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## Discord between Egyptian Agriculture Students' and Employers' Perceptions of the Importance of Various Skills in new Employees

Leah Thompson

*Purdue University*, thomp307@purdue.edu

J. Alex Pasternak

*Purdue University*, jpastern@purdue.edu

Ramjee Ghimire

*Michigan State University*, ghimirer@msu.edu

*See next page for additional authors*

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### Abstract

Unemployment remains high among Egyptian university graduates. This study aimed to identify demographic attributes that influence student perceptions of the importance of employability skills, as well as to measure concordance between employers versus student perceptions of the importance of employability skills. Egyptian university agriculture students and private sector employers completed a survey where they assessed their perceived importance of 35 skills. A multivariate linear regression model was used to measure the influence of student demographics in decision-making and concordance between employers and students were compared using Cohen's weighted Kappa. Student location was the most influential demographic that determined perceptions of the importance of employability skills. As a group, students possessed more intra-group concordance than employers, but concordance levels of all students were low when compared to employers. Our findings indicate that regardless of demographics, Egyptian agriculture university students are unaware of what is important to potential employers, meaning that students do not know which skills to focus on developing when searching for a job. Teaching students the skills that are most desired by employers contributes to Human Capital Theory because it improves the employability value of university graduates. Few studies have analyzed student demographics combined with student/employer concordance. This approach could assist future studies that aim to compare individual student and employer perceptions to each other.

### Keywords

Egypt, employability, university agriculture students, concordance

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### Authors

Leah Thompson, J. Alex Pasternak, Ramjee Ghimire, D. Hashini Galhena Dissanayake, Nanda Joshi, Waleed Saleh, and Paul Ebner

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## **Discord between Egyptian Agriculture Students' and Employers' Perceptions of the Importance of Various Skills in new Employees**

Leah Thompson, Purdue University  
J. Alex Pasternak, Purdue University  
Ramjee Ghimire, Michigan State University  
D. Hashini Galhena Dissanayake, Michigan State University  
Nanda Joshi, Michigan State University  
Waleed Saleh, Cairo University  
Paul Ebner, Purdue University

### **Abstract**

*Unemployment remains high among Egyptian university graduates. This study aimed to identify demographic attributes that influence student perceptions of the importance of employability skills, as well as to measure concordance between employers versus student perceptions of the importance of employability skills. Egyptian university agriculture students and private sector employers completed a survey where they assessed their perceived importance of 35 skills. A multivariate linear regression model was used to measure the influence of student demographics in decision-making and concordance between employers and students were compared using Cohen's weighted Kappa. Student location was the most influential demographic that determined perceptions of the importance of employability skills. As a group, students possessed more intra-group concordance than employers, but concordance levels of all students were low when compared to employers. Our findings indicate that regardless of demographics, Egyptian agriculture university students are unaware of what is important to potential employers, meaning that students do not know which skills to focus on developing when searching for a job. Teaching students the skills that are most desired by employers contributes to Human Capital Theory because it improves the employability value of university graduates. Few studies have analyzed student demographics combined with student/employer concordance. This approach could assist future studies that aim to compare individual student and employer perceptions to each other.*

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## **Introduction**

The Arab Republic of Egypt has experienced rapid population growth in conjunction with urbanization; between 1986 and 2019, the national population doubled to over 100 million people (World Bank, 2020). Annual population growth is estimated to continue at approximately 2% until 2040, when the national population is expected to reach 116 million people (The Arab Republic of Egypt, 2015).

Approximately 60% of Egypt's population is under 30 years of age (Central Agency for Public Mobilization and Statistics [CAPMAS], 2020c). While unemployment in Egypt is approximately 10.45% (World Bank, 2021), unemployment or under-employment among university graduates is substantially higher at 46.9% (CAPMAS, 2020b), which sits in contrast to most countries. In the overall population, unemployment is higher for women (21.3%) versus men (6.7%; World Bank, 2019a; 2019b) and this trend is also seen in unemployment among university graduates where unemployment rates of female university graduates (56.4%) are greater than those of their male counterparts (43.6%; CAPMAS, 2020b). Taken together, these data indicate: 1) potential mismatches in skills acquired at the university and skills needed by employers; and 2) additional barriers specific to women may reduce their employability in their field of study upon graduation.

However, mismatches in skills obtained at university and what is actually desired by employers are not unique to Egypt (Klibi & Oussii, 2013; Lisá et al., 2019; Succi & Canovi, 2019; Wickramasinghe & Perera, 2010). As such, a more detailed understanding of gaps in student readiness would allow development of interventions that improve student employability not only in Egypt, but in a host of other countries with similar unemployment characteristics.

While Egyptian university graduates struggle to find meaningful employment in their field of study, the number of Egyptian university graduates has increased steadily over the past two decades. Approximately 1.9 million students were enrolled in public Egyptian universities in 2018-2019 (CAPMAS, 2020a). In 2007, approximately 318,000 Egyptians graduated from Egyptian universities; in 2018, that number rose to over 430,000 (CAPMAS, 2019).

The high unemployment rates among Egyptian university graduates are likely functions of several interacting factors. The World Economic Forum (Schwab, 2019) assessment for "skillsets of university graduates" ranked Egypt 133rd out of 141 countries, which speaks to the aforementioned mismatch in skills students gain in university versus those needed in the economy. Changes in traditional employment routes have also contributed to high unemployment rates among university graduates. Starting in the 1960's, Egyptians were incentivized to pursue university degrees as such degrees provided guarantee of public sector employment. This massification and rapid expansion of education resulted in bloating of the public sector by the 1980s and such formalized programs were discontinued in the 1990's (Adriansen, 2009). Opportunities for employment in the public sector have since decreased with such jobs accounting for only 23% of the workforce in 2018, compared to 32% in 1998; (Assaad & Krafft, 2013; Assaad et al., 2020). While private sector employment opportunities may have increased, the process to identify such opportunities and secure private sector employment is in many ways different from public sector employment and there are no employment guarantees based on credentials, i.e., a university degree. Likewise, securing private sector opportunities may also require candidates possess a more specific skill set when compared to those traditionally required to secure public sector opportunities.

Thus, obtaining a university degree does not always increase a graduate's employability upon graduation in Egypt (Ghafar, 2016). This may be especially true for women. While women

have higher university graduation rates than men and tend to outperform male students while in university (Buckner, 2013; Elbadawy, 2014; Krafft & Alawode, 2018), unemployment among female university graduates is significantly higher than that of male university graduates. In 2018/2019, females constituted 46% of agriculture university students in public universities (CAPMAS, 2019), yet women remain underrepresented (18%) in agriculture-related occupations (CAPMAS, 2020b).

### **Theoretical Framework**

In 2016, Egypt released its Sustainable Development Strategy (SDS): Egypt Vision 2030, which describes a framework to meeting the needs of its growing population (Ministry of Planning, Monitoring and Administrative Reform [MPMAR], 2016). Within this framework, the theme of human development cuts across its three main dimensions of economic, social, and environmental development. As in other sectors in Egypt, human development is integral to successfully meeting current and emerging agriculture and food production challenges in Egypt, including many of the current mega-projects aimed at transforming various agriculture sectors (Egypt Today, 2017; Feidi, 2018). Thus, there appears a need for skilled agriculturists in Egypt as the country pursues ambitious agriculture-related development projects, but employability gaps may be preventing many agriculture university graduates from filling those positions.

Employability itself is rooted in human capital theory, which describes how one's skills, attributes, and relationships, among other factors can translate into economic value in a job market (Becker, 1964). For this paper, employability is defined as the set of attributes that allow a graduate to "access a job, maintain it, or find another" (Hillage & Pollard 1998; Suleman, 2018). Education and training, in most scenarios, is a large component of employability, especially in fields requiring certifications or credentials (e.g., engineers, health care workers, etc.). Ebner et al. (2020) previously identified skills gaps among Egyptian agriculture university graduates that may impact their employability. In the present study, we add to this framework and report on students' perceptions of the importance of various skills in new employees and how demographic variables affect students' perceptions. Furthermore, we aim to determine how students' perceptions compare to employers' perceptions.

### **Methods**

#### **Research Design**

All procedures were reviewed by the Purdue University Institutional Review Board and determined exempt (#1906022352). The development of the questionnaires used in this study was described previously in more detail (Ebner et al., 2020). Briefly, Egyptian undergraduate students in faculties (i.e., "colleges") of agriculture in public Egyptian universities ( $n = 4$ ) were asked their perceptions as to the importance of 35 skills in new employees using a four-point Likert scale (1 = high; 2 = average; 3 = low; 4 = very low). The 35 skills (items) were later organized at 8 constructs, including communication, problem solving/critical thinking, interpersonal skills, initiative and planning, management, ethics, technical skills, and digital literacy (Table 1). Private sector employers ( $n = 61$ ) and undergraduate students ( $n = 404$ ) in faculties of agriculture at public Egyptian universities ( $n = 4$ ) were asked their perceptions of the importance of the same 35 skills in new employers using the same Likert scale. In addition, students were asked to provide their university (Benha University, Cairo University, Suez Canal University, or Assiut University), gender, year in their undergraduate program (e.g., first year,

second year, etc.), and program language of instruction (Arabic or English). Student responses were also disaggregated by location of their university (out-capital vs. in-capital).

### **Data Collection and Filtering**

Collected data were exported to MS-excel to create the data set. Data were first filtered to separate undergraduate and employer responses. Respondents that did not answer 50% or more questions regarding the importance of a skill in new employees were removed from the data set to avoid significant nonresponse error. Likewise, clear outliers (e.g., respondents providing the same score for all 35 skills in both their perceptions of the value of skills in new employees and in their self-assessment of their own skill levels (reported previously) were removed. Students who provided the same score for their perceived value of all 35 skills but provided heterogenous responses for their own self-assessment of all 35 skills were kept. We decided these types of responses suggested that the respondent did not know which skills were the most valuable to employers, which would be reflected in their homogenous responses to all items for this question. Prior to running the models, all observations with missing (nonresponse) values for the independent variables were dropped so as to not alter the population and p-value every time an adjustment was made to the model, thus making it difficult to analyze the statistical reliability. Students were deemed in-capital if they attended Cairo University, whereas students from Benha, Suez Canal, and Assiut Universities were considered out-capital.

### **Data Analysis**

Data were exported from MS-excel and analyzed with R statistical software (version 4.0.1). All 35 competencies were grouped into eight constructs post hoc based on those proposed by Sherer and Eadie (1987) as shown in Table 1. The first portion of the data analysis aimed to determine if demographic variables of students, specifically location, gender, program language of instruction, and year in program, significantly affected students' perceptions of the importance of different skills in new employees. The second portion of the data analysis aimed to measure concordance between students and employers and whether perceptions of students displayed greater levels of concordance with employers depending on gender, location, program language of instruction, and year in program.

#### ***Factors that Influence Student Assessments***

Multivariate linear regression models were created for each of the 35 skills, where values were considered statistically different at  $P \leq 0.05$ . A specific skill served as the dependent variable and student location (in-capital or out-capital), gender (male or female), year in program (first, second, third, fourth), and program language of instruction (Arabic or English) were independent variables. Initial models included all fixed effects and interaction terms and were then iteratively adjusted to produce the most parsimonious model for each question.

Analysis of variances identified the significant differences across independent variables. As non-significant factors ( $P > 0.05$ ) were removed, the Akaike Information Criteria (AIC's) were used to ensure increased model fit. The results from each skill were then organized by their respective constructs to observe trends within and across constructs. Violin plots were used to illustrate differences in distribution between independent variables within a skill construct.

#### ***Concordance within and Between Students and Employers***

Concordance both within students (intra-group concordance) and between students and employers (inter-group concordance) was calculated to identify whether perceptions of certain groups of students (based on independent variables) were more or less similar to employers'

perceptions (compared to perceptions of other groups of students). First, we calculated the intra-rate concordance within the whole group of students followed by category-specific concordance through Krippendorff's alpha using an ordinal metric (Krippendorff 2018; 2011; Lemon, 2019):

$$\delta_{ck}^2 = \left( \sum_{g=c}^{g=k} n_g - \frac{n_c + n_k}{2} \right)^2$$

where and were individual observation ranks. This allowed us to measure overall student and overall employer concordances and to identify any trends across constructs.

There are few resources for comparing the concordance between two independent groups outside that of Vanbelle and Albert (2009). Therefore, to allow identification of student demographic variables influencing agreement between student and employer perceptions on the importance of various skills in new employees, we calculated the mean pairwise agreement in the form of Cohen's weighted kappa (Cohen, 1968) for each individual student relative to each employer:

$$\bar{X}_{ki} = \frac{\sum_{j=1}^n K_{ij}}{n}$$

A boxplot was then used to illustrate the relationship between the mean weighted kappa and the independent variables. This allowed us to identify the specific demographic variables of those students whose perceptions of the importance of different skills in new employees most closely matched those of employers. Lastly, another multivariate linear model was applied to identify any statistical differences ( $P \leq 0.05$ ) between the mean weighted kappa and the independent variables.

## Results

A total of 974 student and 92 employer questionnaire responses were received; after quality filtering the responses for undergraduate students only, the data set included 404 students and 61 employer responses. Overall, the student response rates for independent variables indicated low likelihood of nonresponse error. Sixty-four and 36% of the 400 students who reported their age were female and male, respectively. Of the 398 students who reported their location, 65% were in-capital and 35% were out-capital. Seventy-four and 26% of the 379 students who reported their program language of instruction were in Arabic and English programs, respectively. Lastly, out of the 401 students who reported their year in university, 10% were first-year students, 35% were second-year students, 31% were third-year students, and 24% were fourth-year students.

### Factors that Influence Student Decisions

Student location as a fixed variable was the most influential factor on students' perception of the importance of each skill. Location impacted student perceptions of the importance of every skill except for the ability to work independently. In terms of the other fixed variables, program language of instruction was second to location and significantly ( $P \leq 0.05$ ) influenced student perception of the importance of eight skills (Table 1). Notably, program language of instruction influenced student perception of the importance of every skill in the digital literacy construct. The interaction between program language of instruction and gender significantly ( $P \leq 0.05$ ) influenced student perception of the importance of eight skills with trends ( $P \leq 0.1$ ) detected with an additional five skills. A significant ( $P \leq 0.05$ ) four-way interaction (location, gender, program language of instruction, year in program) was detected for three skills: analytical skills, human

resource management, and conflict management. Out of the four independent variables, the students' year in program and gender exhibited the least influence on students' perception of the importance of the various skills in new employees.

**Table 1.**

*Significant (S;  $P \leq 0.05$ ) or trending (TR;  $P \leq 0.10$ ) effects from interactions or fixed values based on 35 items (skills).*

Competency	Year	Lang	Gend	Loc	Year: Lang	Year: Gend	Lang: Gend	Year: Loc	Lang: Loc	Year: Lang: Gend	Year: Gend: Loc	Lang: Gend: Loc	Year: Lang: Gend: Loc
Oral communication	NS	NS	NS	S	S	NS	NS	NS	TR	NS	NS	NS	NS
Written communication	NS	TR	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	NS
Proficiency in English	NS	S	TR	S	NS	NS	NS	NS	NS	NS	NS	NS	NS
Proficiency in other languages other than Arabic and English	TR	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	S	NS
Use of MS word, MS excel, email, internet	S	S	S	S	NS	NS	TR	NS	TR	NS	NS	NS	NS
Specialized computer skills (programming)	NS	S	NS	S	NS	NS	NS	NS	TR	NS	NS	NS	NS
Ability to access different resources for information	NS	S	TR	S	NS	NS	S	NS	NS	NS	NS	NS	NS
Creativity	NS	S	NS	S	NS	NS	NS	S	NS	NS	NS	NS	NS
Proactivity to tasks	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	NS
Ability to plan and organize	NS	NS	NS	S	NS	NS	S	NS	NS	NS	TR	NS	NS
Ability to work independently	NS	NS	NS	NS	S	NS	S	NS	NS	NS	NS	NS	NS
Knowledge of industry or potential employer	S	NS	NS	S	NS	NS	S	NS	NS	NS	TR	NS	NS
Self-motivation to learn new things and work	NS	NS	NS	S	NS	NS	TR	NS	NS	NS	NS	NS	NS
Knowledge of subject matter	NS	S	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	NS
Ability to apply academic knowledge to real scenarios	NS	TR	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	NS
Applied math skills	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	NS
Knowledge/ability to apply technical skills specific to a job	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	NS
Knowledge/ability to apply technologies specific to a job	NS	NS	NS	S	NS	NS	TR	NS	NS	NS	NS	NS	NS
Familiarity with the latest technologies	TR	S	NS	S	NS	NS	S	NS	NS	NS	S	NS	NS
Analytical skills	NS	NS	S	S	NS	NS	NS	NS	NS	NS	NS	NS	S
Problem identification and solving skills	NS	NS	NS	S	NS	TR	NS	NS	S	NS	NS	NS	NS
Ability to interpret data and make inferences	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	NS
Ability to work across disciplines	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	S	TR	NS
Ability to manage complex tasks/projects	NS	NS	NS	S	NS	NS	TR	NS	NS	NS	NS	NS	S



Competency	Year	Lang	Gend	Loc	Year: Lang	Year: Gend	Lang: Gend	Year: Loc	Lang: Loc	Year: Lang: Gend	Year: Gend: Loc	Lang: Gend: Loc	Year: Lang: Gend: Loc
Adaptability to changes in the field or workplace	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	NS
Financial management	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	NS
Organizational management	NS	NS	NS	S	NS	NS	NS	NS	NS	S	NS	NS	NS
Human resource management	TR	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	S
Time management	NS	NS	NS	S	NS	NS	S	NS	NS	NS	NS	NS	NS
Customer service	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	NS
Ability to function as part of a team	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	NS
Working with others from diverse backgrounds	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conflict management	NS	NS	NS	S	NS	NS	S	NS	NS	NS	NS	NS	S
Knowledge of ethics and best practices in field	NS	NS	TR	S	NS	NS	S	NS	NS	NS	NS	NS	NS
Ability to make ethical decisions	NS	NS	NS	S	NS	NS	S	NS	NS	NS	S	NS	NS

*Lang = language; Gend = gender; loc = location; NS = not significant (or trending)*

### ***Intra-group Concordance***

Total groupwise construct scores for students showed that they perceived the importance of skills as “high” or “average” approximately 90% of the time (Table 2). Across all skills, students perceived the importance of skills as “high” 63.0% of the time, “average” 27.8% of the time, “low” 5.5% of the time, and “very low” only 1.5% of the time (2.2% were nonresponse). Although students assessed most skills as highly important for new employees, skills in the communication construct had the greatest range of responses: students perceived the importance of various communication-related skills as “high” 55.2% of the time, “average” 30.4% of the time, “low” 9.7% of the time, and “very low” 4.2% of the time (Table 2). However, student perception of the importance of various communication skills produced a Krippendorff’s alpha value at 0.200, indicating that while the range of students’ perceptions was more dispersed, students agreed with one another more on the importance of individual skills within the communication construct compared to other constructs. This category also had the lowest number of blank responses (0.5%). Student perceptions of the importance of technical communication produced the next highest alpha value at 0.089. In contrast, student perception of the importance of ethics-related skills not only produced the lowest Krippendorff’s alpha but was also the only group with a negative alpha (-0.001).

**Table 2.**

*The Frequency with which Students Valued the Importance of Skills (Grouped by Construct) Along with the Number of Blank Responses and each Construct's Krippendorff's Alpha Values (1 = "high", 2 = "average", 3 = "low", and 4 = "very low").*

Construct (# of questions)	1	2	3	4	Blank	Total	Alpha
Communication (4)	669 (55.2%)	369 (30.4%)	117 (9.7%)	51 (4.2%)	6	1212 (100%)	0.202
Problem-solving (6)	1539 (63.5%)	707 (29.2%)	104 (4.3%)	25 (1.0%)	49	2424 (100%)	0.018
Interpersonal Skills (4)	964 (59.7%)	471 (29.1%)	101 (6.3%)	26 (1.6%)	54	1616 (100%)	0.037
Initiative/Planning (6)	1723 (60.9%)	850 (30.1%)	152 (5.4%)	37 (1.3%)	66	2828 (100%)	0.041
Management (4)	1005 (62.2%)	454 (28.1%)	98 (6.1%)	29 (1.8%)	30	1616 (100%)	0.032
Technical Skills (6)	1515 (62.5%)	682 (28.1%)	129 (5.3%)	33 (1.4%)	65	2424 (100%)	0.089
Digital Literacy (3)	881 (72.7%)	260 (21.5%)	54 (4.5%)	7 (0.6%)	10	1212 (100%)	0.027
Ethics (2)	606 (75.0%)	144 (17.8%)	21 (2.6%)	10 (1.2%)	27	808 (100%)	-0.001
Total	8902	3937	776	218	307	14140	0.074
Percent of Total	63.0%	27.8%	5.5%	1.5%	2.2%	100%	

**Table 3.**

*The Frequency with which Employers Valued the Importance of Skills (Grouped by Construct) along with each Construct's Krippendorff's Alpha Values (1 = "high", 2 = "average", 3 = "low", and 4 = "very low").*

Construct (# of questions)	1	2	3	4	Blank	Total	Alpha
Communication (4)	63 (34.4%)	71 (38.8%)	32 (17.5%)	15 (8.2%)	2	183 (100%)	0.179
Problem-solving (6)	173 (47.3%)	136 (37.2%)	38 (10.4%)	14 (3.8%)	5	366 (100%)	0.001
Interpersonal Skills (4)	115 (47.1%)	93 (38.1%)	22 (9.0%)	12 (4.9%)	2	244 (100%)	0.041
Initiative/Planning (6)	204 (47.8)	159 (37.2%)	44 (10.3%)	12 (2.8%)	8	427 (100%)	0.016
Management (4)	88 (36.1%)	96 (39.3%)	49 (20.1%)	7 (2.9%)	4	244 (100%)	0.048
Technical Skills (6)	164 (44.8%)	141 (38.5%)	42 (11.5%)	10 (2.7%)	9	366 (100%)	0.048
Digital Literacy (3)	101 (55.2%)	48 (26.2%)	15 (8.2%)	16 (8.7%)	3	183 (100%)	0.043
Ethics (2)	68 (55.7%)	41 (33.6)	4 (3.3%)	7 (5.7%)	2	122 (100%)	-0.005
Total	976	785	246	93	35	2135	0.058
Percent of Total	45.7%	36.8%	11.5%	4.4%	1.6%	100%	

Similar trends were identified in the employers' results, albeit there were fewer respondents. Due to the differences in respondent group populations, we decided to record the relative percentages of the groupwise scores for students and employers to better understand the distribution of results. As illustrated in Table 3, employers tended to utilize the full four-point scale more than students, however employers also perceived the importance of the majority of skills as "high" or "average." Overall, employers perceived the importance of skills as "high" 45.7% of the time, "average" 36.8% of the time, "low" 11.5% of the time, and "very low" 4.4% of the time (1.6% were nonresponse). Like students, employers' perceptions of the importance of communication skills produced the greatest concordance with a Krippendorff's alpha value of 0.179. Furthermore, employer perception of the importance of ethics-related skills retained the least amount of concordance and a negative Krippendorff's alpha value of -0.005 and had a Cronbach alpha value of 0.889, which indicated acceptable reliability. Taken together, cumulative group concordance resulted in a Krippendorff's alpha value of 0.058 (Table 2). Therefore, there was more agreement within students on the importance of various skills than within employers.

### **Inter-group Concordance**

A multivariate regression model was created to identify students whose perceptions of the importance of various skills in new employees were most similar (or dissimilar) to those of employers. Students whose perceptions of the importance of different skills most closely matched perceptions of employers could have increased human capital in job markets upon graduation. Program language of instruction was the only variable that had a statistically significant ( $P \leq 0.05$ ) impact on the student concordances (0.042), but location and year in program were trending at 0.075 and 0.073, respectively. Thus, students and employers had discordant perceptions of the importance of different skills in new employees in general.

### **Discussion**

Previous studies identified skills gaps among Egyptian agriculture university graduates as a means of identifying how students could increase their employability (Ebner et al., 2020). Those studies identified groups of skills valued in new employees as indicated by potential employers as well as student, professor, and employers' perceptions of the competency level of students in those skills. Here, we wanted to examine more closely students' perceptions of the importance of different skills in new employees and how well (or not) those perceptions matched those of actual employers. In addition, we wanted to see if demographic variables influenced students' perceptions of employability. Having a better understanding of what employers need in new employees could increase student human capital and employability by highlighting those skills that should receive student focus during their time in university.

Missing from our analysis is a clear estimation of the number of jobs available to agriculture university graduates in Egypt. For some fields of study (e.g., many of the humanities), it is clear there is saturation in the Egyptian job market, and it would be a disservice to students to develop graduates well-qualified for jobs that do not exist. With students studying agriculture, it is difficult to quantify the available employment opportunities for university graduates as such students may pursue diverse careers from farm-level production to technology development to sales and marketing. Such careers span across different sectors and industries; estimations of employment opportunity would require extraction and compilation of opportunities from different estimates for multiple sectors. Additionally, Egypt has a significant informal economy and associated job market that contributes to the country's labor demand; many Egyptians may have voluntarily left the labor force as well (Abbott & Teti, 2017; Assaad et al., 2020). Nevertheless, the previous study by Ebner et al. (2020) indicated that potential employers (agriculture private sector) are ready to hire more university graduates if those graduates have skills relevant to the jobs being offered. Thus, the results from this paper contribute towards identifying ways in which university students studying agriculture could best prepare themselves for those jobs and careers that are available.

### **Female Student Perceptions and Employment**

Unemployment rates of women (including university-educated women) in Egypt are higher than those of men (CAPMAS, 2020b). The reasons for higher unemployment rates among Egyptian women are likely multi-factorial and include decreasing availability of public sector positions (Abbott & Teti, 2017; Fedi et al., 2019), gendered roles in families (Hendy, 2015), disengagement from the formal economy, among many others (Abbott & Teti, 2017). For women studying agriculture, obtaining meaningful work in their field of study may be complicated by employers' perceptions that the jobs they offer are themselves gendered, as

indicated by employers' stated preference to hire men (Ebner et al., 2020). Nevertheless, we were interested to see if the employability of women might also be affected by the women's perceptions of the value of different skills to employers. We did not find any significant differences, however, in women's vs. men's perceptions of the importance of different skills in new employees, indicating that women are not at a disadvantage to men in this aspect of human capital. The high unemployment rates among Egyptian women are still highly problematic and as Constant et al., (2020) asserts, Egypt will be unable to reap the benefits from its investment in free public education when structural and institutional barriers result in underemployment of 50% of the population. Hendy's (2015) analysis of the Egypt Labor Market Panel Survey from 1998, 2006, and 2012 concluded that marital status is a significant factor of employment trends of women in Egypt. Women are often responsible for the majority of domestic labor (including family care, shopping, cooking, agriculture labor for household consumption, etc.), regardless of whether they work outside the home. Ever-married (including divorced/separated or widowed) employed women work an estimated 29.3 hours per week on domestic labor compared to 13.1 hours per week for never-married employed women (Hendy, 2015). Yet a greater percentage of ever-married women participated in the labor force (52% of all ever-married employed women in 2012) than never-married women (32% of all never married employed women in 2012), which Hendy (2015) attributed to ever-married women's employment in the public sector. However, public sector jobs, which often come with better benefits such as maternity leave, continue to shrink in availability, which likely translates to reduced numbers of employed ever-married and never-married women (Hendy, 2015). In contrast, private sector job availability has increased, but the employment numbers indicate that private sector work environments are not as hospitable for women as public sector jobs. A qualitative study by Barsoum (2010) that consisted of in-depth interviews and focus group discussions identified central issues that women, especially younger women, face in the private sector market. Fear of sexual harassment at work, lack of respect and trust, long workdays, gender wage gaps, and lack of employment contracts were some of the themes participants identified when discussing their concerns with the private sector (Barsoum, 2010). A study from Said (2015) found that women, on average, are paid 34% less than men are paid by the private sector. Zeitoun (2018) found from small group discussions and interviews that men in the private sector are more likely to be promoted and perceived as better fit for leadership positions. While the percentage of never-married women in private sector jobs has increased from 12 to 25% between 1998 and 2012, the percentage of ever-married women in private sector jobs only increased from three to four percent during the same time period (Hendy, 2015). National policies could assist in mitigating the underutilization of qualified women and allow Egypt to take full advantage of their educated workforce by creating a more inclusive working environments for women that provides equal wages, and prioritizes family leave.

### **Concordance**

It should be noted that all students, regardless of background/demographics, showed low levels of concordance with employers regarding the importance of different skills. Thus, there is measurable disconnect between what students perceive as skills important to employers and skills actually identified as important by employers. This disconnect could be remedied by more direct engagement of students with employers in their field of study during the students' time in the university. Egypt's Sustainable Development Strategy (SDS): Egypt Vision 2030 speaks to creating curricula that foster the development skills needed in the economy (MPMAR, 2016). Universities should look for opportunity to integrate employers into the delivery of the curricula

to allow messaging directly from employers to students. In a previous study by Ebner et al., (2020), employers indicated their willingness to do so through mentoring programs, guest lectures, and sponsored applied research projects, among many other platforms.

Beyond gender, it was of interest to determine if certain students, depending on their location, program language of instruction, and year in program would have a higher level of concordance with employers compared to other students. Ideally, students representing these independent variables would have been more equally distributed so that data from each student subgroups would have been equally reliable. This was not the case, however, for our data set. For example, third-year, out-capital students in English-language programs showed the greatest mean concordance to employers, but this subpopulation was comprised of only three observations. In contrast, fourth-year, in-capital students in Arabic-language programs showed a slightly lower mean concordance with employers but that estimate was based on more observations ( $n = 68$ ). Therefore, due to the distribution of our study population, results from some student groups are likely more reliable than others.

Students possessed a higher overall intra-group concordance compared to employers (Table 1). Since students primarily chose “high” and “average” in their assessments of the value of skills, there was less variance in student answers compared to those of employers, who utilized the full four-point scale more (Table 1). It is possible that acquiescence bias or social desirability bias led students to responding similarly throughout the questionnaires. Regardless, our results showed that students were unable to discern which skills are considered more important, relative to other skills.

These results build on the findings from previous research (Ebner et al., 2020) that identified gaps in skills students possess and skills needed by employers by adding that students, in general, do not have an accurate understanding of what specific skills are the most important in new employees. Thus, students lack needed skills, but also do not know what skills are needed and, thus, where they should focus to improve their employability. Thus, there are significant opportunities for professors to ensure their students’ post-graduation success by utilizing their positions as key career advisors to shape students’ understanding of what is needed by employers. Like students themselves, professors’ capacity to deliver accurate messaging to students could be enhanced by greater integration of potential employers in the development and delivery of curricula.

Regardless of the variability of the individual subpopulations and constructs of our study, we can still conclude that regardless of gender, location, program language, or year in school, our population of students possessed consistently low concordance with their perceptions of the values of employability skills compared to employers. Due to such low Kappa results, we consider it fruitless to discern the reasoning between the differences amongst our groups in our study, as there is no student group which meaningfully deviated from the others. In summation, while there was an observable profile of students with the greatest level of concordance with employers, none of the groups produced a high enough Kappa value to possess a substantial amount of agreement with employers.

As mentioned above, other studies that analyzed students’ perceived values of employability skills are limited; studies examining students’ perceptions of their own skills are more common (Qenani et al., 2014; Rothwell et al., 2008; Rothwell et al., 2009). Klibi and Oussii (2013) studied accounting students’ perceptions of skills that would be important to their careers and compared them with employers’ expectations. A list of skills was created where each skill identified as either “technical” or “generic,” (e.g., personal qualities, such as interpersonal

and communication skills). Skills were then separated into several constructs and evaluated. Significant differences were detected between employers and students in their perceptions of importance of technical skills and generic skills, where employers desired a diverse set of generic skills, but students consistently valued technical skills higher than generic skills (Klibi & Oussii, 2013). The authors concluded that there was a gap between what students perceived to be important skills compared to what employers believed, specifically that employers emphasized greater perceived importance on generic skills compared to students, who perceived technical skills to be the most important. These findings are consistent with the previous study by Ebner et al. (2020), but our analysis for this study did not discern which skills students perceived more important than others.

Some studies have focused on student perceptions of specific skills and the impact of demographic variables on those perceptions (Hall et al., 2012; Hergert, 2009; Khan et al., 2012; Leggett et al. 2004). Hall et al., (2012) studied the influence of gender, age, and former education on students' perceptions of the importance of digital literacy skills to employers and whether students believed they would use such skills in their future employment. The demographic variables, however, did not affect student perceptions of the importance of digital literacy skills to employers. Additionally, most students believed they would be able to apply digital literacy skills in the future. The only demographic difference was that students further along in their program believed they would use information literacy and information and communication technology skills more than students that were not as far along in their program believed they would use those same skills (Hall et al., 2012). While previous education level nor age were applicable demographics in our study, our findings are similar to Hall et al., (2012) in that gender was not a significantly influential demographic in student perceptions. In another study, Khan et al., (2012) compared the perceptions of dental students, faculty from the participating dental colleges, and the general public about the importance of 30 individual skills for dentists to possess. The skills were part of a previously established list of skills that dental school graduates needed to obtain according to Khan et al., (2010). Unlike our study, which only found significant gender differences between two individual competencies (analytical skills and use of MS word, MS excel, email, internet), the authors identified more significant differences between male and female students. Specifically, female dental students placed greater importance on competencies related to "treatment planning" and "performance of the task" than male students. The authors noted that these results suggested that females possessed a better understanding of what would be required of them in their dental careers (Khan et al., 2012). In general, first year students' perceptions of the importance of different skills were higher than fourth year students' perceptions of the importance of the same skills (Khan et al., 2012). In contrast, year in program only affected proficiency in other languages other than Arabic and English, use of MS word, MS excel, email, internet, and knowledge of industry or potential employer.

Hergert (2009) concluded that demographics such as age, year in school, and GPA all had significant effects on business students' perceived value of internships. Gender was the only demographic variable that did not have a significant effect (Hergert, 2009). Leggett et al. (2004) compared lecturer and student perceptions of the importance of generic skills in science, where students were divided by their year in school (first, second, or third year). As students progressed in their programs, their concordance with the lecturer's assessments increased (Leggett et al. 2004). Clearly there are external variables that can impact the way students perceive the value of different skillsets, but ultimately efforts should be made to ensure that students possess a clearer understanding of the skillsets that are highly valued relative to their industry.

The results from our study that indicate that university students do not possess a comprehensive understanding of what skills are most important to employers support a growing body of literature that has reached similar conclusions (Klibi & Oussii, 2013; Lisá et al., 2019; Succi & Canovi, 2019; Wickramasinghe & Perera, 2010). Higher education institutions throughout the world must make more comprehensive efforts that encourage relationships between students, employers, and the institutions themselves to better prepare the next generation of workers for the demands of the labor force.

### **Conclusions, Implications, and Recommendations**

Unemployment rates among university educated Egyptians are comparatively very high. As public-sector job opportunities in Egypt continue to shrink and the private sector job market grows, it is important for university graduates to have a comprehensive understanding of what employers desire in future employees. Understanding which skills are required for jobs of interest would add to the students' human capital and employability as they pursue such jobs. Building off the results from Ebner et al., (2020), we aimed to see if demographic variables of Egyptian agriculture students affected perceptions of the value of skills, and which type of student possessed the greatest (or least) concordance in the perception of the importance of skills with private sector employers. We concluded that while there are some demographic differences that influence students' perceived value of different skills to employers, none of the disaggregated student groups possessed an adequate understanding of which skills were most valuable to private sector employers. Importantly, inaccurate perceptions of skills needed by employers is likely not a contributing factor to greater unemployment rates among females. Further efforts should be made to encourage interaction between employers and universities, specifically with university professors and students, in an effort for all parties to understand what is expected of recent graduates as they finish university and enter the labor force. In this way, professors can better prepare students for life after university, students can grow their professional networks and gain exposure to future employers, and employers can ultimately identify better employees.

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