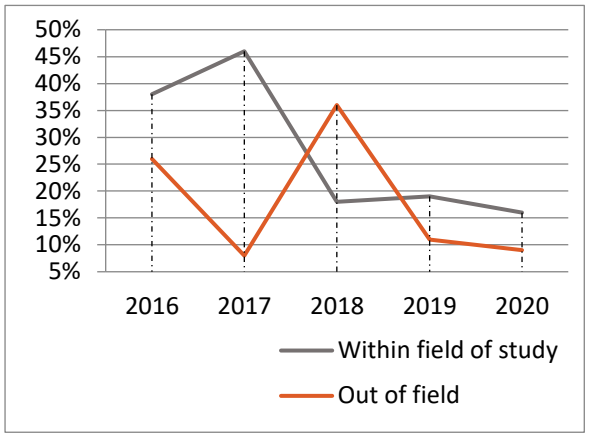
We base ourselves on the results obtained from survey, we can infer that the employability rate of graduates varies according to the studies acquired for these five promotions, and we can observe that unemployment affects recent university graduates disproportionately, regardless of the field of study. In fact, we note that the unemployment rate for graduates of the ISET Kef exceeded 41% in 2020 (see figure 1 below). Similarly, it is worth noting that the percentage of students who secured jobs aligned with their university majors within 12 months after graduation varied based on their fields of study. Moreover, this percentage experienced a rapid decline, from 2016 to 2020 due to the impact of the COVID 19 pandemic. Furthermore, we can highlight that engineering graduates have employment prospects compared to other disciplines with an employability rate of approximately 19% in 2020 despite the COVID19 pandemic, following behind are economics and management graduates with an employability rate of around 16%, in 2020.

As Regards Electrical Engineering Studies, we find that it have the lowest employability rate among recent university graduates in their field of study, with significant fluctuations in this rate, ranging from 23% to 7% over the 2016-2020 study periods (see Figure 1 below). However, we should pointed out that a proportion of university graduates find themselves in jobs outside their field of study in 2020 must be taken into our account because the employability rate for graduates of ISET Kef outside their field of study varies between 9% and 20%, that it is considered relatively high (see figure 1 below).

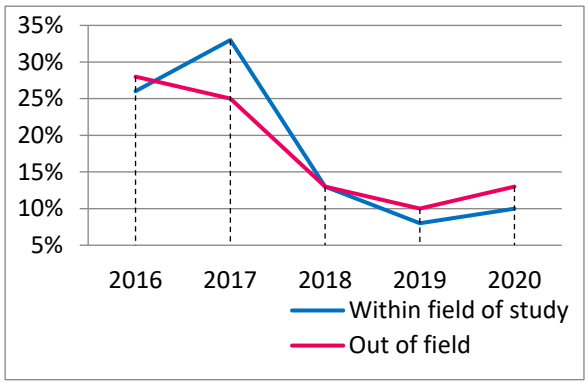
Noting that this rate was higher in 2016, varying between 18% and 28% (appendix 1), given that recent university graduates accept jobs for want of anything better, which leads to an under-utilization of their skills and professional dissatisfaction, which can also have a negative impact on their long-term career, Boudabbous, S. & all (2011). The variation in the employability rate of graduates of ISET Kef, within or outside their field of study, illustrated in the figure 1 below. Eventually, the main findings from the discussion of the results obtained from the survey can , therefore, be summarized as follows: the low employment rate among university graduates can be attributed to a number of factors, as mentioned previously. It is not solely dependent, on specificity and quality of university studies, but also influenced by the capacity of both local and national job markets to accommodate all university graduates according, Hammami, S. (2021) .



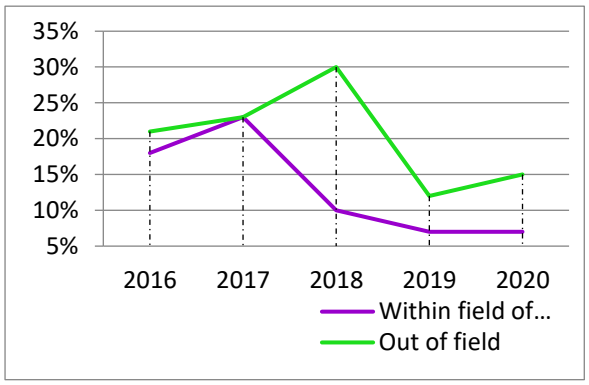
Employability rate of recent university graduates in Mechanical Engineering Department



Employability rate of recent university graduates in economics and Management department



Employability rate of recent university graduates in Technical IT Department



Employability rate of recent university graduates in Electrical Engineering Department

Source: Survey conducted by ISET Kef

Figure 1: Employability rate of recent university graduates from the academic year's graduating class of ISET Kef: 2016, 2017; 2018; 2019; 2020

The mismatch between the acquired skills and those required by employers is a major obstacle to the full participation of recent university graduates from the ISET Kef in working life, due to a number of factors. On the one hand, university curricula are often not in harmony with real developments in job demand, and on the other hand, the limited supply of work placements and other practical training opportunities, as well as the inadequacy of real supervision within companies, explain why the majority of recent university graduates lack professional experience. Essentially, these factors are likely to suffer from a weak hegemony of skills. Furthermore, cross-disciplinary skills, which are considered to be a decisive factor for success in professional life and which help to propose innovative solutions, are not constantly emphasized in university curricula, Belchior-Rocha, H. & all (2022) ; Bros, F. & all (2019).

5.2 Current employment requirements by region of north-west Tunisia

Depending on the specific features of each economic sector and each geographical area, employment needs vary from one region to another in each country, and since the north-west region of Tunisia is renowned for being an agricultural region with large agricultural areas and genuine natural, cultural and social wealth, its needs labor demand is typical. For example, agricultural activities require recent university graduates with skills in organic and sustainable farming , industrial activities require graduates with technical skills in mechanics and electronics, whereas the region's booming tourism sector requires versatile managers with skills in tourism and ecotourism.

The north-west region of Tunisia, including Kef, Siliana, Jendouba and Béja , is characterized by an activity based not only on agriculture, trade and services , but also by an alternative tourism activity, that we have perceived as a growth niche not only at regional level but also at national level, and as a substitute for seaside tourism in recent decades . Consequently, employers in this region are looking for university graduates with acquired skills in traditional and organic farming, as well as acquired skills in project management and marketing of agricultural products and skills acquired in offering and marketing tourism products. By taking into account the specific needs of the north-west region of Tunisia, the recent university graduate will be able to maximize chances of finding a satisfying and rewarding job, by acquiring the appropriate and much needed skills during the course of university studies.

5.2.1 Analysis of the agricultural potential of the governorate of Kef

The governorate of Kef has an agricultural potential comprising nearly 18,000 farms representing more than $(2/3)$ of the total surface area of the governorate with the main activity is cereal growing, which covers almost $(1/2)$ of the governorate's total surface area, followed by olive growing, Sai, M.B. & all (2017).
In addition, the irrigated area represents almost $(1/3)$ of that of the Mejerda catchment area and $(1/10)$ of the total irrigated area at national level, while pointing out that the $(1/2)$ of irrigated area is dominated by fodder crops, Samaali, H.& all (2020). However, it should be highlighted here that the growth in hydro-agricultural development and the increase in demand from the agri-food industry are contributing to the emergence of extensive fruit orchards in this governorate.

5.2.2 Natural tourist attractions in the Governorate of Kef

The governorate of Kef has a rich and diverse natural, cultural and historical heritage, in fact, these include famous archaeological sites such as the Khasba, the Cathedral, Bou Makhlouf and Sidi Zine, nature reserves rich in flora and fauna such as the Saddine reserve, caves and geological wonders including the Hammam Mellègue KT site 5 km south-west of Kef Ville.
This governorate contains extraterrestrial chemical elements (iridium and meteoric spinel), corresponding to a site that was voted best stratotype in the world at the Washington Congress in 1989. The site was voted the best stratotype in the world at the Washington Congress in 1989. Long neglected and under-valued, this rich heritage is now seen as an interesting alternative for the development of ecotourism in governorate of Kef. Managers of Tunisian ecotourism and sustainable tourism businesses will have to exploit this immense potential by designing tours, products and services that offer tourists an authentic experience. In this respect, the employment prospects are very favorable. However, most of the business managers we met said that it is difficult to find qualified people to work as tourism managers.

5.3 Partnership of ISET Kef with ADUIT and CICAN for a better integration of recent university graduates

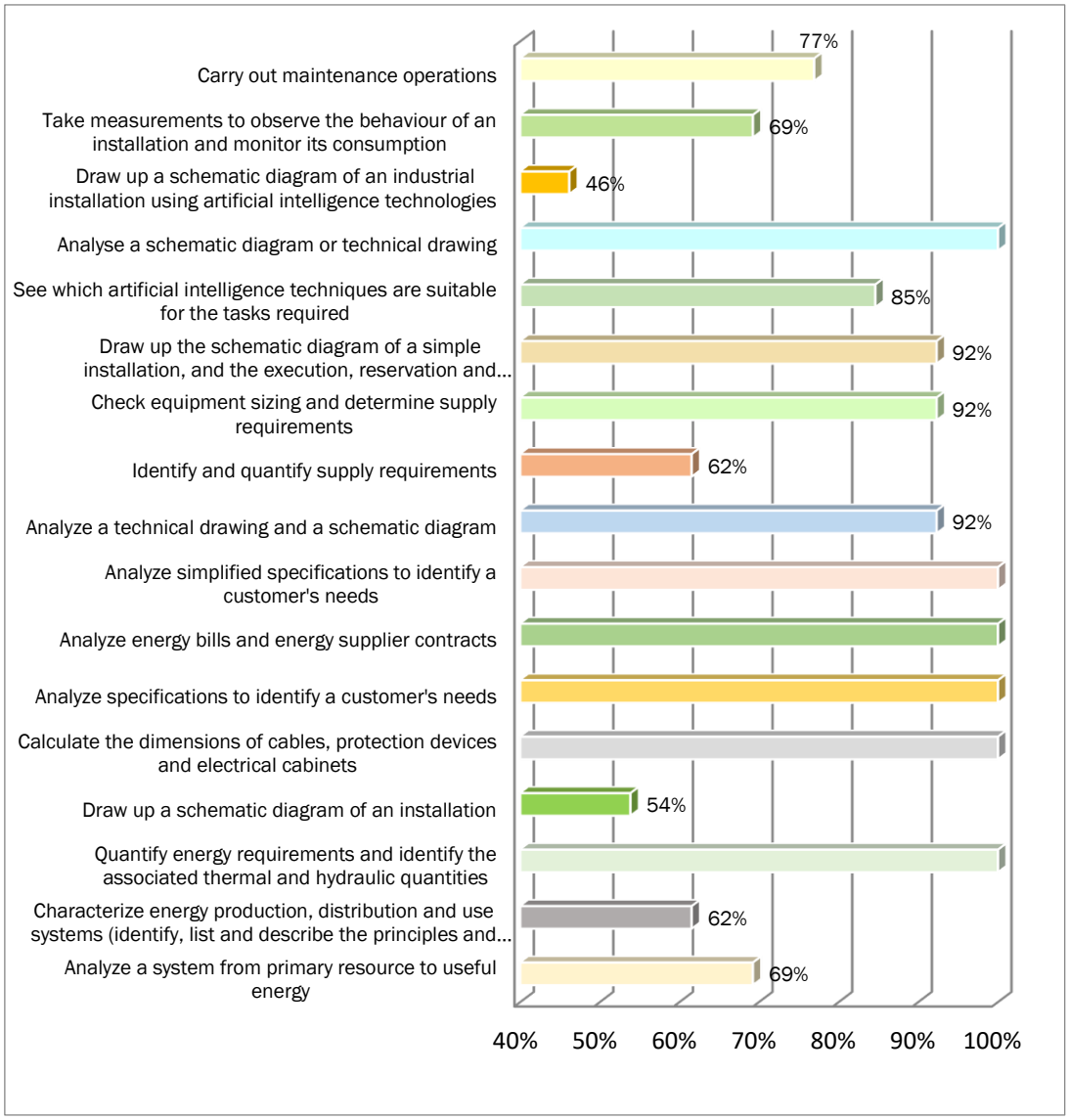
The main objective of mission of ISET is to provide training to university graduates enabling them with the necessary skills to meet the specific requirements of the local job market ,because, as we have noticed that when there is a mismatch, between training programs and the needs of both national job markets it adversely affects the employment opportunities, for university graduates who have completed their education at ISET Kef.
For this reason, ISET Kef decided to reorganize and revise existing procedures, through partnerships with the Assembly of Directors of University Institutes of Technology (ADUIT) and with Colleges and Institutes Canada (CICAN), in order to improve the integration of its recent university graduates in to the labor market in north-west Tunisia.

5.3.1 Partnership between ISET Kef and ADUIT

The creation of a co-constructed degree in Renewable Energy in Agriculture and Industry (ERAI) within the electrical engineering department of ISET Kef was carried out as part of a cooperation project between the ISET network and the Assembly of Directors of University Institutes of Technology (ADUIT). The aim of this partnership is to modernize and develop agriculture in the north-west to improve the employability of recent qualified university graduates. The implementation of this program must be based on a well-defined trade in order to meet the immediate needs of the labor market in the region concerned.
The skills-based approach seems to be the most appropriate strategy for guaranteeing a closer partnership with professionals throughout all the stages of skills acquisition, from analysis of the work situation, through the definition of skills and modules, to the delivery of courses, supervision and assessment of students. The vision of this training course is in line with the guidelines of the national strategic plan for the management of water resources and renewable energy and the skills needs of companies in the region, as identified following the preliminary study carried out by the ISET Kef. This objective will be achieved by strengthening collaboration with local socio-economic partners.

A survey was carried out, in January 2022, in the North West region of Tunisia, and more specifically in governorate of Kef, in order to understand which skills really need to be developed during university studies according to the needs of the region. The importance of such a more in-depth examination is to ensure that graduates with a proposed co-constructed degree in Renewable Energy in Agriculture and Industry (REAI) have the necessary skills to excel in their chosen profession. Our sample consisted of 13 industrial and agricultural companies (Appendix 2).

According to the results obtained, we can notice that most industrial and agricultural companies, which were installed at governorate of Kef, are inclined to invest in renewable energy because it is inexhaustible and more environmentally friendly, because photovoltaic energy is the only type of renewable energy demanded in this region by entrepreneurs and farmers. However, entrepreneurs have pointed out that there is a skills deficit in the field of renewable energy in agriculture and industry, while hoping that the new graduates of this new degree will interact in the field of agriculture and exploit renewable energy in several activities, such as irrigation, lighting or pumping, etc. The figure below gives an overview of the key skills required by employers in this field.



Source: Survey conducted by ISET Kef

Figure 2: Key skills required by industrial and agricultural companies based in governorate of Kef.

5.3.2 Partnership between ISET Kef and CICAN

The co-constructed bachelor's degree program in ecotourism ,that is so recently created, is in line with the aim of developing tourism activity in Tunisia's inner region, by focusing on ecotourism and alternative tourism in order to allow the university graduates meet a demand for multi-skilled managers with expertise in tourism and ecotourism. Their versatility will enable them to be useful to businesses and organizations working in the sector in governorate of Kef and throughout Tunisia. The program has been designed using a skills-based approach in collaboration with two Canadian higher education institutions, “Collège de Matane” and “Collège la Gaspésie et des Iles”. The methodology used is characterized by close links with the reality of the tourism sector in the region and the country.

A brainstorming session was held with 18 professionals operating in the region's tourism sector, including several from the region of Kef (see appendix 3). This enabled us to gather information on the role and functions of the eco-tourism business manager, the profile of a tourism manager, the conditions of his or her work, his or her tasks and the skills required, which formed the basis for developing a suitable program for this degree. This training aims to ensure that the ecotourism graduate acquires various skills, listed in the table below, which are considered fundamental for a versatile and competent tourism and ecotourism manager.

Table 1: Skills required for a versatile and competent manager in tourism and ecotourism

Specific skills	Cross-disciplinary skills
-Analyze the general context of ecotourism -Develop a strategy for the eco-tourism business -Develop an eco-tourism experience Marketing the eco-tourism product -Provide a welcome and service to visitors -Manage the company's human resources -Manage the company's financial resources -Manage the company's material resources	-Analyze the work functions associated with the profession of ecotourism manager -Use computers for administrative and communication purposes -Communicate in a management and customer-oriented context -Communicate in foreign languages in a tourism context -Adopt a customer-oriented approach lead a work team -Use sources of law applicable to administrative and tourism contexts -Ensure the health and safety of all those involved and the quality of the tourism environment -Develop a business project

Source: Survey conducted by ISET Kef

6 Conclusion

The “employability gap” among recent university graduates, in Tunisian country, is a complex problem that requires serious attention, for this reason preparing university graduates to enter the labor market successfully will be the main objective of any university, Touhami, H.(2010) ; Kthiri, W.(2019) ; Mestour, C.& all (2018). However, most Tunisian universities and institutions of higher education focus more on the acquisition of theoretical knowledge than on the development of practical and much needed skills, consequently university graduates are left with solid academic knowledge without having acquired skills that are in line with the real needs of the country's labor market, Kthiri, W. (2019) ; Mestour, C.& all (2018) ;Vérez, J.C.(2013) ; Doray, P.& all (2017) .

Lack of work experience is therefore seen as one of the main reasons for graduate unemployment, while internships have always been seen as a means of acquiring skills complementary to those acquired during university studies, Michaud, R.& all (2020) ; Dominique, G. (2014) ; Eneau , J. & all (2014). To bridge the employability gap, universities and educational institutions need to implement appropriate strategies such as, establishing partnerships between higher education institutions and employers, to identify skills needed in the labor market and integrate them into curricula, and promoting entrepreneurship and innovation ,in order to improve the quality of training and create new employment opportunities and reduce dependence on traditional employment sectors, Doray, P.& all (2017) ; Michaud, R. & all (2020).

The availability of information on job opportunities, professional requirements and qualifications available to companies and recent university graduates, in the North West region and more specifically governorate of Kef, is crucial to improving graduate employability. Therefore, to ensure that ISET's programs match with the skills required by the region's labor market in order to increase the employability of recent university graduates, not only in north-west Tunisia but also in other regions of Tunisian country.

Thus, by understanding the skills acquired, identifying the needs of region's labor market and implementing appropriate strategies, we will to close the employability gap and create a better future for recent university graduates, while placing greater emphasis on developing practical and professional skills and offering opportunities such as internships, applied research projects and mentoring programs, Dominique, G. (2014) ; Eneau, J.& all (2014) ; Cappelli, P. (2015) .
However, it should be noted that technological advances in artificial intelligence and machine learning are expected to have a profound impact on the structure of professions in the coming decades around the world, BenYoussef , A.(2022) ; AUC/OECD (2021). The rise of new technologies such as virtual reality will also lead to significant changes in the nature of many jobs, from manufacturing and marketing to management etc, Nolan, A. (2018) ; Boutte, J. L. (2019). As a result, we will see the emergence of new professions in programming, graphics, marketing and digitization, so, it is essential for universities to keep abreast of the latest technological developments in order to adapt the skills and knowledge of recent university graduates to new working methods and remain employable, Mell, L. (2018) ; Ghouati, A. (2019) .

By implementing strategies to address the mismatch between the skills acquired by recent university graduates and the real needs of the labor market and more particularly the regional market, Tunisia could create a more dynamic and competitive economy, which could attract and retain highly skilled workers, reduce brain drain and promote economic growth; Samet, K.(2014) ; Grundke, R. & all. (2022) ; Organization international du Travail. (2017b).

REFERENCES

[1] **Ahouari, Z 2022):**"The employment policies of young Algerian graduates support vulnerability at work.".*Revue Algérienne des Manuscrits Volume:18/N°:2/Juin 2022* https://www. asjp.cerist. dz/en/downArticle/160/18/2/202362

[2] **Ammari, F. (2016)**:" Essay on education and the labor market in Morocco: Application of Deibolt's Theory of Bottlenecks". *Revue Economie & Kapital N°8 Printemps 2016.* Https://Revues. Imist.Ma/Index.Php/Rek/Article/Download/10020/5720

[3] **Arias, O., Evans, D .K., & Santos ,I. (2020):**" Skills development in sub-Saharan Africa, a balancing act Investing in skills for productivity, inclusion and adaptability". *International Bank for Reconstruction and Development* . https://issuu.com/world.bank.publications/docs/9781464815379

[4] **Armoogum, N., & Goinden, K. (2022):**" Tertiary training: Meeting the new needs of businesses" *Business Magazine Issue 1598 ; Mai 17, 2022*.https://www.business-magazine. mu/entreprendre/business-files/formation-tertiaire-repondre-aux-nouveaux-besoins-des entreprises

[5] **AUC/OECD.(2021):**" Dynamics of Development in Africa (2021):Digital Transformation and Quality of Employment".*CUA, Addis Abeba/Éditions OCDE,Paris*.https://doi.org/10.1787/cd08eac8-fr.

[6] **Belchior-Rocha, H., Casquilho-Martins, I., & Simões, E.(2022):**"Transversal Competencies for Employability : From Higher Education to the Labor Market". *Education Sciences .2022, 12, 255.* https://doi.org/10.3390/educsci12040255

[7] **Bell., A.(2019):** "OECD Skills Strategy 2019: Skills for a better future" . *Paris: OCDE*. http://www.oecd.org/fr/emploi/strategie2019-de-l-ocde-sur-les-competences-9789264313859-fr.htm

[8] **Bellatreche ,Y. (2021):** "The labor market integration of higher education graduates: What role does the university play in employability?". Journal f Economics and Human Development,*V,31.N3,p 105-118*. https://www.asjp.cerist.dz/en/downArticle/275/13/1/197451

[9] **Ben Halima, M.A., Kocoglu, Y., & Ben Halima, B. (2010):**" Professional Integration of University Graduates in Tunisia: A Public-Private Comparison" . *Working Papers.* https://ideas.repec. org/p/hal/wpaper/hal-00943982.html

[10] **Benhabib, L. (2017):**" Youth Unemployment and Inequal Insertion into the Algerian Labor Market: Multidimensional Analysis and Experimentation". Economics and Finance .University of Paris-East, 2017. https://theses.hal.science/tel-01649848/document

[11] **Benyahia, S. (2019):**" Unemployment in Algeria: Characteristics, Causes and Consequences" . *Revue de l'Ijtihad D'études Juridiques et Economiques ;V :08 ; N:01 ; Année 2019.*https://www. asjp. cerist. dz/en/downArticle/222/8/1/72419

[12] **Boudabbous, S., & Mâalej, A.(2011) :**" Over-education and Devaluation of Higher Education Graduates".La Revue des Sciences de Gestion 2011/5 (n° : 251), p 107 à 114. https://www.cairn.info/revue-des-sciences-de-gestion-2011-5-page-107.htm

[13] **Boutte, J.L. (2019):** "The Transmission of Know-how in Large Companies: a Study of the Expert-novice Educational Relationship". Michel Sot. Knowledge mediation practices, 2019. https://hal-amu.archivesouvertes.fr/hal-02160362/document

[14] **Bros, F., Vermelle, M.C., & Boanca, I. (2019) :** " Cross-disciplinary Skills, a New 'Key' to Integration? Stakes and Effects for Players". *Recherches en Education,(37)*.http://www.recherches-eneducation. net/IMG/pdf/REE_37.pdf

[15] **Cappelli, P. (2015) :** "Skill Gaps, Skill Shortages, and Skill Mismatches". *Industrial and Labor Relations Review; March 2015 ; 68 (2):251-290.* https://www.researchgate. net/publication/279290714_Skill _Gaps Skill_Shortages_and_Skill_Mismatches

[16] **Future Skills Council (2020):"** Canada: A Learning Nation: A Skilled and Flexible Workforce Ready to Shape the Future" . *Ottawa, Ministry of Employment, Labour Development and the Inclusion of Persons with Disabilities of Canada* . https://www.oresquebec.ca/articles-de-veille/rapport-sur-les-competences-futures-publication

[17] **Djeflat, A. (2022):**"Graduate Employment, Absorptive Capacity and the Knowledge Economy in Algeria: Analysis and Prospects". *Les Cahiers du Cread -Vol. 38 - n° 03- 2022*. https://dx.doi. org/ 10.4314/cread.v38i3.21

[18] **Dominique, G. (2014):**" Internships in Higher Education: a Scheme Full of Promises that are Hard to Keep" .*Éducation et Socialisation 3(35) April 2014.* https://www.researchgate. net/publication/272783256_Le_stage_dans_l'enseignement_superieur_un_dispositif_riche_de_promesses_difficiles_a_tenir

[19] **Eneau, J.,Lameul, G ., & Bertrand, E. (2014) :**" Work-study Placements in Higher Education: What Kind of Professional Development? The Case of a University Training Course in Training Professions" . *Éducation et Socialisation, 35 | 2014.*https://doi.org/10.4000/edso.689

[20] **European Training Foundation .(2019):**"Tunisia : education, training and employment developments 2018". Turin: European Training Foundation. https://www.etf.europa.eu/sites/default/files/2019-03/Tunisia%202018.pdf.

[21] **Fahssis, L., & Neggady Alami, T. (2017):"**The Impact of Higher Education on Employability: Perceptions of Graduates and Employers". *Revue Economique N°12.* Https://Revues. Imist. Ma/Index.Php/Rek/Article/Download/9989/5701

[22] **Ghouati,A., Ammar, M.N ., Dahmani, .Mabrouki, M., Turki, H. & Guebna, O. (2022) :**" The Digital Transition in Tunisia by 2050: Vision and Strategic Plan" . *Report number: Tunisian Institute for Strategic Studies, Tunisia. January 2023*. https://www.researchgate. net/publication/367655972_The_Digital_Transition_in_Tunisia_by_2050_Vision_and_Strategic_Plan

[23] **Ghouati, A. (2019):**" University Reforms and the Training-Employment Relationship in Algeria" . *Carrefours de l'éducation, 47(1), 211-224*. https://doi.org/10.3917/cdle.047.0211

[24] **Ghouati, A. (2016):**" The Professional Integration of Graduates in North Africa. What Effect(s) Has the Professionalisation of Training Had? Professionalisation of Training, Employability and Integration of Graduates" . 30/6 and 01/07/2016 in Clermont-Ferrand, University School of Management, University of Auvergne, Jun 2016, Clermont-Ferrand, France. https://hal.science/hal-01671188/document

[25] **Grundke, R., Cassimon, S. (2022):**" Improving skills and employment prospects in Tunisia". OECD Economic Studies 2022/6 (n° 6). https://www.cairn.info/revue-etudes-economiques-de-l-ocde-2022-6-page-89.htm

[26] **Hammami, S. (2021)**:" Report on the employability of young graduates through ERASMUS+ projects". https://www.erasmusplus.tn/doc/publication_sami_hammami_2021.pdf

[27] **Hammouda, N.E., & Medjoub, R.(2014):**" Unemployment among University Graduates" . Conference Paper December 2014. https://www.researchgate.net/publication/275354195_Evolution_du_chomage_des_universitaires /link/5aa167cba6fdcc22e2d11a06/download

[28] **High Commission for Planning. (2023 a)**:"Activity, Employment and Unemployment" . Résultats Annuels 2022. *Kingdom of Morocco ;Second quarter 2023*. https://www.hcp.ma/Activite-emploi-et-chomage-trimestriel--deuxieme-trimestre-2023_a3789.html

[29] **High Commission for Planning. HCP (2023 b):**" Note on International Youth Day, 12 August 2023". https://www.hcp.ma/Note-sur-la-journee-internationale-de-la-jeunesse-12-aout-2023_a3742.html

[30] **Idlhadj, Y.,Louizi, K., & Tadjousti, H. (2020) :** " Graduate Unemployment in Morocco: a Quantitative and Qualitative Mismatch " . *Alternatives Managériales Economiques . Vol 2, No1 (Janvier, 2020) 323-341*. https://revues.imist.ma/index.php/AME/article/download/19430/10603

[31] **International Labor Office .(2015):**" Taking Stock of Youth Employment in Tunisia Thirty Years of Employment Policies" . *International Labor Office . Genève:ILO, 2015*. https://www. ilo. org/wcmsp5 /groups/public/ed_emp/documents/publication/wcms_444914.pdf

[32] **International Labour Organization. (2022):**" An overview of vocational training in Tunisia through ILO projects". *First Edition 2022.* https://iloskill skspstorage. blob.core. windows.net

[33] **International Labor Organization (2017 a):**" Tools for quality apprenticeships Volume I: ILO guide for policymakers" .First Edition 2017. https://www.ilo.org/wcmsp5/groups/public/ed_emp/ifp_skills/documents/publication/wcms698049.pdf

[34] **International Labor Organization. (2017 b):**" Anticipating and Adjusting Skills and Jobs; Guidance note" . *International Labor Organization 2017.* https://www.ilo.org/wcmsp5/groups/public/ed_emp/ifp_skills/documents/publication/wcms_755866.pdf

[35] **Kalla, S. (2017):"**Tertiary Training: When Diplomas are no Longer Attractive" . *Business Issue 1515; May 3, 2017*. https://www.business-magazine.mu/entreprendre/autres-entreprendre/formation-tertiaire - quand-le-diplome-ne-seduit-plus/

[36] **Kthiri, W. (2019)**: Skills Mismatch in Tunisia: what are the Determinants of Underemployment?. *Document de travail ; Notes et analyses de l'ITCEQ N° 01 – 2019.* http://www.itceq. tn/files/ emploi/ inadequation-des-qualifications-en-tunisie.pdf

[37] **World. Bank. (2014):**"Tunisia: Overcoming the Obstacles to the Inclusion of Young People". *Washington. D.C. World. Bank Group.* http://documents.worldbank.org/curated/en /120511468305646014 / Tunisie-Surmonter-les-obstacles-a-linclusion-des-jeunes

[38] **Labaki, B. (2009) :**" Higher education and the labour market in the Arab world". *Publications de l'Institut français du Proche-Orient 2009.* https://books.openedition.org/ifpo/754

[39] **LinkedIN.(2023):**"Skills-First : Reimagining the Labor Market and Breaking Down Barriers". https://economicgraph.linkedin.com/content/dam/me/economicgraph/en-us/PDF/skills-first-report-2023.pdf

[40] **Mestour, C., & Khiat, A .(2018) :**" Employability: What Role Do Universities Play in Improving the Employability of New Graduates? The case of the University of Oran 2". *Revue Algérienne d'Economie de Gestion Vol. 12,N°:01(2018).*https://www.asjp. cerist.dz/en/ downArticle/ 154/12/1/ 82235

[41] **Michaud, R., Bernier, A., & Ben Mansour, J. (2020):**"Matching training to jobs: human resources management concepts and practices". *La revue Relations industrielles / Industrial Relations. Volume 75, numéro 2, printemps 2020, p. 296–320*. https://www.erudit.org/fr/revues/ri/2020-v75-n2-ri05386/1070350ar

[42] **National Institute of Statistics (NIS).(2023):**" Employment and unemployment indicators . First quarter 2023" . http://www.ins.tn/sites/ default/files/ publication/pdf/Note% 20Emploi% 20T1% 202023.pdf

[43] **National Office of Statistics (NOS) (2019) :** "Algerian Demography . National Statistics Office ". N°890. https://www. ons. dz/IMG/pdf/demographie2019.pdf

[44] **Nolan, A. (2018):"**The Next Production Revolution: Key Issues and Proposals for Action". *La prochaine révolution de la production (2018), pages 21 à 73*. https://www.cairn.info/la-prochaine-revolution-de-la-production--9789264280793-page-21.htm

[45] **Organization for Economic Co-operation and Development (OECD).(2022):**"Education at a Glance 2022". *OECD Indicators, OECD Publishing, Paris,* https://doi.org/10.1787/3197152b

[46] **Pellegrin,C,. Alazali, M.,& Meyer. J. B. (2020) :** "Higher Education in Morocco: State of Play and Public/Private Comparison". *Working Paper du Ceped Centre Population et Développement. 2020, 25 p*. https://hal.science/hal-04144673/document

[47] **Doray , P., Félix, B., Simoneau, F.B., & Solar-Pelletier, L.(2017):**"Matching training to jobs: the case of tailor-made training in higher education in Montreal" .*Rapport- Adequation -Finale 26042017 CIRDEF OCE CIRST*.https://oce.uqam.ca/wp-content/uploads/2019/06/PSRA-Rapport-Adequation-Final-26042017-VF.pdf

[48] **Prévost, P.,& Hébrard, P. (2010) :**" The sciences of education and training; Part II: Between the sciences of education and the world of work, cooperation to be pursued for better integration between schools and businesses" . *Éducation et Socialisation 27-28 2010.* https://doi.org/ 10.4000/edso. 16228

[49] **Puckett, J., Hoteit, L.,Perapechka, S.,Loshkareva, E.,& Bikkulova, G. (2020):**"Fixing the Global Skills Mismatch" . *Bosten Consulten Group january 15, 2020*. https://www.bcg. com/ publications/ 2020/fixing-global-skills-mismatch

[50] **Saadi, A ., Laamire, J., & ElAbbass, I. (2021):**"Active employment policy and graduate unemployment in Morocco: An evaluation of the impact of SHP" . *Les Cahiers du Plan N53*

Novembre2021.https://www.researchgate.net/publication/355859381_Politique_active_d'emploi_et_chomage_des_jeunes_diplomes_au_Maroc_Une_evaluation_de_l'impact_par_la_PSM

[51] **Sai, M.B., Msallem, M., & Trigui, A. (2017):**" The development of olive growing in Kef . Document produced within the framework of an agreement with the CRDA of Kef: Project (PDAI - NNEK)". *Special issue of the Revue Scientifique de l'Oléiculture et de l'Oléotechnie (Scientific Review of Olive Growing and Olive Technology)*. . http://www.iosfax.agrinet.tn/ pdf

[52] **Salas-Velasco, M. (2021):** "Mapping the (Mis) match of University Degrees in the Graduate Labor Market". *Journal for Labor Market Research 55,14 (2021)*. https://doi.org/10.1186/s12651-021-00297

[53] **Samaali, H., & Mjejra, M.(2020):**" Typological Study of Irrigated Perimeters in the Governorate of ElKef (North-West Tunisia): A Tool for Diagnosing and Assessing Farm Performance". *Revue Marocaine des Sciences Agronomiques et Vétérinaires (2020)8(4).* https://www.agrimaroc. org/index.php/Actes IAVH2/article/download/863/1188

[54] **Samet, K.(2014):**" The brain drain in Tunisia" . *Hommes & migrations,1307 | 2014.* http://journals.openedition.org/hommesmigrations/2891

[55] **Sanchez Puerta, M., Robalino, D., Strokova, V., Lord, N., & Perinet, M. (2015):** "Skills and Jobs: Lessons Learned and Options for Collaboration". *World Bank; Washington*. http://www-wds.worldbank. org/external/default/WDSContentServer/WDSP/IB/2015/

[56] **Steed, S. (2018):**"Too many Graduates are Mismatched to their jobs. What's Going Wrong?".*25Janury2018*.https://www.theguardian.com/higher-education-network/2018 /jan/25/ too-many-graduates-are-mismatched-to-their-jobs-whats-going-wrong

[57] **Touhami, H. (2010):** "Unemployment among Higher Education Graduates : Findings, Origins and Prospects". https://www.leaders.com.tn/uploads/FCK_files/file/diplomes.pdf

[58] **Vérez , J.C .(2013) :"**The Challenges of Education in Mediterranean Countries". *Mondes en développement 2013/4 (n° 164), pages 115 à 138.*https://www.cairn.info/revue-mondes-en-developpement-2013-4-page-115.htm

[59] **World Economic Forum.(2014):**"Matching Skills and Labor Market Needs Building Social Partnerships for Better Skills and Better Jobs". *Global Agenda Council on Employment, January 2014 Davos-Klosters, Switzerland 22-25 January 2014*. http://www3.weforum.org/docs/GAC/2014/WEF_GAC_Employment_MatchingSkillsLaborMarketReport_2014.pdf

[60] **World Economic Forum. (2017):**"The Future of Jobs and Skills in Africa Preparing the Region for the Fourth Industrial Revolution". *WEF:Davos.Reports May 2017*. https://www.weforum.org/reports/the-future-of-jobs-and-skills-in-africa-preparing-the-region-for-the-fourth-industrial-revolution/

Appendices

Appendix 1: Employability rate of recent graduates from the five classes: 2016; 2017; 2018; 2019 and 2020 of ISET Kef

Situation / Year	Employed			Currently unemployed
	Within field of study	Out of field	Higher level studies	
Economics and Management Department				
2016	38%	26%	18%	18%
2017	46%	8%	31%	15%
2018	18%	36%	36%	10%
2019	19%	11%	29%	41%
2020	16%	9%	31%	44%
Technical IT Department				
2016	26%	28%	36%	10%
2017	33%	25%	9%	33%
2018	13%	13%	47%	27%
2019	8%	10%	46%	36%
2020	10%	13%	32%	45%

Mechanical Engineering Department				
2016	52%	18%	12%	18%
2017	60%	20%	10%	10%
2018	42%	17%	17%	25%
2019	17%	20%	20%	43%
2020	19%	21%	19%	41%
Electrical Engineering Department				
2016	18%	21%	20%	41%
2017	23%	23%	23%	31%
2018	10%	30%	20%	40%
2019	7%	12%	48%	33%
2020	7%	15%	52%	26%

Source: Survey conducted by ISET Ke

Appendix 2: Skills required by industrial and agricultural companies based in the governorate of Kef

Overall skills	Skills level	Specific skills required	Compay Ennasr	Company Rinad	Business Lamouchi Abdeljelil	Sun Solution Integration	Nursery Mabrouka Nord Ouest	Company Agriculture Moderne Elemtiez	Comptoir Agricole Du Kef	Ghofran Jardinage Et Service Agricole	Farm Zahwa	Ghzaiel Agricole	Exploitation Agriculture	Business Mohamed Sadek	Exploitation Agriculture Maraichere
SIZING	Sizing electrical and energy installations	Analyze a system from primary resource to useful energy			X	X	X			X	X	X	X	X	X
		Characterize energy production, distribution and use systems (identify, list and describe the principles and functions of equipment)	X	X	X	X		X	X			X			X
		Quantify energy requirements and identify the associated thermal and hydraulic quantities	X	X	X	X	X	X	X	X	X	X	X	X	X
		Draw up a schematic diagram of an installation	X		X	X		X	X			X			X
		Analyze a technical drawing			X	X	X		X	X					

		Calculate the dimensions of cables, protection devices and electrical cabinets	X	X	X	X	X	X	X	X	X	X	X	X	X
OPTIMIZING	**Preparing to implement an energy audit**	Analyze specifications to identify a customer's needs	X	X	X	X	X	X	X	X	X	X	X	X	X
		Distinguish between the different energy audit methodologies			X	X									
		Analyze drawings of required installations			X	X	X	X	X						
		Identify electrical installation equipment and propose an energy optimization plan			X	X									
		Analyze energy bills and energy supplier contracts	X	X	X	X	X	X	X	X	X	X	X	X	X
		Assess the overall condition of a company's installation and its energy consumption	X		X	X		X	X						
		Propose the measurement methods and resources (measurement and metering plan) needed to carry out an energy audit of existing installations			X	X	X				X		X	X	
REALISING	**Identifying and preparing the technical documents needed to install renewable energy sources**	Analyze simplified specifications to identify a customer's needs	X	X	X	X	X	X	X	X	X	X	X	X	X
		Analyze a technical drawing and a schematic diagram	X	X	X	X		X	X	X	X	X	X	X	X
		Identify and quantify supply requirements	X	X	X	X				X	X		X	X	
		Check equipment sizing and determine supply requirements	X	X	X	X		X	X	X	X	X	X	X	X
		Draw up the schematic diagram of a simple installation, and the execution, reservation and incorporation plans	X	X	X	X		X	X	X	X	X	X	X	X
		See which artificial intelligence techniques are suitable for the tasks required	X	X	X	X	X			X	X	X	X	X	X
		Consult suppliers					X			X	X	X	X	X	X
OPERATING	**Ensuring the maintenance of installations**	Distinguish between the different types of maintenance		X	X	X	X					X			X
		Analyze a schematic diagram or technical drawing	X	X	X	X	X	X	X	X	X	X	X	X	X
		Identify the different components of an installation (in particular safety elements)	X		X						X		X	X	
		Draw up a schematic diagram of an industrial installation using artificial intelligence technologies	X		X		X				X		X	X	
		Take measurements to observe the behaviour of an installation and monitor its consumption		X	X	X	X	X	X		X		X	X	
		Carry out maintenance operations		X	X	X	X				X	X	X	X	X

Source: Survey conducted by ISET Kef

Appendix 3: List of specialists in the profession or representatives of the professional sector consulted

Name	Position	Organisation/ Company and Location
M. Idriss Abdelmalek	Sales manager	Camping et maison d'hôte Cindirella Douz
Mme Khouloud Abid	Co-founder and organiser	Groupe El Fallega Tunis (Randonnées et Camping)
M. Ramzi Belarbi	Co-fondateur et organisateur	
M. Moez Ben Abdeljelil	Administrative director	FTAV Sud-Ouest 2 Douz
M. Mohamed Ben Mimoun	Owner and manager	Agence de voyage Grand SudMaison des Sables Douz
M. Abdelmajid Boukhris	General manager (volunteer)	Festival international du Sahara Douz
M. Imed Ben Jlila	Forestier	Parc national de Jbil (bureaux à Kébili)
M. Mohamed Bourouba	Conservateur et technicien principal	
M. Hédi Belhadj Brahim	Owner and manager	Campement au désert Grand Erg Oriental Café culturel Authenticity Douz
M. Mongi Chikhaoui	Member	Association pour la sauvegarde de la médina du Kef Le Kef
M. Salah Kassem	Regional Commissioner North-east zone and Zaghouan	ONTT Tunis
M. Fehti Lebdi	Owner	Maison d'hôte Manara Le Kef
M. Aymen Louhichi	Manager	Tunisia Ecotourism Bizerte
M. Chokri Moussa	Curator and senior technician	Agence de Formation dans les Métiers du Tourisme (AFMT) Tunis
M. Mohamed Souf	Member	Association pour la Sauvegarde de l'Ancien Kébili Kébili
M. Ali Souissi	Commercial director	Tunisia Ecotourism Bizerte
M. Khaled Touil	Owner and manager	Touil Travel Douz
M. Skander Zribi	Owner and manager	Écolodge Dar Zaghouan Zaghouan

Source: Survey conducted by ISET Kef