Practices and Prospects of Enhancing Employability of Addis Ababa University Engineering Graduates

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Received: 20 November 2020; Accepted; 18 April 2022

Abstract: The purpose of this study was to examine the practice and prospects of graduate employability at the Institute of Technology, Addis Ababa University. The study employed a mixed approach in which the quantitative aspect was a descriptive survey design. Four departments from three schools were purposively selected and included in the study. A total of 161 final-year (graduate class) students were selected by using a simple random sampling and all their respective instructors (i.e., 64) were consulted. Furthermore, two career center heads, two department heads, and three professional association heads were purposively selected and included. The data were collected by means of a questionnaire, interview, and document review. The collected data were analyzed through quantitative analysis techniques: mean percentage, independent sample t-test, principal components analysis and one way ANOVA. The qualitative data were analyzed thematically. The result of the study indicated that out of 29 employability enhancement factors, 17 factors were identified as significant factors by the principal factor analysis technique and used for further parametric tests. The study results also showed that instructors and students had similar awareness about graduate employability. Besides, one-way ANOVA signified that there were no statistically significant differences among departments in employability enhancement practices in three sets of employability enhancement practices out of four. Finally, the study concluded that the employability enhancement practices do not give adequate support to help students enhance their employability possibilities in the current and future labor market. The study recommended that the university needs to promote employability pedagogy that includes the practice-based and work-based teaching-learning process.

Keywords: Employability, Employability Enhancement, Final-Year Students, Perceived Employability

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Background of the Study

The global economy becomes vibrant because of different shocks (financial and economic crisis) and political and social instability (e.g., the Arab spring, Brexit). In 2017, the global growth showed recovery to 3.4 percent from 3.1 percent projected slowdown in 2016 (IMF, 2016). However, the unemployment rate is still very high because of the number of employees (27 million) lost their job as the result of the crisis and the additional number of new entrants (40 million) of labor force joining the labor market each year. Governments are challenged both economically and politically because of the imbalance between the number of new jobs created and job seekers (ILO, 2018). In addition, in developed nations knowledge and intangible capital are increasingly recognized as being the dominant factors for economic development (Tholen, 2010). Even though the emerging and developing nations have not reached at knowledge-based economy level, due to globalization, they also consider knowledge and intangible capital as a dominant factor for their economic development. Thus, the current world economy is expected to create more new jobs for labor force with competent knowledge and intangible capital and minimize the effect of unemployment on creating political and social instability.

The concept of employability emerged in 1900 as the concept of 'dichotomy employability' i.e., the state of employment or unemployment but it has got high attention in the higher education arena since 1980 (Small, Shacklock and Marchant, 2018). Furthermore, like the quality of education, it is a controversial and wooly concept and difficult to pin-down (Cranmer, 2006; Harvey, 2001; McQuaid & Lindsay, 2005). Therefore, there is still a disagreement on the conceptualization of employability among professionals.

Employability has been defined from various perspectives such as from skills/personal attributes at the workplace, duration to get the first employment, career development, and lifelong learning. For instance,

the Confederation of British Industry (as cited in Harvey, 2001 p.97) defined employability as *the possession by an individual of the qualities and competencies required to meet the changing needs of employers and customers and thereby help to realize his or her aspirations and potential*. Yorke (2004 p.8)) gave a descriptive definition by defining employability as *a set of achievements – skills, understandings, and personal attributes – that makes graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community, and the economy*. Likewise, Bhola and Dhanawade (2013) defined employability as an individual's capability, ability, success, chance, adaptability, and competency to gain employment and be successful in their chosen occupation. Tomlinson (2012) considered employability in a broader view by defining it as a social construct based on negotiation between the graduate and the wider economic and social structure. Yorke and Knight (2007 p.58) interpret employability by comparing it with employment. They state that *employability is a graduate's (or other awardees') suitability for appropriate employment. It is quite different from actually getting an appropriate job, which is dependent on factors such as the state of the economy and patterns of discrimination in the labor market.* Generally, all definitions commonly indicated that graduates should be suitable for appropriate employment and succeed in their careers. Suitability for appropriate employment is achieved mainly through education and training. The higher education system in Ethiopia has a short history of less than a century, starting from the establishment of the first higher education institution in 1950, University College of Addis Ababa (UCAA). Up to the mid of the 1990s, the country's higher education system on the shoulders of this university and a few specialized colleges in different cities such as Haramaya, Ambo, Jimma, and Gondar. Higher education in Ethiopia, from its start to present, has a major purpose of preparing graduates for the world of work. To achieve this purpose, the higher education institutions have been attempting to equip graduates with different skills appropriate for

the labor market through their core missions; teaching-learning, research, and community services.

Currently, the higher education system in Ethiopia is organized and led by an independent ministry by merging science and higher education, and comprising of TVET as the Ministry of Science and Higher Education (MoSHE) (FDRE, 1097/2018). The number of public higher education institutions has reached 45 and all these public higher education institutions are established and governed by the federal government. The major role of higher education institutions is preparing a competent labor force for both the national and international labor market. Different policies such as the education and training policy (TGE, 1994), Higher Education Proclamation (FDRE, 1152/2019), 70:30 program mix policy direction (MoE and MoCB, 2007), and National Employment Policy and Strategy (MoLSA, 2017) support the production of the competent labor force. Moreover, these policies and strategies gave priority for the production of a large number of labor forces in science and technology fields. Because of the supportive environment, large number of students in the fields of science, engineering and technology were placed in most public higher education institutions. In relative terms, a few numbers of students were placed in the social sciences and other programs to meet the 70:30 policy. Preparing graduates requires equipping graduates with different skills and capabilities and making them employable in changing labor market contexts.

Addis Ababa University (AAU), which was established in 1950 as the University College of Addis Ababa (UCAA), is the oldest and the largest higher learning institution in Ethiopia. Over 222,000 students have graduated from AAU since its establishment. As per the recent reports, partly due to the incapability of industries to absorb graduates and low employability of graduates, high graduate unemployment is observed in the country (MOE, 2016).

Therefore, it is very imperative and sensible to study the employability enhancement/ development practice of higher education institutions because unless the graduates are prepared to be employable, they will not be competitive, employed, and productive in the world of work. Besides, enhancing graduate employability is done in collaboration with the different stakeholders like higher learning institutions, industries, and professional associations. Therefore, it is important to consider the awareness and consensus of different stakeholders such as students, instructors, and academic leaders on graduate employability enhancement practice. This paper is structured as follows: it briefly presents problem statement, methodology of study, study findings, discussions and, finally the conclusion and recommendations.

Statement of the Problem

Higher education institutions are supposed to prepare graduates for the labor market by equipping with the necessary knowledge, skills, and personal attributes that can be used by graduates to be successful in their chosen career and play their role in the economic, social and, the political transformation of the country (TGE, 1994; Yorke and Knight, 2007). However, currently higher education institutions are not always succeeding in preparing graduates either to be docile employees, business/work leaders or entrepreneurs (Nel & Neale-shutte, 2013). This inadequacy leads to question the employability enhancement/ development practice of higher education institutions. The employability enhancement practice can be linked with program relevance, curriculum responsiveness, teaching and assessment methodology, research practice, community service, industry-university linkage, and other employability enhancement opportunities in the university. Since the concept of employability is very recent in higher education and it is a concept constructed based on the nature of the dynamic labor market, there are still disagreements among professionals about the conceptualization of employability, models,

practices, strategies to enhance graduate employability in higher education institutions.

In recent years in Ethiopia employment and graduate employability have become a policy and research agenda in higher education. As a result, different studies have been conducted in the area of employment and graduate employability. For instance, Henok (2018) investigated the skill profile of business graduates coming out of Addis Ababa University and the direct and indirect effects of skills on graduates' employability. The study employed exploratory and confirmatory factor analyses and the findings of the study indicated that generic skills have a positive and direct effect on employability. As well, Jerusalem (2016) examined the linkages between higher education and the labor market in Ethiopia with a particular focus on the factors influencing employment opportunities of engineering graduates of Addis Ababa and Bahir-Dar Universities. The findings of this study indicated that the employment status of the 2012 engineering graduates of Addis Ababa University Institute of Technology and Bahir-Dar University Bahir-Dar Institute of Technology is found to be too late for the majority in terms of the duration after graduation even for those engineering graduates who can secure jobs within six-month' time. Moreover, the study finding indicated that the main employer in the Ethiopian labor market tends to be the public institutions, followed by private institutions, while the self-employment category remains to be minimal. In general, these studies indicated that there is a problem with employment and graduate employability among public higher education institutions graduates.

According to Hailemelekot (2013), Henok (2018) and Jerusalem (2016) studies, most graduates lack job-searching techniques, necessary skills and other capabilities for the world of work, and there are different factors that affect employability of graduates. Because of this, graduates have different employment status i.e., some graduates

employed within a short time after graduation and others take long time to be employed.

The Addis Ababa University Institute of Technology like other higher learning institutions in the country faces high graduate unemployment problem. For instance, a tracer study conducted on the Addis Ababa and Bahir-Dar University Institute of Technology indicated that graduates took more than six months to secure their first job and the number of graduates employed in self-employment category was minimal (Jerusalem, 2016). These findings clearly indicated that the gaps in graduates' employability enhancement of the Institute of Technology. In general, previous studies (Hailemelekot, 2013; Henok, 2018; and Jerusalem, 2016) in Ethiopia focused on employment status of graduates. There is no much evidence on the preparation of graduates for world of work. Therefore, the current study is necessary to examine the graduate employability enhancement of engineering graduates of Addis Ababa University Institute of Technology.

Addis Ababa University Institute of Technology has over 60 years of experience and highly qualified and experienced instructors in higher education and industries. Besides, it has relatively better workshops and a good proximity advantage for various industries found in Addis Ababa. However, the Institute does not show better graduate outcomes in the labor market as it used to be. Therefore, this study is planned to examine the employability enhancement practices in the institute, identify gaps in the area of graduate employability enhancement practices and their prospects for future employee environments. The following basic questions are designed to guide the overall research process:

- The level of awareness and consensus of instructors, students, academic leaders about the enhancement of graduate employability
- The current status of graduate employability enhancement practices at Addis Ababa University Institute of Technology
- The extent different graduate employability enhancement practices (teaching- learning, co-curricular activities, Projects, Employability Development Opportunities) contribute to enhancing the perceived employability of students?

In addition to these basic questions, some hypotheses are made to guide the study:

- There is no significant difference between instructors and students in employability awareness.
- There is no significant difference on employability enhancement practices among departments.
- There is no significant difference in student's perceived employability between sex and department.
- Employability enhancement practices have no contribution to students' perceived employability.

Review of Literature and Model for the Study

Employability is how individuals engage with opportunities, reflect, and articulate their skills and experiences. Besides, three core process have significant impact on employability of graduates i.e., the pedagogic process that encourages development; self-reflection by the student and articulation of experiences and abilities.

Graduate employability is studied from different perspectives in different areas of the world because employability has a dynamic and context-specific nature. Different studies (like Christina and Tine, 2017; Cranmer, 2006; and Gill, 2018) indicated that practices that are

undertaken at higher education institutions such as curriculum development, pedagogy, co-curricular activities, entrepreneurship, internationalization, and career development opportunities and forums have contributions to enhance employability of graduates. However, graduate employability enhancement has best intentions but the outcomes are varied based on each practice. For instance, according to, Cranmer, (2006); Brigdstock (2009), Christina and Tine (2017), Lim et al (2011), and Wye and Lim (2009) structured work experience, employer involvement in degree course design and delivery, real work situations, students' assessment of their competencies and tracking their progress towards self-improvement in the course of their studies were found to have positive effects on graduates' outcomes.

Moreover, Dacre-Pool and Sewell (2007) and Yorke and Knight (2007) showed that fostering continuous improvement (portfolio) and professional judgment have an impact on employability enhancement. Further, Støren and Aamodt (2010) related quality indicators and employability of graduates by surveying graduates of 13 European countries and the result of the study indicated that the characteristics of the study program and modes of teaching-learning which were taken as quality indicators in the study seem to have minor effects on the chances of obtaining a job but significant effects on doing the job. Most studies were relayed on quantitative data and the variability of the study findings implied that the employability enhancement practice at higher education is still vague and needs further study.

Likewise in Africa, Bezuidenhout (2011) studied the development and evaluation of a measure of graduate employability in the context of the new world of work and a cross-sectional survey was utilized to collect data from a random sample of final-year undergraduates and postgraduates from the college of economics and management sciences at a higher distance learning institution in South Africa. The findings informed that the conceptualization of the employability constructs, the elements it consists of, and how it can be measured

validly and reliably. However, the study is done in the context of South Africa and the measures cannot be used for other contexts.

By and large, this study was guided by using the following graduate employability development as a conceptual framework. The graduate employability development model (Figure 1 below) indicates the employability development process through engagement in employability development, reflection and articulation. Besides, the model considers different activities related to curricular, extra-curricular and employability development opportunities to develop employability. Moreover, employability development opportunities are affected to some extent by the subject discipline of the graduate. Some programs like engineering and technology areas tend to be more active than others in promoting employability, either because they more readily lend themselves to developing particular employability attributes, or because of a need to ensure engagement with the world of work. The model is carefully chosen to this study because it fits to examine the engineering graduates' employability enhancement.

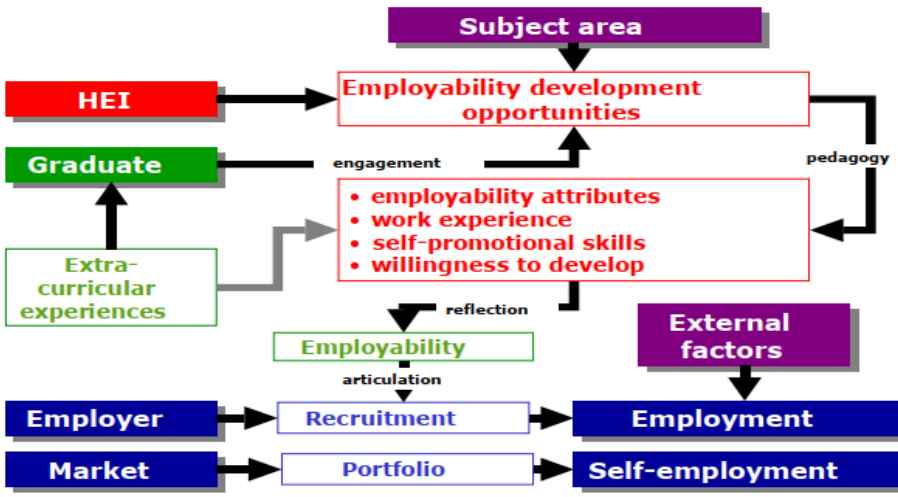

Fig. 1. *A model of Graduate Employability Development* **(**Harvey and Morey; 2002, p. 18.)

Definition of Terms

Career a lifelong endeavor comprising behaviors, attitudes and feelings in a developmental process driven by people's work and life goals and moderated by the organizations they work in (Creed and Hood,2009, p.2).

Career development: Career services supporting the development of graduate attributes by taking various curricular and extra-curricular approaches and integrate career development learning into various disciplinary curricula (Creed and Hood, 2009, p.3).

Employability: A set of achievements – skills, understandings, and personal attributes – that makes graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy (Yorke, 2004, p.8)

Employability enhancement: The process of preparing graduates for first employment/self-employment, career success, and lifelong productivity by equipping them with necessary capitals or competencies (knowledge, skills, attitude, and personal attributes) for the current and future labor market (ILO, 2018).

Methodology of the Study

Study Approach and Design

Mixed research approach was employed in this study to get a comprehensive understanding of employability enhancement practice in the selected undergraduate engineering programs of Institute of Technology in Addis Ababa University by collecting both quantitative and qualitative data over time (Creswell, 2014). Besides, convergent parallel mixed research design was applied to enable the researcher typically to collect both forms of data at roughly the same time and then

integrate the information in the interpretation of the overall results. Moreover, the quantitative portion of the study was descriptive survey.

Study Area

The study setting is Addis Ababa University (AAU) which is a pioneer higher education institute in Ethiopia. Currently, AAU runs 73 undergraduate programs and 366 graduate programs in ten colleges, 11 research institutes, and two technology institutes. One of the technology institutes is the Addis Ababa Institute of Technology (AAiT), which was established about 60 years ago. Currently, there are over 5500 undergraduate and 4500 graduate (M.Sc. and PhD) students enrolled in the various programs of the Institute. Besides, the Institute has six schools and four centers with 388 academic staff and about 600 administrative and technical staff.

Sampling Techniques

This study was focused on four undergraduate programs, i.e., civil, mechanical, electrical, and software engineering, from three schools because most of the graduates are from these programs and the unemployment rate is high in these programs. Besides, only final-year students were considered because they had passed through different employability practices and they were ready to join the labor market. Out of the 961 final year students in the selected undergraduate programs sample size of 282 is determined by using Yamane's sample size determination formula and individual samples were selected by using proportional random sampling. Regarding the instructors, all instructors of final-year students were included in the study because the number of instructors was manageable. Besides, career center heads, the three selected department heads, and professional associations related to selected departments were included purposively in the study.

Data Collection Tools

Questionnaire, interview and document review were used to collect data. Concerning the questionnaire both standardized and self-prepared questionnaires were used to collect data from graduating class students and their respective instructors. Standardized tool is used to measure perceived employability of students and self-prepared questionnaire was used to measure employability enhancement practice. The use of both standardized and self-prepared tools was to increase the validity of the tools. Moreover, the questionnaire consists of both open and close-ended questions designed in a Likert scale format with response categories strongly agree (5), Agree (4), (3) undetermined, (2) disagree, (1) strongly disagree. The questionnaire contains three major components: awareness and consensus about graduate employability (21 items), practice of employability enhancement (32), and perceived employability of students (39 items). The questionnaires were prepared in English language.

To ensure the reliability of the questionnaires, a pilot test was conducted by involving 20 students and 11 instructors who were not included in the sample of the study. The calculated Cronbach Alpha for the five Likert-scale items was found to be 0.89 and based on the result seven items were reworded and three items were totally deleted. Regarding the content validity of the instruments, the contents were judged by two experts in the area of educational policy and items were revised based on their comments. Interview was conducted with three department heads in Amharic language at the Institute. Each interview took 25 minutes on average and conducted at the office of the department. Concerning the document review, it is made to review the contents of the documents such as curricula, strategic plan, and yearly reports on employability enhancement practice were reviewed by preparing leading questions. Out of 282 selected only 198 (70%) students were returned the questionnaire and 37 questionnaires were incomplete out of 198 returned. Therefore, a total of 161 final-year

students' questionnaire and 64 instructors (i.e., included using comprehensive sampling) questionnaires were used for final analysis. Further, two career center heads, two department heads, and three professional association heads were purposively selected and included in the study.

Data Analysis

Both quantitative and qualitative data analysis techniques were employed. More specifically, quantitative data analysis techniques such as mean, percentage, independent sample t-test, principal components analysis, one way ANOVA, and multiple regression analysis were employed. Throughout the analysis, three (3) was used as a hypothetical mean score to indicate the level of respondents 'agreement. Besides, 0.05 alpha (or significance level) level was used to determine whether statistically significant differences exist between instructors and students, male and female, and among four departments of the institute. Finally, for correlation analysis, correlation values between.10 and .39 were referred to as weak positive relationships; between .40 and .69 as moderate positive relationships; and .70 and above as high positive relationships. Besides, thematic analysis i.e., based on the research questions, was used to analyze the collected qualitative data.

Ethical Considerations

In mixed method research, the issue of ethics is very important (Creswell, 2009). Therefore, the current study employed various techniques to respect the rights, needs, values, and desires of the informants. The respondents were given a short explanation about the purpose of the research and filled the questionnaires based on their full consent. The anonymity of participants was handled by numerically coding each returned questionnaire and keeping the responses confidential. While conducting the individual interviews with the selected respondents, they were assigned codes for use in their

description and reporting the results. All study data, including the survey electronic files, interview tapes, and transcripts, were kept in locked metal file cabinets in the researcher's office and would be destroyed after a reasonable period of time.

Findings of the Study

Respondents' Background Information

As shown in Table 1 below, (61) 95.31 percent of instructors were male and only (3) 4.68 percent were female. This shows that majority of the instructors of final-year students were males and this may lead to male-dominated teaching-learning process that may have an impact on the employability enhancement of female students in their final year. Regarding students, 107 (66.45 percent) were male and 54 (33.54 percent) and in this case, also the number of male students in the sample is greater than female students. These findings have implications for the future employee environment that the situation appears to be very competitive for females in getting employment opportunity.

Table 1: Respondents' Sex and Departments

Roll No	Variable	Categories	Instructors		Final year students	
			N	%	N	%
1	Sex	Male	*61*	*95.31*	*107*	*66.45*
		Female	*3*	*4.68*	*54*	*33.54*
		Total	*64*	*100.00*	*161*	*100.00*
2	Department	Mechanical Engineering	*16*	*25.00*	*43*	*26.70*
		Electrical Engineering	*18*	*28.12*	*40*	*24.84*
		Civil Engineering	*19*	*29.68*	*45*	*27.95*
		Software Engineering	*11*	*17.18*	*33*	*20.49*

Source: Researcher own survey

As depicted in Table 2, all students, and 161 (100%) were in the age range of 20 to 25 and this means all are in the age range of youth. This implies that employability enhancement practice in the Institute will focus on identifying the needs of young people and design a suitable strategy to address their needs. Besides, graduates are joining the labor market at the right age and the future employee environment will be overwhelmed by the youth.

Table 2: Age of Respondents

No	Participants		Age	
			N	%
1	Students	20-25	*161*	*100*
		26-30	-	-
		More than 30	-	-
2	Instructors	25-30	*14*	*21.875*
		31-40	*44*	*68.75*
		More than 40	*6*	*9.375*

As displayed in Table 3 below, the majority of instructors, 43 (68.25 percent) participated as part-time employee/ volunteer/ entrepreneurial/ freelancer in a job related to their current job. This indicated that instructors have an opportunity to get competencies (Knowledge, skills, and attitude) needed in the current labor market and this is good to enhance their students' or graduates' employability. In relation to students, however, the majority i.e., 133 (82.60 percent) of the students did not participate in part-time employee/ volunteer/ entrepreneurial/ freelancer in a job related to their current field of study. These may hinder the employability enhancement practice at the university because students are less aware of the competencies (Knowledge, skills, and attitude) needed in the current and future labor market. This may make future employee environment difficult for employees and organizations. Besides, it may decrease the productivity of industries.

Table: 3 Participation in a Part-time Job-Related Activities and Professional Associations

No	Items	Instructors				Students			
		Yes		No		Yes		No	
		N	%	N	%	N	%	N	%
1	Have you participated as part-time employee /volunteer/ entrepreneurial/ freelancer in a job related to your current job/field of study?	*43*	*68.25*	*21*	*32.81*	*28*	*17.39*	*133*	*82.60*
2	Are you a member of a professional association (like professional associations of civil engineers, mechanical engineers) in students or professional associations in your field of study?	*21*	*33.33*	*43*	*67.18*	*21*	*13.04*	*143*	*88.81*

Source: Researcher own survey

In relation to participation in professional associations, Table 3 also portrayed that 43(67.18 percent) of instructors and 143 (88.81 percent) students did not participate in their respective professional associations. This may harm employability enhancement endeavors and future employee environment since professional associations work for betterment of professionalism and competency of members of the associations.

The Level of Awareness and Consensus of Instructors and Students, about Graduate Employability

As indicated in Table 4 below, the awareness about employability and stakeholders' consensus on employability is below the mean (M=3). The mean of instructors' awareness of employability is 2.92 and students' is 2.75 that show numerically both instructors and students

have low and approximately similar awareness of employability. This low awareness of employability indicated that both instructors and students were not doing well to prepare successful graduates for the labor market.

Table 4: The Level of Awareness and Consensus of Instructors and Students about Graduate Employability

No	Items	Participants	N	M	SD	Skew	Kurtosis
1	Awareness about employability	Instructors	64	2.92	0.22	-.93	1.04
		Students	161	2.75	0.49	-0.49	-.96
2	Stakeholders' consensus on employability	Instructors	64	2.34	0.97	-	-
		Students	161	2.53	1.32	-	-

Source: Researcher own survey

In addition, the key informants' interviewees also support this result and one of the key informants puts his idea as follows:

> ...both instructors and students are not well aware of employability and employability enhancement rather they worried about teaching-learning issues like course completion, assessment, and grading. (Department Head -01)

Furthermore, an independent sample t-test is done to observe whether there is a significant difference in awareness of employability and employability enhancement between instructors and students. As can be seen in Table 5, the instructors and students' distribution were sufficiently normal for conducting a t-test (i.e., Skew <|2|, Kurtosis < |9| or both are between -1 to 1 or less than three times their respective standard errors).

Table 5: Independent t-test on the Awareness on Employability between Instructors and Students

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Awareness on employability	Equal variances assumed	14.05	.00	3.15	223.00	.00	.17	.05	.06	.27
	Equal variances not assumed			3.84	184.89	.00	.17	.04	.08	.26

Source: Researcher own survey

Additionally, as shown in Table 5, the assumption homogeneity of variance was tested and satisfied via Levene's F-test, F (184), 14.05, p=0.00. The independent sample t-test was statistically significant, t (184) =3.84, P=.00. Thus, instructors were associated statistically significant larger mean of awareness of employability.

Moreover, regarding the stakeholders' consensus on employability enhancement, Table 4 above showed that both instructors and students rate the stakeholders (both in the university and industry) consensus on employability as low (M < 3) i.e., instructors (M= 2.34, SD= 0.97 and students (M= 2.53, SD=1.32). This implies that stakeholders such as instructors, students, industries, and professional associations were not working in harmony to enhance graduates' employability.

The Current Status of Graduate Employability Enhancement Practices

To see the current graduate employability enhancement practices, principal factor analysis was run to reduce variables or constructs. Principal components analysis was used because the primary purpose was to identify and compute composite scores for the employability enhancement practices underlying the instrument/ tool used.

Table 6: Enhancement Practices (Factors) of Employability

No	Enhancement Practices (Factors)
	A. Teaching learning practice
1	Practice based teaching -learning
2	Work-based Teaching learning
3	Assessment focus on work-related competencies (skills, attributes, and Attitudes)
4	Practicing presentation skills
5	Group work/teamwork
6	Modules on work related competencies
7	Sandwich courses, theory-Practice-theory
8	Internship/Apparent ship
9	Giving entrepreneurship course
	B. Co-curricular activities
10	Professional clubs
11	Intercultural training
12	Short term skill training
	C. Practices related to assurance of quality and relevance of a program
13	high quality teaching and learning service
14	high quality research service
15	high quality community service
16	Relevant curriculum/courses for the current labor market
17	Evaluation of instructors by students
	D. Employability Development Opportunities
18	Conference and Job fair (an event in which employers, recruiters, and university give information to potential employees)
19	Forum of students and industry /labor to create network
20	Help with CVs. (e.g., Writing)
21	Mock interviews (emulation of job interview for the sake of training) with employers.
22	Help identifying skills gaps
23	Spending time in a business or organization on placement.
24	Help researching the job market
25	Site Visits
26	Entrepreneurship; students run real or simulated businesses
27	Regular attachment with Alumni (former students or their association)
28	Attending professional speaker session
29	Career guidance and mentoring

Factor analysis was done for self-prepared questionnaire on employability enhancement practice. Initially, the factorability of the 29 (Table 6) items was examined. Several well-recognized criteria for the factorability of a correlation were used. Firstly, it was observed that 29 items correlated at least 0.3 with at least one other item, suggesting reasonable factorability.

Table 7: KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.670
Bartlett's Test of Sphericity	Approx. Chi-Square	1394.08
	Df	136
	Sig.	.000

Source: Researcher own survey

Secondly, as shown in Table 7, the Kaiser-Meyer-Olkin measure of sampling adequacy was .67, which is above the commonly recommended value of .6, and Bartlett's Test of Sphericity was significant ($\chi 2$ (136) = 13948.0, $p < .05$). The diagonals of the anti-image correlation matrix were also all over 0.5. Finally, the commonalities were all above 0.3 further confirming that each item shared some common variance with other items. Given these overall indicators, factor analysis was deemed to be suitable for all 29 items. Initial eigenvalues indicated that the first five factors explained 31.58%, 11.29%, 9.26%, and 8.64% of the variance respectively (Table 8). The three-factor solution, which explained 65% of the variance, was preferred because of: (a) its previous theoretical support; (b) the 'leveling off' of eigenvalues on the Scree plot after five factors; and (c) the sufficient number of primary loadings.

Table 8: Total Variance Explained

Components	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
Practicing presentation skills	5.37	31.58	31.58	5.37	31.58	31.58	3.97	23.37	23.37
Group work/teamwork	1.92	11.29	42.87	1.92	11.29	42.87	2.74	16.09	39.46
Modules on work related competencies	1.57	9.26	52.13	1.57	9.26	52.13	1.90	11.15	50.62
Sandwich courses	1.47	8.64	60.77	1.47	8.64	60.77	1.73	10.15	60.77
Internship/Apparent ship	1.25	7.34	68.11						
Giving	0.98	5.76	73.87						
Professional clubs	0.81	4.79	78.66						
Intercultural training	0.72	4.23	82.89						
Short term skill	0.66	3.87	86.76						
High standard teaching and learning service	0.57	3.36	90.12						
High standard Research service	0.45	2.65	92.77						
High standard	0.32	1.85	94.63						
Relevant courses for	0.29	1.73	96.35						
Evaluation of	0.24	1.39	97.74						
Conference and Job fair (an event in which employers, recruiters, and university give information to	0.18	1.07	98.81						
Forum of students and industry /labor to create network	0.12	0.70	99.51						
Help with CVs.	0.08	0.49	100.00						

To see whether there is a difference among the departments in employability enhancement practices mean comparison analysis was done by using one way ANOVA and the result of the test is displayed as follows:

Table 9: Descriptive Statistics of Employability Enhancement Practices

		N	Mean	Std. Deviation	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
TLPs	CE	45	3.08	0.65	2.88	3.27
	ME	44	2.87	0.40	2.75	2.99
	EE	41	2.85	0.37	2.73	2.96
	SE	31	2.75	0.62	2.52	2.97
	Total	161	2.90	0.53	2.82	2.98
CoCurs	CE	45	2.89	0.77	2.66	3.12
	ME	44	2.73	0.59	2.55	2.91
	EE	41	2.95	0.57	2.77	3.13
	SE	31	3.03	0.61	2.81	3.26
	Total	161	2.89	0.65	2.79	2.99
QRAPs	CE	45	3.13	0.69	2.92	3.34
	ME	44	2.86	0.54	2.70	3.02
	EE	41	2.87	0.58	2.69	3.05
	SE	31	2.94	0.57	2.73	3.14
	Total	161	2.95	0.61	2.86	3.05
EDOs	CE	45	2.89	0.75	2.67	3.12
	ME	44	2.83	0.51	2.67	2.98
	EE	41	2.83	0.56	2.65	3.00
	SE	31	2.81	0.60	2.59	3.03
	Total	161	2.84	0.61	2.75	2.94

Note: CE: Civil Engineering, ME: Mechanical Engineering, EF: Electrical Engineering, TLPs=Teaching learning practices, CoCurs =Co-curriculum activities, QRAPs=Quality and relevance assuring practices, EDOs=Employability development opportunities

Table 10: One way Analysis of Variance among the Set of Employability Practices

		Sum of Squares	df	Mean Square	F	Sig.
CoCurs	Between Groups	1.95	3	0.65	1.57	0.20
	Within Groups	64.93	157	0.41		
	Total	66.88	160			
QRAPs	Between Groups	2.08	3	0.70	1.92	0.13
	Within Groups	56.70	157	0.36		
	Total	58.78	160			
EDOs	Between Groups	0.16	3	0.05	0.14	0.94
	Within Groups	58.99	157	0.38		
	Total	59.14	160			

Source: Researcher own survey

As shown in Table 10, all three employability enhancement practices, co-curricular practices F (3, 157) = 1.57, p >0.05; quality and relevant assuring practices F (3, 157) = 1.92, p > 0.05, and employability development opportunities F (3, 157) = 0.14, p >0.05 have P value greater than 0.05. These indicate that there were no statistically significant differences among the four departments in employability enhancement practices.

Further, regarding the status of employability enhancement in the university, the department heads and career heads described it as low status in general. For instance, one of the career heads put his idea about employability status as follows:

> Even though the university has shown great commitment in organizing career centers, the units are not doing as expected. This is because of different challenges such as lack of resources, low awareness of university communities and employers on employability enhancement, and low participation of market actors in employability development. Because of this, the current status employability enhancement is low. (Career Head-01)

The Contribution of Different Graduate Employability Enhancement Practices for Enhancing Employability.

As shown in Table 11, a high percentage of students (19.5 percent) with low perceived employability were indicated in the electrical engineering department and very high perceived employability is indicated in civil engineering.

Table 11: Cross Tabulation between Department and Students Perceived Employability

Scale	Count	Department of students				Total
		Civil Engineering	Mechanical Engineering	Electrical Engineering	Software Engineering	
Low	F	5	4	8	4	21
	% Within Department of students	11.1%	9.1%	19.5%	12.9%	13.0%
Medium	F	8	5	5	5	23
	% Within Department of students	17.8%	11.4%	12.2%	16.1%	14.3%
High	F	21	28	20	20	89
	% Within Department of students	46.7%	63.6%	48.8%	64.5%	55.3%
Very high	F	11	7	8	2	28
	% Within Department of students	24.4%	15.9%	19.5%	6.5%	17.4%

Source: Researcher own survey

As shown in Table 12 below, numerically civil engineering female final year students have the highest mean of perceived employability (M=4.41; SD= 0.14) and software engineering female final year students have the lowest mean of perceived employability (M=3.91; SD= 0.17).

Table 12: Cross Tabulation between Department and Students Perceived Employability

Dependent Variable: Perceived employability					
Department of students	Sex of students	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
Civil Engineering	Male	4.23	0.11	4.00	4.45
	Female	4.41	0.14	4.13	4.68
Mechanical Engineering	Male	4.01	0.11	3.80	4.23
	Female	3.96	0.17	3.63	4.28
Electrical Engineering	Male	3.98	0.11	3.77	4.19
	Female	4.12	0.18	3.77	4.47
Software Engineering	Male	4.05	0.14	3.78	4.32
	Female	3.91	0.17	3.57	4.25

Source: Researcher own survey

Furthermore, to observe if there is a significant difference in student's perceived employability between sex, department, and their interaction two-way ANOVA was used as is shown in the Tests of Between-Subjects Effects table, as shown below:

Table 13: Tests of Between-Subjects Effects

Dependent Variable:	Perceived employability				
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	3.480[a]	7	.497	1.407	.206
Intercept	2308.576	1	2308.576	6533.066	.000
Depart	2.993	3	.998	2.824	.041
Sex	.035	1	.035	.098	.755
Depart * Sex	.605	3	.202	.571	.635
Error	54.065	153	.353		
Total	2744.907	161			
Corrected Total	57.545	160			
a. R Squared = .060 (Adjusted R Squared = .017)					

As indicated in Table 13 there was no statistically significant difference in mean perceived employability between departments (*p* = .04), male and female (p=.75), and interaction of department and sex (p=.63).

To observe the contribution of each graduate employability enhancement practices i.e., teaching learning practice, co-curricular activities, quality and relevance assuring practices, and employability development practice for employability enhancement, a correlation among the variables was done in Table 14 below.

Table 14: Correlation between Employability Enhancement and Perceived Employability

Variables	TLP	Co Cur	QRAP	EDO	Perceived employability
TLPS					
CoCurS	.014				
QRAPS	.204*	.445			
EDOS	.138	.314*	.310		
Perceived Employability	.12	.52*	.69*	.71*	

Source: Researcher own survey

As shown in Table 14 above, moderate to strong and significant correlation was observed, i.e., CoCurS (r= .52, P<0.05), QRAPS (r=6.9, P<0.05), (EDOS r=.71, P<0.05), among employability enhancement practice and students' perceived employability. However, weak and insignificant correlation was observed for the teaching learning practices (r=.12, P>0.05). This indicated that practicing more employability enhancement practices increased student's perceived employability i.e., the knowledge, skill and attitude to work in the labor market.

Table 15: The Contribution of Each Employability Enhancement Practices to Graduate Perceived Employability

Employability Enhancement Practice	Count	β	p-value	R-square	% VOC
CoCurS	161	0.58	0.00	0.07	7
QRAPs	161	0.30	0.00	0.21	21
EDOs	161	0.43	0.00	0.28	28

As shown in Table 15 above, employability development opportunities contribute the highest i.e., 28 percent for enhancement of employability and co-curricular activities contribute 7 percent which is the least as compared to employability development opportunities and quality and relevance assurance practices (i.e., 21 percent).

Moreover, the document analysis indicated that AAU is currently doing employability development by including it in its strategic plan. Based on the plan, a career development center is established at the university level and each campus has career units. The main objective of the career center is providing comprehensive resources and services that are complementary to and integrated with, the academic provision of the university, enabling students and graduates to develop, evaluate, and implement career decisions and employment plans. In addition, since 2017 the University formulated a *deliverology* plan aimed at increasing the employability of graduates and the plan has identified seven relevant strategic actions to realize a 95% employability of the University's graduate by the year 2020. The plan has given a priority for improving students' soft skills, entrepreneurial skills, and career development through intensive training, career guidance, counseling, job fairs, career weeks, and other related activities deemed relevant to enhance the employability of our graduates.

Concerning the curriculum, the current study tried to analyze four departments harmonized curriculum with respect to employability enhancement. Even though there are various frameworks to measure employability inclusion in the curriculum, this study employed its criteria to analyze the curriculums. Among the criteria participation of labor market actors in the curriculum development; inclusion of different types of skills (soft skills, hard skills, or core skills), knowledge and attitude relevant to the labor market; inclusion of different methods and approaches of employability enhancement within teaching -learning, assessment. Based on the analysis, all the curricula tried to identify different types of skills, engineering knowledge as a graduate profile. However, there are gaps in identifying and embedding different methods and approaches of employability enhancement in the curricula. Moreover, the curricula lack involving labor market actors both in preparation and implementation phases.

Discussion

In light of the purpose of the study, it is found that both students and instructors have low awareness and consensuses about graduate employability. Besides, the current status of graduate employability enhancement practices in the institute is low and there were no statistically significant differences among the four departments in employability enhancement practices. Moreover, out of four sets of employability enhancement practices, i.e., teaching learning related, co-curricular related, quality and relevance assuring related, and employability development opportunities, employability development opportunities contributed 28 percent for perceived employability of graduates.

The study results indicate that students and instructors at Addis Ababa University Institute of Technology have shown low awareness of employability and lack of consensuses among stakeholders (students, instructors, and department heads) on employability enhancement.

This means students, instructors, and academic leaders in the institute were not performing well on employability enhancement because of low awareness and lack of consensus on graduate employability enhancement. Moreover, the study finding was indicated that students and instructors were not participating in part-time job-related activities and professional associations even though they have a great impact on increasing employability by creating good practical and real-life opportunity for students. Therefore, the employability of students impacted as result of low participation of students in job-related part-time activities and professional association. In addition, in the future employee environment, industries will be forced to give additional induction training for graduates. These findings are important because they have shown that there are awareness and consensus gaps in employability enhancement in the Institute of Technology Addis Ababa University. These findings are consistent with the findings of Ferns, Dawson, & Howitt's (2019) study that indicated stakeholders' collaboration which is based on their awareness and consensus is important for employability enhancement.

The principal factor analysis technique identified 17 significant factors of employability enhancement. This means some factors contribute much to employability enhancement and doing on these factors enhance the employability of graduates. This finding is very important because it gives hints for students and instructors about the factors that most contribute for graduate employability enhancement. Further, this finding is in line with Anas and Hamzah’s (2017) study that indicated work-based learning such as internship/ apprenticeship as a key factor for employability enhancement.

The data also showed that the practice of employability enhancement in the Institute of Technology of Addis Ababa University is below the average in all four employability practices i.e., teaching-learning practice, co-curricular activities, quality and relevance assuring practices, and employability development practice. This implies that the Institute graduates may face challenges in the labor market both to be

employed/self-employed and reduce their success in the labor market. Besides, the Institute's teaching-learning practice, co-curricular activities, and quality and relevance assuring practices were not practiced in a way that could enhance graduate employability. These findings are significant because they indicate more important employability contributors and prospects of employability enhancement practices. These findings are contradictory to the findings of Christina and Tine (2017) Cranmer (2006**)** and Gill (2018) that indicated the universities teaching-learning, extra-curricular activities and quality assurance activities were practiced in a way that can contribute to enhance graduates' employability. This may be because of a single sample or the study focuses on a single institute.

This study focused on students, instructors, and academic leaders at Addis Ababa University in Ethiopia, and the findings may not apply to other universities. Generalizability is limited as the whole sample was from one university and one institute. A variation of experiences could have been noticed had other universities been incorporated in the study. Although enlightening, the findings of this study may not be generalized to other students who are enrolled at other universities classified under different generations, or any other population of students in Ethiopia. Thus, future studies should utilize samples from several institutions of different generations.

Conclusion

Higher education plays an important role in the economic development and social and political transformation of a nation by producing graduates who are knowledgeable, skilled, and having a positive attitude. This is why most countries, including Ethiopia, invest a large amount of money in higher education. Competent human capital generates and adapts knowledge and technology, creates jobs, engages in problem-solving research and innovation, and meaningfully

serves the community and nations in different professions. To achieve this, higher education institutions must prepare employable graduates.

The current study considered graduate employability practices and its prospect in future employee environment by focusing on selected undergraduate engineering programs in Addis Ababa University Institute of Technology. In general, the study concluded that the employability enhancement practices do not give adequate support to help students enhance their employability possibilities in the current and future labor market.

Recommendations

The findings of the current study have some implications on university leadership and organization, instructors' competency and industries' role in preparing graduates for the current labor market and future employee environment. Based on the findings of the study the following recommendations are forwarded:

- The AAU career center should design and implement platforms to create continuous awareness about employability enhancement and the labor market contexts starting from the freshman program up to graduation for instructors and students to improve their awareness about graduate employability.
- The Institute of Technology should promote employability pedagogy mainly practice-based and work-based methods to improve employability of graduates. This can be done by increasing the duration of the internship program, involving industry experts in the teaching-learning process, and giving high value for the significant participation of instructors, industries and professional associations in their career development process.
- The University career center in collaboration with department heads should design and implement different

employability development opportunities such as regular attachment with alumina, extracurricular activities (e.g., internship, industry expert or entrepreneur mentorship, (un)paid employment during summer), entrepreneurship development project, and graduate-level business projects. These employability development opportunities help to familiarize graduates with world of work and enhance their employability.

- Finally, future research is needed in the area of graduate employability by including the perspective of labor market actors and considering a greater number of universities.

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