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## **How successful is the Higher Institute of Energy, Kuwait, in reducing dependence on expatriates?**

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**Abstract.** The role of technical and vocational education in enhancing indigenous capabilities is highly discussed by authors, observers, and academics. In fact, there is a common understanding that technical and vocational education is a dual educational system that allow students to transfer what they have been learned in classroom, laboratories and workshops into real work environment. The success of technical and vocational education would depend on the management mentality in the ability in forging and effective and fruitful linkage with industries and business. It is a management responsibility to identify and determine the level of knowledge, skills, and attitudes that are mostly required by the recipients of technical and vocational graduates. Kuwait, as one of the gulf states, the shortage of indigenous skilled and semi-skilled manpower in noted in essential sectors of the economy (e.g., electricity and water and the oil sector). Decision makers have realized the significant role of technical and vocational institutions in providing essential sectors of the economy with the skilled and semi-skilled national manpower in order to reduce, to great extent, the dependence on expatriates. The Higher Institute of Energy, HIE, was forged by the Kuwaiti Government with the aim to equipped local manpower with the know-how and know-why that are applied in local industries. The research is focus on measuring the perception of a sample of heads of supervisors at the Ministry of Electricity and Water and at the oil sector towards the quality of HIE graduates. The research is based on extensive field work that encompasses a review of the related literature, interviews with a sample of heads of supervisors at the Ministry of Electricity and Water and at the oil sector to assess the quality of field training program and the standard of the HIE graduates. Finally, the research will argue that unless the HIE recognize and appreciate the value of building a strong linkage with local industries, its contribution in tackling the shortage of skilled and semi-skilled indigenous in essential sectors on the economy will be below the government expectations, thus continuing relaying on expatriates for years ahead.

**Keywords.** Technical and Vocational, on-the-job training program, developing Indigenous Manpower, Interaction between technical and vocational education and Local industries· Higher Institute of Energy, Kuwait

### **1. Introduction:**

It is well acknowledged that technical and vocational education is a unique type of education that is completely different from formal education. It is characteristic is the so-called dual system technical and vocational education and training or firms training (Ludwig et., al., 2011). It allows the opportunity for students to acquire the necessary knowledge, skills, and attitude that are mostly needed by industries and business. In fact, with the rapid advancement

of science and technology, industries and business are interested of those who have skills that enable them to deal with the technology already applied in their production activities. Technical and vocational education can be viewed as an education system that encompasses the acquisition of knowledge and equipping learners with practical skills and career-based experience for occupational field. (Ehlers, 2018), and that education which aim to equip youth and adult with knowledge, know-how, skills and/or competences mostly required in particular occupations or more broadly on the labour market. (Cedefop, 2020, UNSCO, 2016) Lacking useful job experience, information data and contacts, young people struggle to compete for available employment. (OECD, 2020, Simone, 2020, The World Bank, 2017) Technical and vocational education would permit lifelong learning opportunities to the youth, enhance their prospects of employability and reduce the demand and supply gap in the workforce market. (Mahendra, 2020) In fact, the NEP (2020) requires all educational institutions to include technical and vocational education into their offerings, thus possibly heralding its explosive growth in the country. A very large number of schools, colleges and universities will join the fold of TVET providers in the coming decade, making TVET available to millions of students while still at school, colleges and universities. (NEP, 2020) However, the continuing spread of Covid-19 in the world has created an unforgettable and significant consequences that affected the life of human being. It causes economic and social disruption that left millions of people without work. Covid-19 pandemic has placed a considerable pressure on the health infrastructure, labour markets and rate of employment to a degree never seen before. (UNESCO, 2020) In a survey conducted by UNESCO and World Bank on 126 countries revealed that 90% of respondents indicated total closure of TVET centers in their country and virtually 98% of respondents reported disruption of work-place learning. (UNESCO, The World Bank, 2021) The unexpected and sudden closures of technical and vocational education colleges and centers has introduced, without hesitation, the online teaching which is without doubt cannot replace the quality of the present of students in classes, workshops, and laboratories. The majority of technical and vocational colleges and centers were unable to transfer the required skills, whereas others find a way through apprenticeship with highly precaution rules and procedures. The conversion to online teaching showed a crucial deficiency in some countries due to the lack of electricity, access to internet connectivity, communication apparatus, and inadequate preparation and readiness of lecturers and trainers to convert to online platforms. According to an international survey, many countries and training providers were insufficiency prepared to cope to the pressure resulted from covid-19 pandemic. (International Labour Organization, 2021) The transfer to online teaching can be described as a process of learning by doing or learning by mistake. Online teaching has focus on increasing the number of students attending a certain meeting rather than the quality of teaching and the extent of achieving course objectives. This was worsening by the inability of lecturers and trainers to transfer the necessary skills that are required by industries and business. Technical and vocational education curriculum is design to encompasses the know-how and know-why that enable students to perform in a real work place. Online learning is perceived as an effective method to enhance the quality of teaching since increases student's interaction with lecturers and trainers, encourage students to attend classes, and ensuring learning satisfaction. (Belaya 2018, Bignoux 2018) Technical and vocational education require students to obtain the necessary knowledge, skills, and attitudes that in most need of industries and business. Therefrom, online learning requires a careful design of the content to tackle those obstacles converting students in achieving course objectives. (Indira and Indira, 2017, Muthuprasad, 2020). Lecturers and trainers must exert efforts to apply and explore all educational technologies to achieve satisfactory outcomes. (Ferreira, 2018) The role of teachers in technical and vocational education is highly discussed

in related literature. (Sallimah, et., al., 2021, OECD, 2021, Muhammad, et., al., 2020) Teachers' beliefs may be influenced through professional development for technology integration in the TVET curriculum (Sallima, et., al., 2021), the success of learning would depend on quality of teacher's relationship with students (Gabriela, 2016), teachers must focus of career education, as a career is how teachers organized education to work after students leaving school (Education Service Austria, 2021), due to the changes in working life, innovations and variable skills requirements change rapidly the role of VET teachers and trainers. (NSVETT 2020)

Technical and vocational education and training, TVET, is essential in promoting self-directed and sustainable development by strengthening human resources in developing countries (Woo & Kim, 2018). TVET has a great potential in reducing poverty, increase change for employment, high wages, and livelihood for workers, particularly younger workers. Kuwait as one of the gulf states has realized the importance of technical and vocational education in reducing the dependence on expatriates, especially in essential sectors on the country's economy (e.g., oil, electricity and water, health care, constructions). It is the believe of the Kuwaiti government that technical and vocational education would accelerate the country's economic and social growth as well as preparing students to take over expatriate in the most crucial sector in the economy. The Kuwaiti government has forged the Public Authority for Applied Education and Training, PAAE&T, to respond to the urgent of essential sectors of the economy from semi and skilled indigenous manpower. The PAAE&T aims include interaction with major institutions in the labour market, training national manpower, joint research with local industries, and linking programs to society's needs and requirements. In another word, the Kuwaiti government attention is not only to prepare students to the world of work but also to closing the gap between technical and vocational institutions and local industries. The PAAE&T has five colleges and eight training centers. The Higher Institute of Energy, HIE, was first established. In 1968 under the name of the Electricity and Water Center and was affiliated with the Ministry of Electricity and Water. However, in 1982 moved to the Public Authority of Applied Education and Training and afterword's change its name to the Higher Institute of Energy. The main objective of the HIE, is "to be the first locally and regionally in the field of qualification and certified technical training in the field of energy, creating job opportunity for Kuwaiti youth, meeting the development requirements of the State of Kuwait and providing technical and professional trained output that seriously contribute with its arms efforts to advance the development wheel in the country and improve production and service quality". (The PAAE&T main Website.) The HIE consists of the flowing departments: Department of Water Resources, Department of Electrical Networks, Department of Mechanical Forces, Department of Electrical Forces, Department of Chemical Processes, General Management Department. The current population of Kuwait in 2021 is 4,328,550 a 1.36% increase from 2020. Expatriates account for about 70% of Kuwaiti population, among which 1.1 million Arab expatriates and 1.4 million Asian expatriates. (World Population Review, 2021) The focus of this research is to examine how successful is the Higher Institute of Energy in reducing dependence on expatriates in the Ministry of Electricity and water and at the oil sector. It hopes that the results of this research would guide the management of the HIE in setting and implementing an appropriate and an efficient plan that would contribute significantly in enhancing the quality of the HIE graduates. Thus, reducing the level of dependence on expatriates at the Ministry of Electricity and Water and at the oil sector.

### **3. Research Objectives:**

- a. To identify and examine the level of interaction between the Higher Institute of Energy and the recipients of the HIE graduates (The Ministry of Electricity and Water and the oil sector).
- b. To identify and examine the perception of the selected heads of supervisors at the Ministry of Electricity and Water and the oil sector towards the quality of the field training program.
- c. To identify and examine the perception of the selected heads of supervisors at the Ministry of Electricity and Water and at the oil sector towards the quality of the HIE graduates.
- d. To identify and examine those obstacles (if any) that might affect the quality of the HIE graduates.
- e. Discussions and Recommendations.

The outcomes of the research would indeed guide the management of the Higher Institute of Energy, HIE, to improve the quality of their graduates. In addition, enhancing the standard of academic staff and enrich their knowledge, skills and attitudes towards strong collaboration with the recipients of the HIE graduates. Overall, achieving the HIE objectives in providing the recipients of the HIE graduates with skilled and semi-skilled indigenous manpower. Thus, reducing dependence on expatriates at the health sector.

## **4. Materials and Methods**

### **4.1 Design**

This research consisted of a descriptive survey designed to identify and examine the type of interaction between the HIE and the recipient of the HIE graduates (the Ministry of Electricity and Water and the oil sector). The research focused on whether students acquired the necessary knowledge, skills and attitudes that are suitable to the recipients of the HIE graduates. In addition to, examining the perception of the recipients of the HIE graduates towards the quality of the HIE graduates. The research focused on the requirements as well as the obstacles that may hinder the enhancement of the quality of teaching and learning at the HIE as well as the methods for strengthen the linkage with the Ministry of Electricity and Water and the oil sector

### **4.2 Sample**

The research encompassed interviews with (6) heads of supervisors at the Ministry of Electricity and Water and (6) heads of supervisors at the oil sector. The selected heads of supervisors have more than 20 years of working experience and have a direct contact with either the HIE students who are attending field training programs and/or the HIE graduates who are officially employed at the Ministry of Electricity and Water and at the oil sector five years ago until now. Among the issued that were discussed are: students attitudes towards attending field training program, level of knowledge and skills, ability to use machines and tools, understanding technical terms, communications skills, and attitudes towards working at the Ministry of Electricity and Water and at the oil sector. The research also focuses on examining the perceptions of selected heads of supervisors towards the quality of the HIE graduates who already working at the at the Ministry of Electricity and Water and at the oil sector. Among the issues that were discussed are: attitudes towards working at the Ministry of Electricity and Water and at the oil sector, the level of knowledge and skills, communication skills, the ability to deal properly with machines, devices, and tools, work ethics, work loyalty, understanding

technical terms, and the ability to solve existing technical problems. Interviews were conducted with a sample of (15) graduates who are already working at the Ministry of Electricity and Water and (15) graduates who are already working at the oil sector. The aim is to investigate and measure their views towards the quality of teaching and learning while they were attending the HIE.

#### **4.3 Instrumentation**

The target population for this research consists of interviews with (6) heads of supervisors at the Ministry of Electricity and Water and (6) heads of supervisors at the oil sector. The selected heads of supervisors have more than 20 years of working experience and having either direct contact with the HIE students who are attending field training program and/or the HIE graduates who are officially working at the Ministry of Electricity and Water and the oil sector five years ago until now. The aim is to obtain an in-depth information on the quality of the HIE graduates and the level of work readiness. Interviews were conducted with a sample of (15) graduates who are already working at the Ministry of Electricity and Water and (15) graduates who are already working at the oil sector. The aim is to investigate and measure their views towards the standard of teaching and learning while they were attending the HIE.

#### **4.4 Statistics and Parameters**

The statistics pertain to the sample. The parameters pertain to an entire population.

#### **4.5 The research parameters/sample are as follows:**

- (a) Interviews were conducted with (6) heads of supervisors at the Ministry of Electricity and Water and (6) heads of supervisors at the oil sector.
- (b) Interviews were conducted with a sample of (15) graduates who are already working at the Ministry of Electricity and Water and (15) graduates who are already working at the oil sector.

### **5. Research Findings:**

#### **5.1 The Characteristic of the Research Sample.**

Interviews were conducted with (6) heads of supervisors at the Ministry of Electricity and Water and (6) heads of supervisors at the oil sector. The selected heads of supervisors have more than 20 years of working experience and having either direct contact with the HIE students who are attending field training program and/or the HIE graduates who are officially working at the Ministry of Electricity and Water and the oil sector five years ago until now. The objective was to examine their perception towards several issues related to field training program (e.g., students' attitudes towards participating in field training program, ability to use machines, devices, and tools), and evaluating the quality of the HIE graduates (e.g., communication skills, work loyalty and work ethics).

#### **5.2 Measuring the level of collaboration between the HIE and the Ministry of Electricity and Water and the oil sector.**

There is no doubt that the collaboration between both parties would indeed enhance the quality of the HIE graduates. In addition to, improving the quality of the HIE curriculum, laboratories and workshops, safety and health procedures and rules, field training program, students' evaluation scheme, and implementing joint committee. Technical and Vocational education provides employers with skilled and semi-skilled manpower at the same time

reducing the rate of unemployment specially among young generation. The rapid advancement of science and technology, particularly in production techniques and methods force technical and vocational education institutions to apply new learning and teaching techniques to respond to industrial needs and business requirements. On other hand, industries and business have to strengthen their relationship with technical and vocational education institutions in order to close the gap and thus enhance students and graduates' competencies in various field of production methods and techniques. The dynamics of relationship between technical and vocational education institutions and industries and business is highly stressed in related literature. (OECD, 2018, Australian Government Productivity Commission, 2021, Triki, 2008, Yorke and Knight, 2019) The contribution of a strong linkage between technical and vocational education and local industries and business is manifest itself in reducing rate of unemployment, particularly in youth unemployment (Simone 2020), enhancing students' knowledge and skills (The World Bank, 2017), and strengthening teachers' competencies and personality (OECD, 2021, Gabriela, 2016), reviewing and monitoring curriculum to respond to industrial needs (Bohmann, 2007), forming proper policy and strategy for future manpower needs analysis (Khawla 2011, Ministry of Education and Sports, 2019), enhancing and upgrading the learning process to be compatible with industrial requirements (OECD, 2021), and maintaining a strong partnership for ensuring a continuing future successful collaboration (Florinda, 2021). An effort has been exerted to interview selected heads of supervisors at both the Ministry of Electricity and Water and at the oil sector. The types of collaboration between both parties are revealed below.

***Identifying types of collaboration with the HIE and the Ministry of Electricity and Water and the oil sector.***

Joint Efforts in:	Available	Not-Available
Creating Data Base		✓
Setting Plan/Action Plan		✓
Curriculum Review & Development		✓
Updating Workshops & Laboratories		✓
Setting Student's Evaluation Scheme		✓
Setting Criteria for Assessing Graduates		✓
Consultancy Committee		✓

Note: The above percentages are an approximate estimation obtained from the selected heads of supervisors at the Ministry of Electricity and Water and at the oil sector.

Joint Efforts in:	Available	Not-Available
Conducting Joint Research		✓
Joint Seminars	✓	
Health & Safety Protocol		✓
Needs Analysis		✓
Determining level of: Knowledge		✓
Level of Skills		✓
Level of Attitudes		✓
Joint Meetings		✓

Note: The above percentages are an approximate estimation obtained from the selected heads of supervisors at the Ministry of Electricity and Water and at the oil sector.

Joint Efforts in:	Available	Not-Available
Assessing Field Training Program		✓
Setting Criteria for HIE Students Enrollment		✓
Sharing Technological Information		✓
Inviting of Experts		✓
Participation in Inventions Exhibitions		✓
Exchange of Staff		✓
Visiting the Recipients of the HIE Graduates	✓	

Note: The above percentages are an approximate estimation obtained from the selected heads of supervisors at the Ministry of Electricity and Water and at the oil sector.

Selected heads of supervisors at the Ministry of Electricity and Water and at the oil sector have been interviewed and questioned on the types of linkage with the Higher Institute of Energy, HIE. The research revealed no tangible evidence of an effective collaboration with

the recipients of the HIE graduates in various academic activities. Among the absent of significant aspects of collaboration were as follows:

a) The lack of data bank.

An effort has been made to identify whether the selected heads of supervisors have been approached by staff from the HIE for forging a data based. It is a crucial to established a data bank that would include names and contact numbers of those staff at the HIE who are responsible for teaching and training students to be ready to work at the Ministry of Electricity and Water and at the oil sector In addition to, gathering and storing relevant information and data regarding the number of students who are expected to be graduates from the HIE in the near future and the number of HIE graduates who are already working at the Ministry of Electricity and Water and at the oil sector. It is highly advisable that the HIE have an access to the names and contact numbers of those who are supervising the HIE graduates at the Ministry of Electricity and Water and at the oil sector to allow a free access to information and data regarding the quality of the HIE graduates. Regrettably, the findings of this research revealed that no data base or data bank have been allocated nor in the process of completion between both parties.

b) The lack of a plan and/or action plan.

An attempt has been made to investigate whether the selected heads of supervisors have a mutual plan set with the HIE to ensure high quality of graduates. Indeed, it is considered highly significant to set a professional plan that embedded objectives that are focusing on how to improve the standard of students at the HIE as well as on how to enhance graduates' competencies at the Ministry of Electricity and Water and at the oil sector. A plan that consists of objectives that are realistic and measurable to allow both parties (the Ministry of Electricity and Water and the oil sector), to jointly review, monitor, and evaluate the standard of the HIE graduates. Unfortunately, the findings of this research revealed that no indication of a professional joint plan and/or action plan that encompasses essential and realist objectives or aims that are related to reducing dependence on expatriates, especially at the recipients of the HIE graduates, nor a plan that focuses on monitoring and assessing the quality of the HIE graduates.

c) The lack of joint efforts in curriculum development.

It is well understandable that curriculum design, review, and monitoring in technical and vocational education is different from its counterpart in formal education (e.g., schools, colleges, universities). Technical and vocational education is described as a dual system type of education that comprises theory and practical work at employer workplace. There is no doubt that the contents of technical and vocational curriculum focus on determining the level of knowledge, skills, and attitude that are mostly needed by industries and business. Therefore, the contribution of industrial and business in reviewing, updating, and monitoring curriculum in technical and vocational education is one of most priority of those who are running technical and vocational institution. In another word, industrial and business have to be involved in assessing the quality of curriculum, particularly those skills and attitude which are in current practice at industrial and business work place. The success of technical and vocational education graduates would depend, to great extent, on the degree of industrial and business involvement in setting practical and measurable criteria's in judging the quality of vocational graduates' competencies. The findings of this research indicated without doubt, that there are no efforts

have been noted by both parties (the Ministry of Electricity and Water and the oil sector and the HIE) to review, monitor, update, and evaluate the curriculum at the HIE.

d) The lack of joint efforts in update the HIE laboratories and Workshops.

Indeed, science and technology are in a rapid change and efforts to cope and deal with the advancement of technological machines, devices, monitors, and tool is extremely difficult. When heads of supervisors at the Ministry of Electricity and Water and at the oil sector questioned whether the HIE staff have contacted them for an advice for assessing and updating the types of machines, devices, monitors, and tools, the reply was negative “no”. It is essential that students at the HIE to practice on recent machines, devices, monitors, and tools that are compatible with the technical facilities at the Ministry of Electricity and Water and at the oil sector. Indeed, this would encourage students to practice what they have been learned at the HIE place into a real working environment. In addition to, strengthen the quality of the HIE graduates since they would totally familiar with the use of the same machines, devices, monitors, and tools that are available at the Ministry of Electricity and Water and at the oil sector.

e) The lack of joint efforts in setting student’s evaluation scheme.

The Ministry of Electricity and Water and the oil sector must play a vital role with the HIE in setting student’s evaluation scheme that would contribute significantly in ensuring that students receive the right and relevant level of knowledge, skills, and positive attitudes that are in need by the recipients of the HIE graduates. A joint effort to establish student’s assessment performance scheme must be one of most importance priorities of the HIE. The participation of the Ministry of Electricity and Water and the oil sector in forming those criteria related to the enhancement of the quality of the HIE students would indeed ease the way to a high standard of graduates. The joint efforts in monitoring and adjusting student’s performance criteria to respond to the advancement of technical machines and tools and production techniques and methods would reduce and/or overcome any obstacles that may occur when the HIE graduates formally employed at the Ministry of Electricity and Water and the oil sector. When heads of supervisors questioned to indicate if there is a joint effort with the HIE to forge student’s evaluation scheme, the answer was negative “no”.

f) The lack of joint efforts in assessing the quality of HIE graduates.

It is highly recommendable that both parties participate in evaluating the standard of the HIE graduates through joint committee. It is through such committee the heads of supervisors at the Ministry and Electricity and Water and at the oil sector can provide a sincere and truly feedback on the competencies of the HIE graduates while they are officially employed at the recipients of the HIE graduates. In addition to, providing a useful information on the quality and accuracy of the level of knowledge, skills, and attitude that are acquired by the HIE graduates. A more useful information and data can be also provided by the Ministry and Electricity and Water and at the oil sector on the performance and attitudes of the HIE students while there are on field training program. Despite the importance of such committee, no evidence has been allocated in respect to the existence of a joint committee between both parties (the Ministry and Electricity and Water and at the oil sector and the HIE) to evaluate the quality of the HIE graduates who are already employed at the recipients of the HIE graduates. The absent of a joint committee would, indeed, hinder the improvements of the quality of the HIE graduates.

g) The lack of joint efforts in conducting joint research.

Research and development are highly importance in solving various issues concerning the quality of the HIE graduates. A constant evaluation and monitoring of the competencies of the HIE graduates through research and development would prevent and overcome any escalation or deficiencies that might occur during their present at the Ministry and Electricity and Water and at the oil sector. The joint research and development between both parties would allow a free flow of significant information and data and permit a fruitful exchange of experiences. However, the findings of this research revealed a clear absent of a joint research and development activities that would have, if well organised and implemented, a significant positive impact on the quality of teaching, learning, and training of the HIE graduates.

h) Joint efforts in conducting joint seminars.

A free exchange of information's and successful experiences between both parties would, without doubt, enhance the quality of students attending the HIE and its graduates. An active joint seminar between both parties is viewed as one of most academic activities that would help in improving the quality of the HIE graduates and in maintaining a strong relationship. Other aspects of strengthen collaboration can be also investigated to ensure free exchange of information and set a realistic recommendation for upgrading the standard of the HIE graduates.

i) The lack of joint efforts in enhancing safety and health procedures and rules.

The constant use of machines and tools would expose students and graduates to a certain hazard if safety and health procedures and rules not properly applied and monitored. Therefore, students and graduates who attend the Ministry and Electricity and Water and at the oil sector must be aware of the risk involved when working in a hazardous area. It is highly recommended that the HIE cooperate positively with the Ministry and Electricity and Water and at the oil sector to forge a safety and health procedures and rule. This would strength the relationship between both parties and protect the life of students and those who are already working at the Ministry and Electricity and Water and at the oil sector.

j) The lack of joint efforts in determining needs analysis.

The HIE must be aware of the proximate number of those who should join the Ministry of Electricity and Water and at the oil sector in the near future. It is the responsibility of both the HIE and the Ministry of Electricity and Water and the oil sector to forecast the need of graduates in different fields of speciality. The objective of determining need analysis is to help both parties in identifying the number of skilled and semi-skilled national manpower required by the Ministry of Electricity and Water and at the oil sector in the coming years. Unfortunately, no sign of a collaboration between both parties in a joint effort to perform a proper manpower needs analysis nor in determining the number of graduate's that are required by the Ministry of Electricity and Water and at the oil sector in the forthcoming years.

k) The lack of joint efforts in determining the level of knowledge, skills, and attitudes.

The Ministry of Electricity and Water and at the oil sector are not interested in graduates who have extensive knowledge that are not relevant to their work techniques and methods. In addition to, avoiding those graduates who are not properly skilled to deal with the type of production machines and tools applied in their work activities. The recipients of the HIE graduates reject those graduates who show negative attitudes towards working outdoor or

dealing with machines and tools. Thus, both parties must consider an effective collaboration to determine the level of knowledge they are required for those graduates before their employment. In fact, technical and vocational education is a dual system type of education that concentrate on specific knowledge that students and graduates must acquire before enrolling at the Ministry of Electricity and Water and at the oil sector. It is the responsibility of the HIE to open the gate for fruitful interaction with the Ministry of Electricity and Water and at the oil sector to agree on the current and future skills that graduates must obtained and able to practical in a real working environment. Attention must be also paid to students and graduates' attitudes since the recipients of the HIE graduates require sincere and honest skilled and semi-skilled indigenous manpower who are truly eager to work at the Ministry of Electricity and Water and at the oil sector premises.

l) The lack of joint efforts in conducting joint meetings.

The management of the HIE must considered forging a joint committee with the Ministry of Electricity and Water and at the oil sector. It is an opportunity for both parties to meet and discuss relevant matters concerning their interest and aspiration in meeting the country overall manpower plan. A joint committee would allow a free transformation of information and data and secure a continuing of a strong relationship between both parties so that objectives can be accomplished.

m) The lack of joint efforts in forging a consultancy committee.

A joint consultancy committee between both parties would not only strengthen relationship but also open a new window for a better and a successful contribution in achieving short, medium, and long-range objectives that are embedded in the overall country's manpower plan

n) The lack of joint committee in evaluating field training program.

The existing of a joint committee that focus on assessing the quality of field training program is highly recommended. It would provide both parties with the actual information on student's real interaction with trainers and the ability to transfer what have been learned at the HIE into a similar work environment. Lecturers and trainers can absorb student while they are present on field training program and speculate whether students are sincerely interested in working at the Ministry of Electricity and Water and at the oil sector. It is also an opportunity for students to familiarise with the type of machines, devices, monitors, tool, and working environment that they would expect to work in the near future.

o) The lack of committee for setting criteria for HIE students' enrolment.

It is preferable that the HIE consider inviting a member from each of the recipient of its graduates in the selecting and interviewing committee for those who wishes to enrol at the HIE. Their involvement would contribute is evaluating candidates' personality and attitude since the recipient of the HIE graduates already have an extensive experience of the HIE graduates' personality and their real motive behind their willingness to employ at the Ministry and Electricity and Water and at the oil sector.

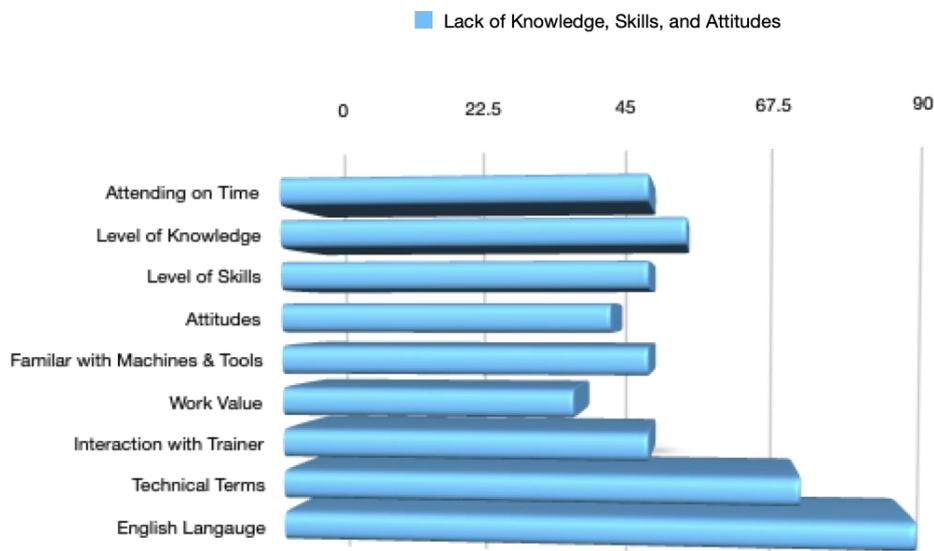
p) The lack of exchange of technological Information.

The exchange of a free technological information between both parties would light a shade on new scientific and technological machines, devices, monitors, and tools fall into the interest of both parties. The creation of an information channels between both parties would

close the gap and allow for the movement of new information, new learning and teaching techniques, exchange of lecturers and trainers, and establishing contact with external counterpart education and training institutions. It is worth mentioning at this point that, there is an evidence of staff visiting from the HIE to the recipients of the HIE graduates to exchange information regarding field training program.

### **5.3 Examining the perception of the Ministry of Electricity and Water and the oil sector regarding the quality of HIE field training program.**

An attempt has been made to examine the perception of selected heads of supervisors at the Ministry of Electricity and Water and at the oil sector towards various aspects related to field training program. The findings are clearly showed below.



Note: The above percentages are an approximate estimation obtained from the selected senior supervisors at the Ministry of Electricity and Water and at the oil sector.

It highly stress in related literature that technical and vocational education is different from a formal education that is taught at formal schools and universities. It is globally agreed that technical and vocational education is considered as a dual type of education system. This implies that students spend certain time in industrial and business workplace to transfer what has been learned in classroom, workshops, and laboratories into real work place. The main characteristic of a dual system is an apprenticeship which links technical and vocational institutions with real workplace. It is an opportunity that allow closing the gap between both parties (the Ministry of Electricity and Water and the oil sector and the HIE) in order to facilitate the transfer of students from colleges and institutions to work place. The findings of the research revealed that approximately 50% of HIE students attend field training program on time since there is an assessment and scores allocated for student's attendance. The selected heads of supervisors have been asked to evaluate the level of students' knowledge, skills, and attitudes during field training program. They stated that approximately 55% of students have an acceptable level of knowledge, approximately 50% of students have acceptable level of skills, and approximately 45% of students have acceptable level of positive attitude. However, approximately 50% of those students attending field training program seemed unfamiliar with

the types of machines, devices, monitors, and tools applied at the Ministry of Electricity and Water and at the oil sector. In respect to students' interaction with trainers, approximately 50% showed a positive attitude towards trainers. The selected heads of supervisors at the Ministry of Electricity and Water and at the oil sector strongly suggest that the Higher Institute of Energy must exert a considerable effort in stressing on the issue of work value since approximately 40% of students are eager to transfer to other departments for a better allowance. It was notable that students lack basic technical terms (approximately 70%), and a clear lack of speaking and writing skills in English language (approximately 85%).

#### **5.4 Examining the perception of the Ministry of Electricity and Water and the oil sector regarding the quality of graduates from the Higher Institute of Energy, HIE.**

An attempt has been made to evaluate the quality of the HIE graduates who are already working at the Ministry of Electricity and Water and the oil sector five years ago until now. Interviews have been conducted with selected heads of supervisors at the recipient of the HIE graduates and the results are showed below.

Quality of HIE Graduates		
Elements	%	Comments
Ready to Work with Machines & Tools	50%	Attitudes
Ready to Work Outdoors	45%	Lack of Skills & Attitudes
Reliance on Contractors	100%	Contractor Agreement
Understanding Technical Terms	50%	Lack of Knowledge & Skills
Lack of Effective Communication	35%	English Language Skills
Unfamiliar with Machines	100%	LED & Solar Energy
Acceptable Level of Knowledge	45%	Lack of Knowledge

Note: The above percentages are an approximate estimation obtained from the selected heads of supervisors at the Ministry of Electricity and Water and at the oil sector.

The research findings revealed that approximately 50% of those graduates who are already employed by the Ministry and Electricity and Water and at the oil sector five years ago until now, are not ready or unwilling to work with machines and tools and prefer to work in offices rather than workshops or laboratories. In fact, the selected heads of supervisors indicated that approximately 45% of those graduates are not keen to work outdoors especially at the summer season where the temperature record is very high. The graduates found to extensively depend on contractor workers (100%) who can bear the high temperature and complete work under difficult and hard circumstances. The selected heads of supervisors noted graduates clear lacking of technical terms (approximately 50%), and only approximately 35% who are able to communicate, speaking and writing, in an acceptable level of English language. Surprisingly

enough, the selected heads of supervisor’s stress on the need to enhance graduates’ knowledge and skills in Light-Emitting Diode (LED), and Solar Energy (SE), since they have not showed any knowledge or skills in such widespread electrical technological systems and devices. The level of graduate’s knowledge is rated by the heads of selected supervisors as an acceptable for only approximately 45% of the graduates, approximately 45% of graduates for the level of skills, and approximately 40% of graduates for level of positive attitudes.

**Quality HIE Graduates**

Elements	%	Comments
Acceptable Level of Skills	45%	Lack of Skills
Acceptable Level of Attitudes	40%	Lack of Positive Attitudes
Aware of Safety & Health Procedures	50%	Lack of Knowledge & Skills
Inability to Solve Technical Problem	85%	Lack of Skills
Inability to Understand Technical Drawings	80%	Lack of Skills
Inability to Understand Elec. Components	85%	Lack of Knowledge & Skills

Note: The above percentages are an approximate estimation obtained from the selected heads of supervisors at the Ministry of Electricity and Water and at the oil sector.

The issue of safety and health procedures and rules are essential since graduates would work in a hazardous working environment and the probability of accidents occurrence is very high and could be an expected. The HIE must ensure students are well aware of safety and health procedures and rules and must practice applying a high standard of safety and health precautions, since only approximately 50% of graduates showed a proper safety and health practice. It was also notable that graduates have not practice (approximately 85%) on solving possible technical problem that might occur while working with machine, devices, and tools related to their field of specialty nor understanding (approximately 80%) different technical drawings that are applied at the Ministry of Electricity and Water and at the oil sector. The selected supervisors have also noted graduates’ unfamiliarity with specific electrical devices components (approximately 85%) that are related to their field of specialty.

**Quality of Graduates**

Elements	%	Comments
Inability to Write Technical Report	70%	Lack of Knowledge & Skills
Lack of Innovation Skills	100%	Lack of Innovation Knowledge & Skills
Undesired to gain New Knowledge & Skills	65%	Lack of Skills & Attitudes
Inability to use Recent Technical Software	100%	Lack of Knowledge & Skills
Inability to Apply Team Work Approach	75%	Lack of Skills & Attitudes
Inability to Cope with Work Stress	65%	Lack of Skills & Attitudes

Note: The above percentages are an approximate estimation obtained from the selected heads of supervisors at the Ministry of Electricity and Water and at the oil sector.

It is part of graduate's skills to able to write and understand technical reports, however approximately 70% of graduates seem unable to write proper technical report. The HIE must widen students' knowledge and skills and encourage innovation skills since no concrete evidence were noted in graduate's (approximately 65%) ability or interest in innovation and creativity nor in acquiring recent knowledge and skills related to their specialty. The use of computer software related to graduate's specialty is significant in enhancing their knowledge and skills and connect them with the world of new technology, since no strong evidence support their ability to apply new software to assess and enhance their competencies at work place. Indeed, working environment either at the Ministry of Electricity and Water and or at the oil sector would place graduates in a challenging and uncomfortable situation that require special skills and attitudes in coping with work stress. However, approximately 65% of graduates showed inability to adapt to work pressure and stress. The issue of team work is so essential to cooperate graduates' efforts and time to achieve the setting objectives at work place, however approximately 75% graduates were unfamiliar with such crucial concept of collective work sprite.

**Quality of HIE Graduates**

Elements	%	Comments
Constant use of Mobile Phone	85%	Lack of Work Ethics
Inability to deal with Critical Tech. Situation	75%	Lack of Skills & Attitudes
Inability to Access Update Information	65%	Lack Computer Skills
Lack of Self-Development Skills	80%	Lack of Skills & Attitude
Inability to Understand Power Station Sections	75%	Lack of Knowledge & Skills
Lack of Skills in Elect. Circuit Networks	65%	Lack of Knowledge & Skills

Note: The above percentages are an approximate estimation obtained from the selected heads of supervisors at the Ministry of Electricity and Water and at the oil sector.

The selected supervisors have annoyed by the graduate's constant use of mobile phone at work (approximately 85%), despite the repeat reminders and warnings. The HIE must emphasis on strengthen student's ability in dealing with unexpected critical technical situation since approximately 75% of graduates lack suck significant skills. The ability of graduates in dealing with unexpected critical technical situation would help is applying a proper and accurate action to tackle any unpleasant consequences. The use of communication technology is importance so that students and graduates can reach and updated information. Regrettably, approximately 65% of graduates are unable to access new technical information and data from specialized network data base. The need for self-development must be one of the HIE priority to enhance students and graduates' level of knowledge, skills, and attitudes. Unfortunately, approximately 80% of graduates are unaware or not interested, maybe for the time being, in enriches their competencies in their field of specialty. The Ministry of Electricity and Water and the oil sector use a high technological machines, devices, monitors, and tools that are require a careful and sophisticated work planning design. For instance, the design of an electricity power station or a refinery complex is not a simple process. Therefore, graduates must understand at least the main sections of electrical power station that are exist at the Ministry of Electricity and Water as well as understanding the main sections of the distribution of oil production and refinery layout at the oil sector since approximately 75% of graduates are not aware of the main section involved at the work place sites. In addition to, enhancing graduates' ability to thoroughly understand electrical circuit networks that is already applied and monitored by the Ministry of Electricity and Water. The absent of such information and skills (approximately 65%) from the graduates who are already working at the Ministry of Electricity and Water and the oil sector would require a re-training and re-assessment that would consume efforts, time, and cost.

An attempt has been made to measure the perception of a sample of graduates who are already working at the Ministry and Electricity and Water and at the oil sector regarding the

quality of teaching and learning while they were attending the HIE. The selected graduates confirmed that the standard of the HIE workshops and laboratories are not, to great extent, compatible with its counterparts at other external institutions nor with the workshops and laboratories at the Ministry and Electricity and Water and at the oil sector. The selected graduates stress on the need to concentrate on specific details topics related to their field of specialty rather than discussing general topics. As a senior HIE graduates who elaborated on this issue and stated “we are not at a high school nor at a formal education college, we were at the HIE which is a technical and vocational type of education which must tackle those issue directly related to our job descriptions and specification as an official employee at the Ministry and Electricity and Water and at the oil”. On the other hand, the selected heads of supervisors at the Ministry and Electricity and Water and at the oil confirmed that graduates from the HIE lack significant knowledge and skills regarding essential issues related to their specialty, such as: inability to clarify type of electrical shocks and its consequences, types of insulated electrical networks and the degree of danger involve, electrical networks safety rates, how to calculate length of street lights, proper position for fixing street lights, defining position of street light on two ways road, different types of street light (public street, motorways, domestic street, reaction center), methods of fixing street light on different facilities, regulation regarding level of lighting power set by the Ministry of Electricity and Water, types of electrical networks, electrical power station lines, devices used to identify defect underground cables, factors affecting the performance of electrical power stations, the use of electrical devices for underground cable/pip locator system, types of electric volts, meaning of light-emitting diode (LED) and its efficiency (cost, lighting distribution range , types, degree of weather resistance and components), solar energy (definition which is the transfer of sun and then converted into thermal or electrical energy, domestic, commercial, and industrial sites usages, cost, and limitation), understanding and interpreting electrical drawing at a refinery sites, types of energy sources at the oil sector, average power requirements for air compressor, chemicals pumps, downhole pump (10hp), electric actuator, solar package, understanding and interpreting drawings for the electric power field and electrical one line diagram.

## **6. Discussion and Conclusions**

The importance of electricity in our life is significant, and living without electricity is unimaginable. Electricity and water are importance for sustaining and enhancing economic growth and social development. (Julia, et., al., 2020) The demand for the consumption of energy and water is increasing due to the fast growing of population, changing of consumer consumption habit, the high rate of commercial and industrial usage. In fact, the majority of water in the electricity sector is consumed for generating electricity (about 88%), especially for cooling processes at thermal power station plants, with thermal power station plants accounting for about 70% of the today’s international installed power station plant capacity. (OECD, 2016)

According to U.S. Energy Information Administration (2021), USA is considered the second major country in the production of electricity and generates around 4327 terawatts per hour of energy. The outbreak and spread of Covid-19 pandemic in the world have creating a critical and challenging situation for decision makers to ensure the continuing supply of electricity and water, particular to the health sector. “The most important challenge for electricity companies in the region has been to ensure the continuity of services despite the effects of the pandemic. This isn’t an industry in which people can work from home; you have to operate 24/7 to ensure electricity reaches homes reliably,” says Ariel Yépez, chief of the Energy Division at the Inter-American Development Bank (IDB, 2021). In respect to Kuwait, the country has one-tenth of the world’s proven oil reserves and has a considerable natural gas

reserve. Kuwait is heavily dependent on oil export and accounts about 90% of export revenue. Due to the rapid grow of population, the Kuwaiti government-built desalination plants at Kuwait City and several other locations. As mentioned earlier, Kuwait remains heavily dependent on foreign labour, despite the efforts to reduce dependence rate of expatriates.

It is well acknowledged that, technical and vocational education is considered as a dual type of education system that allow the transfer of theory into real work place. It is an education that would ease the transfer of students from schools and colleges after graduates into an assigned job in industries and business premises. The success of technical and vocational education would depend, to great extent, on the ability of the management of technical and vocational education to apply an appropriate and effective criterion in the selection of students who wishes to joint technical and vocational institutions. In Kuwait as in many gulf states (e.g., United Arab Emirates, Bahrain, Oman), The shortage of skilled and semi-skilled is highly noted in essential sector of the economy. Expatriate form approximately 88.5% of the United Arab Emirates population, 70% in Kuwait, and 53% in Bahrain. The Kuwaiti government, as in other gulf states, has realized the importance of enhancing indigenous capabilities, particularly in essential sectors of the country's economy (e.g., oil, electricity and water). As a result, the Kuwaiti Government has established the Public Authority for Applied Education and Training, PAAE&T, which has five colleges and eight training centers. The Higher Institute of Energy, HIE, was first established. In 1968 under the name of the Electricity and Water Center and was affiliated with the Ministry of Electricity and Water. However, in 1982 moved to the Public Authority of Applied Education and Training and afterword's change its name to the Higher Institute of Energy. The main objective of the HIE, is "to be the first locally and regionally in the field of qualification and certified technical training in the field of energy, creating job opportunity for Kuwaiti youth, meeting the development requirements of the State of Kuwait and providing technical and professional trained output that seriously contribute with its arms efforts to advance the development wheel in the country and improve production and service quality". (The PAAE&T main Website.) The HIE consists of the flowing departments: Department of Water Resources, Department of Electrical Networks, Department of Mechanical Forces, Department of Electrical Forces, Department of Chemical Processes, General Management Department.

The findings of this research suggest that there is no concrete evidence have been allocated for a strong collaboration between the HIE and the Ministry of Electricity and Water and with the oil sector in various importance aspect of academic and practical activities. In respect to evaluating the quality of graduates who are already employed five years ago until now, at the Ministry of Electricity and Water and at the oil sector. Interviews were conducted with selected heads of supervisors. The selected heads of supervisors have more than 20 years of working experience and have a direct contact with either the HIE students who are attending field training programs and/or the HIE graduates. The findings of this research revealed that quality of the HIE graduates is below the accepted standard. The link between the Ministry of Electricity and Water and the oil sector and the Higher Institute of Energy is absent in various essential aspect such as: joint efforts in creating a joint data bank, setting a plan/action plan, joint efforts in curriculum development, joint efforts in update the HIE laboratories and Workshops, joint efforts in setting student's evaluation scheme, joint efforts in assessing the quality of HIE graduates, joint efforts in conducting joint research and development, joint efforts in enhancing safety and health procedures and rules, joint efforts in determining needs analysis, joint efforts in determining the level of knowledge, skills, and attitudes, joint efforts in conducting joint meetings, joint efforts in forging a consultancy committee, joint committee

in evaluating field training program, joint efforts in forming a committee for setting criteria for HIE students' enrolment, and joint efforts in exchange of technological Information.

In regard to field training program offered by the HIE, selected heads of supervisors at the Ministry of Electricity and Water and at the oil sector indicated that approximately 55% of students have an acceptable level of knowledge, approximately 50% of students have acceptable level of skills, and approximately 45% of students have acceptable level of positive attitude. However, approximately 50% of those students attending field training program seemed unfamiliar with the types of machines, devices, monitors, and tools applied at the Ministry of Electricity and Water and at the oil sector. In respect to students' interaction with trainers, approximately 50% of students showed a positive attitude towards trainers. The selected heads of supervisors at the Ministry of Electricity and Water and at the oil sector strongly suggest that the Higher Institute of Energy must exert a considerable effort in stressing on the issue of work value since approximately 40% of students are eager to transfer to other departments for a better allowance. It was notable that students lack basic technical terms (approximately 70%), and a clear lack of speaking and writing skills in English language (approximately 85%).

An attempt has been made to evaluate the standard of the HIE graduates who are already working at the Ministry of Electricity and Water and at the oil sector five years ago until now.

The research findings showed that approximately 50% of graduates are not ready or unwilling to work with machines and tools and prefer to work in indoor offices rather than workshops or laboratories, approximately 45% of graduates are not keen to work outdoors, 100% of graduates depend entirely on contractor workers to complete job, approximately 50% of graduates lacking technical terms, and approximately 35% of graduates only who are able to communicate, speaking and writing, in an acceptable level of English language, approximately 85% of graduates have not practice solving possible technical problems, approximately 80% of graduates unable to understand different technical drawings, approximately 85% of graduates' unfamiliarity with specific electrical devices components that are related to their field of specialty, approximately 65% of graduates not interested in innovation and creativity nor in acquiring recent knowledge and skills related to their specialty, approximately 65% of graduates showed inability to adapt to work pressure and stress, and approximately 85% of graduates tend to use mobile phone at work despite the repeat reminders and warnings. The level of graduate's knowledge is rated by the heads of selected supervisors as an acceptable for only approximately 45% of the graduates, approximately 45% of graduates for the level of skills, and approximately 40% of graduates for level of positive attitudes. The selected heads of supervisors at the Ministry of Electricity and Water and at the oil sector stress on the need to enhance graduates' knowledge and skills in Light-Emitting Diode (LED), and Solar Energy (SE), since graduates from the HIE have not showed any knowledge or skills in such widespread electrical technological systems and devices. The HIE graduates must understand at least the main sections of electrical power station that are exist at the Ministry of Electricity and Water as well as understanding the main sections of the distribution of electrical lines and drawings applied at the oil production and refinery plants since approximately 75% of graduates are not aware of the main section involved at the work place sites. In addition to, enhancing graduates' ability to understand electrical circuit networks that is already applied and monitored by the Ministry of Electricity and Water. The absent of such information and skills (approximately 65%) from the graduates who are already working at the Ministry of Electricity and Water and the oil sector would require a re-training and re-assessment that would consume efforts, time, and cost.

The overall research findings confirmed, without any doubt that, the absent of concert evidence of a significant and effective participation with the recipients of HIE graduates (the Ministry of Electricity and Water and at the oil sector). The aim of the country is to reduce

dependence on expatriates. However, this objective seems to be out of reach, for the time being, since the HIE is not seriously considering forging a strong and a fruitful collaboration with the Ministry of Electricity and Water and at the oil sector in various essential academic and practical activities. The clear lack of graduate's knowledge, skills, and attitudes is highly notable in this research. The management of the HIE must exert efforts to enhance the quality of its graduates and set a strict rules and requirements before accepting those who are willing to service at the Ministry of Electricity and Water and at the oil sector. Unless the Higher Institute of Energy thoroughly realized the importance of forging a link with the Ministry of Electricity and Water and at the oil sector, Kuwait would continue, without doubt, relying on expatriates for years ahead.

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