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The Exploratory Study of Business and STEM Students' Perceptions of LinkedIn

Xia Zhang*
Lin Chen†
Yujian Fu‡

Abstract

Our study examines whether there are differences mainly between business students and science, technology, engineering, and math (STEM) students' perceptions of LinkedIn when they use LinkedIn to construct their professional and social identity, as a social capital, as a platform for building relationship with trust, as a platform of professional or business opportunities, and as an interactive learning resource. Our study employs a survey among college students at two different settings of public and private universities in the U.S. The findings reveal that there are no significant differences in business students or STEM students' perceptions of LinkedIn as a social capital, or as a platform of building relationship with trust, or as a platform of professional career development. However, our findings reveal that business and STEM students have different perceptions and usage of LinkedIn as a resource for interactive learning. Our study benefits college students to utilize LinkedIn effectively in their learning and career. Our study fills the gap to examine the differences between young business students and STEM students' perceptions of LinkedIn at two higher educational institutions.

Keywords: LinkedIn, career development, business students, STEM students, social identity, interactive learning resource.

I. INTRODUCTION

In today's emerging technology age, people connect with each other over the different social media platforms. LinkedIn is one of the most professional social networking platforms for employers, employees, and business professionals. LinkedIn becomes one of the best platforms for professionals to promote themselves, through updating professional accomplishments, work and educational experience, (Hairston et al., 2019). While today's college students are adept at using social media in a casual context, Wankel (2010) notes that students use social media as an invaluable tool to develop professional proficiency with business objectives and enter the workforce. The purpose of our study is to examine whether STEM or business students perceive differently the impact of LinkedIn.

Prior studies have examined social networking sites and their motivations, effects, factors, and outcomes in different disciplines. The effects of social networking sites are generally classified as three areas. The first area is social networking sites and how they

* Corresponding author and associate professor of accounting. Department of Accounting & Finance, College of Business & Public Affairs, Alabama A&M University, 4900 Meridian St. N., Huntsville, AL, 35811, U.S.A. Tel: +1 256 372 4786. E-mail: xia.zhang@aamu.edu. Webpage: https://www.aamu.edu/academics/colleges/business-public-affairs/index.html.

† Assistant professor of accounting. Eberhardt School of Business, University of the Pacific, 3601 Pacific Ave. Stockton, California 95211. E-mail: lchen4@pacific.edu.

‡ Professor. College of Engineering, Technology, and Physical Sciences, Alabama A&M University, 4900 Meridian St. N., Huntsville, AL, 35811, U.S.A. E-mail: yujian.fu@aamu.edu.

impact their users' social identity (Boyd & Heer, 2006; Ellison et al., 2007; and Pempek et al., 2009). The second area is the effect of social networking sites on their users' career development (Heifetz, 2015; Beach, 2016). The third area includes social networking sites and their impact on users' academic performance (e.g., Mazer et al., 2007; Chu & Meulemans, 2008; Gabre & Kumar, 2012; Irwin et al., 2012; McCorkle & McCorkle, 2012; Paul et al., 2012; and Stone et al., 2014). Most of the prior literature mainly focuses on the impact of personal social media platforms, such as Facebook and Twitter, while only a few studies examine the impact of professional social network sites, LinkedIn on users' social identity and career development. McCorkle and McCorkle (2012) investigate the impact of LinkedIn on developing college students' social networking skills. Florenthal (2015) states that career development, compared with other three categories-interpersonal communication, online identity, and information, is the category gratifying only LinkedIn college users, compared with Facebook, MySpace and Bebo. In addition, some practitioner articles examine the impact of LinkedIn on business professionals when they use LinkedIn to build their professional relationship (Kaplan, 2009; Hairston et al., 2019).

Little research examines the underrepresented groups, e.g., African American students' usage of social networking sites. Gabre and Kumar (2012) find that compared to non- African American students, African American students have higher stress when using social networking sites. Mathiyalakan et al. (2016) find that Hispanic students use Facebook more for academics than African American students. More recently, Zhang and Chen (2019) conduct a survey among the underrepresented students at historically black colleges and universities (HBCUs) and find that LinkedIn as a social media tool, is important for students at colleges, specifically for accounting students at HBCUs to develop professional networking and present their social identity. Our study is important because of the following perspectives. First, in a world where technology is rapidly changing, LinkedIn, as a professional social networking platform, penetrates professionals, especially business and STEM professionals' lives. Second, according to the Pew research center 2021 social media use study (Auxier & Anderson, 2021), LinkedIn remains popular with college students who account for 51% of the LinkedIn users. Third, to our knowledge, no prior literature investigates business students and STEM students' perceptions of usage of LinkedIn. Finally, our study extends Zhang and Chen (2019) to employ a survey among the college students at one private Caucasian dominate university in the Midwestern U.S. and one public HBCU in the Southeastern U.S. With reference to the prior literature on the impact of the social network sites on the society, our study employs social cognitive theory and motivation theory to explore the impact of LinkedIn on business and STEM students in three aspects: social and professional identity and building relationship with trust, career development, and interactive learning resources.

Our study contributes to the social network sites literature in the following ways. First, this study examines the influence of the professional social platform LinkedIn on young adults in college environment, which has only been researched in a few studies. Second, the study is the first academic study to explore business students and STEM students' perceptions of LinkedIn. Finally, the study helps both business and STEM students realize the impact of LinkedIn on their life and career. Therefore, our study may encourage college students to use LinkedIn more effectively and efficiently. Furthermore, this study provide evidence to educators at universities about the importance of the social networking sites on college students, so that educators have incentives to educate and train their students appropriately to benefit the society.

The study is organized as follows. We review the literature and develop hypotheses in Section 2. We develop methodology in Section 3. We discuss the results and findings in Section 4. Finally, we summarize the findings and limitations in Section 5.

II. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Background

LinkedIn serves as the professional platform to showcase users' profile, expertise, recommendations and connections. Through LinkedIn, the users can interact with other professionals, offer services, find jobs, build network, and promote individuals (Damnjanovic et al., 2012). Therefore, LinkedIn, as a social networking site, is important in potential professional development. Furthermore, LinkedIn learning offers courses covering a wide range of topics, including software, business, and creative pursuits, that incentivize students to explore various activities and develop their online media presence (Peterson & Dover, 2014). According to Gingerich and Nevland (2019), the high-quality, ready-made materials from LinkedIn Learning provide participants with an opportunity that might complement their structured educational curriculum.

Drawing from prior academic literature on social networking sites as the social capital to create the social identity, platform for building relationship with trust and motivation theory, and the practical literature on LinkedIn as a professional networking platform, our study extends the prior literature to examine college students' perceptions and usage of LinkedIn in terms of the four dimensions leading to the hypotheses we posit in our study.

2.2. LinkedIn as a Social Capital from Social Networking Sites

According to Donath and Boyd (2004), social media sites may enhance bridging the social capital since users can utilize these platforms to maintain and expand their networking relationships. Users of social networking sites may disclose personal information to strengthen their social relationships (Maksl & Young, 2013). Ellison et al. (2007) find that there is a relationship between the usage of Facebook and the social capital's formation and maintenance. LinkedIn, as an important professional social networking website, has influences on professionals to social cognitive perspectives. Little prior literature examines the differences of perceptions of LinkedIn usage among different majors. Hoda et al. (2022) compares the intensity of social networks usage and online-bonding social capital show that they differ significantly LinkedIn and Facebook. Therefore, we believe the LinkedIn as a social capital has impact on both business students and STEM students and form the first hypothesis.

H_1: there are no significant differences between business students and STEM students' perceptions of LinkedIn as social capital in constructing their social and professional identity at different institutions.

2.3. LinkedIn as a Platform for Building Relationship with Trust

Trust plays a significant role in building relationship, also applies in online social network (Lai & Turban, 2008). Social exchange theory explains that there is a reciprocal relationship between social capital and trust (Morgan & Hunt, 1994; Putnam, 2001; and Grabner-Kräuter & Bitter, 2015). Users are more likely to trust social network sites to keep their private within the context of trust (Grabner-Kräuter & Bitter, 2015).

With high levels of trust, people are more willing to provide support and take risk in information exchanges (e.g., Nahapiet & Ghoshal, 1998; Krasnova et al., 2010; and Lin & Lu, 2011. Within LinkedIn, Facebook and other online networks, the exchange of social and emotional support and valuable information would be limited without trust

established among participants. Therefore, trust influences users' utilization of online social network to create value (Grabner-Kräuter & Bitter, 2015). According to social network and social capital theories, trust is considered as an important context in relationships between social networking sites and their users, that determines interaction patterns within online social networks (Grabner-Kräuter & Bitter, 2015). Chang et al. (2017) finds that user behavior in the social networks' context was shown to be influenced by trust and the privacy concern has more influence on LinkedIn users' trust than Facebook users' trust. Our study complements the prior studies to examine the perceptions of the business students and STEM students about the LinkedIn as a platform to build up professional relationship with trust. Therefore, we propose the following hypothesis:

H_2: there are no significant differences between the perceptions of the business students and STEM on LinkedIn as a platform to build up professional relationship with trust.

2.4. LinkedIn as a Platform of Professional or Business

As a social networking site, LinkedIn provides both personal and social benefits to users. The motivations of using social networking sites have been studied in prior literature and there are two types of motivations: intrinsic and extrinsic (Reiss, 2012). Kwon and Wen (2010) investigate the extrinsic motivations for social networking sites' usage and find that users intend to use the social networking site if it meets their perceptions and provides opportunities to build and maintain relationships. More specifically, McCorkle and McCorkle (2012) find that LinkedIn provides opportunities for users to build professional networking, search jobs, share achievements and develop careers.

Ryan and Deci (2000) study the intrinsic motivation and indicate that the intrinsic motivation "refers to doing of an activity for the inherent satisfactions of the activity itself" (Ryan & Deci, 2000, p. 71). LinkedIn users receive satisfaction through their activities on LinkedIn, including creating profiles, posting comments, connecting professionals, and applying jobs, which aligns to the intrinsic motivation. The prior literature on social capital theory and motivation theory is applied to both business and STEM students' perceptions and usage of LinkedIn as a platform of professional or business opportunities. Therefore, we propose the following hypothesis regarding users' perceptions of LinkedIn as a career development platform.

H_3: there are no significant differences between business students and STEM students' perception of LinkedIn as a platform of professional or business opportunities.

2.5. LinkedIn as an Interactive Learning Resource

Finally, the effects of social networking sites as a learning resource on college students' academic performance have been examined in prior studies. Both Buzzetto-More (2012) and Junco (2013) find that social networking sites provide college students great educational opportunities for engaging in academic learning, building learning communities and strengthening interpersonal relationships. Cooper and Naatus (2014) find that LinkedIn as a classroom tool, can reinforces basic concepts, increases student engagement and collaboration, and encourages students to begin building their professional networks. Since the business disciplines are largely different from STEM disciplines, accordingly, the following hypothesis is proposed regarding the users' perceptions of LinkedIn as an interactive learning resource.

H_4: there are significant differences between business students and STEM students' perceptions of LinkedIn as an interactive learning resource.

III. RESEARCH METHODOLOGY

3.1. Survey Instrument

The study collects data by surveying business students and STEM students' experience on usage of LinkedIn at two universities in the U.S. The questions in the survey are grouped into three parts. Part A is "user experience on LinkedIn", which includes five questions: "LinkedIn account (yes/no)"; "time of length as a LinkedIn user", "frequency of using LinkedIn", "number of LinkedIn connections", and "purpose of using LinkedIn". Part B has four dimensions, "social and professional identity" (five questions), "trust and building up relationship" (five questions), "future career development" (five questions), and "interactive learning resources" (five questions), total nineteen questions relating to "LinkedIn users' usage and acceptance". Part C includes five demographic questions in terms of "gender", "race", "classification", "age", and "major".

Based on the previously discussed theories on social capital and social identity, trust and motivation theory, we also refer to Singson and Sunkara (2012) and Zhang and Chen (2019) to create the questionnaire instrument. Responses are measured with a five-point scale: 1= "strongly disagree", 2= "disagree", 3= "neither agree nor disagree", 4= "agree", and 5= "strongly agree".

3.2. Participants

We conduct the LinkedIn questionnaire among the students in accounting classes and computer science classes at the two selected institutions: the Caucasian dominate private university located in the Midwest of the U.S. and the public HBCU located in the Southeast of the U.S. Among the collected 242 responses, 44 are removed because they have the answer "no" for the first question "do you have a LinkedIn account?". Among the remaining 198 valid responses, 71 are business majors, 112 are STEM majors, 15 are other majors, and 25 responses are excluded with no answers about the major. The students earn credits by doing the survey in class. However, the sizes of the responses are different among different questions in the questionnaire. Therefore, our study presents the results based on the specific responses for each category accordingly. `

Table 1 presents the demographic information for the 198 participants in our study. In terms of gender, 57.1% are male while 42.9% are female. In terms of race, among 195 valid responses, 38.5% are Caucasian, 53.8% are African, and the remaining 7.7% are Hispanic, Asian, and others. In terms of classification, 92.4% are undergraduate with 1.0% of freshman, 27.8% of sophomore, 43.4% of junior, and 20.2% of senior. In terms of Major, 35.9% are business majors, 56.6% are STEM majors, and about 7.6% are other majors including students in arts and humanities.

To test whether gender or race affects our hypotheses, we first run SPSS Univariant analysis using "gender" and "race" as independent variables and the four questions for "users' experience of LinkedIn" as dependent variables. We find that gender has no effect on "users' experience of LinkedIn", in terms of "length of time", "frequency", "connections", and "purpose". We find that race has no effect on "users' experience of LinkedIn", in terms of "length of time" and "connections". However, analysis results indicate that race has significant effect on "frequency" ($p= 0.035$) and "purpose" ($p= 0.023$).

We further run SPSS Univariant analysis using "gender" and "race" as independent variables and all questions for H_1, H_2, H_3, and H_4 as dependent variables. Analysis results indicate that gender has no effect on any variables for H_1, H_2, H_3, and H_4, while race has no significant effect on any variables for H_1, H_2, and H_4. For H_3, race has significant

effect on two statements: "at LinkedIn, I find some information about job and career" (statement 11, p= 0.003) and "LinkedIn helps me to make professional and business contacts" (statement 13, p= 0.000). Overall, analysis results indicate that gender or race has limited effect on our hypotheses. Therefore, our study mainly focuses on the LinkedIn's perceptions and usage between business and STEM majors.

Table 1
Demographic Profile of Participants

	N	Valid Percent
Gender:		
Male	113	57.1%
Female	85	42.9%
Total	**198**	**100%**
Race:		
White	75	38.5%
Black	105	53.8%
Hispanic	6	3.1%
Asian	4	2.1%
Native American	1	0.5%
Others	4	2.0%
Total	**195***	**100%**
Classification:		
Freshman	2	1.0%
Sophomore	55	27.8%
Junior	86	43.4%
Senior	40	20.2%
Graduate	14	7.1%
Others	1	0.5%
Total	**198**	**100%**
Age:		
Under 18	1	0.5%
19-25	185	94.4%
26-30	6	3.1%
31-40	1	0.5%
Over 40	3	1.5%
Total	**196****	**100%**
Major:		
Business	71	35.9%
STEM	112	56.6%
Humanity & others	15	7.6%
Total	**198**	**100%**

Notes: * 3 responses have no answer for "race" and ** 2 responses have no answer for "age".

3.3. Statistical Approach

This study employs descriptive statistics to describe the frequency distributions of LinkedIn's perceptions and usage by business students and STEM students. In addition, Anova is conducted to compare the differences of distribution between the two major groups. Post hoc Turkey tests are conducted to examine whether there are differences between the business students and STEM students' perceptions and usage of LinkedIn. To ensure the quality of the data collection, we conduct the pilot test among the respondents in both business majors and STEM majors and edit the questionnaire according to the feedback accordingly. To test the data reliability, we run the SPSS

reliability analysis that Cronbach alpha values for the questions in the survey is 0.870, which is above 0.700.

IV. RESULTS AND DISCUSSIONS

This section presents the findings of the questionnaire in terms of four dimensions: 1) "users' experience of LinkedIn", 2) "social and professional identity", 3) "building up connections and relationship with trust", 4) "future career development", and 5) "interactive learning resources". The results of Anova indicate that there are no significant differences among the participants regarding their perceptions of the questions in the first three dimensions in terms of different type of institutions. However, there are significant differences among the participants in different majors of the perceptions of LinkedIn as an interactive learning platform.

4.1. Users' Experience of LinkedIn

We present four questions regarding "users' experience of LinkedIn" in Table 2. The survey results from question 1: "how long have you been a LinkedIn user? (length of time)" indicate that 58 out of 71 (82%) respondents from business majors have one year and above LinkedIn's using experience, while 78 out of 105 (74%) respondents from STEM majors have LinkedIn's using experience. The survey results from question 2: "on average, how often do you check LinkedIn (frequency)?" Show that 55 out of 71 (77%) business majors' respondents and 72 of 102 (69%) STEM majors' respondents check LinkedIn at least once a month. Compared with STEM majors, business majors are more likely to log in to LinkedIn often to connect or view other people's profiles and postings.

Table 2
Users Experience on LinkedIn

Questions	Business Major	STEM Major	Others
1. "How long have you been a LinkedIn user? (Length of time)"			
a. < 1 year	13 (30.2%)	27 (62.8%)	3 (7.0%)
b. 1-2 years	31 (38.3%)	43 (53.1%)	7 (8.6%)
c. 2-3 years	20 (47.6%)	18 (42.9%)	4 (9.5%)
d. 3-4 years	6 (40.0%)	8 (53.3%)	1 (6.7%)
e. 4-5 years	0 (0.0%)	2 (100%)	0 (0.0%)
f. > 5 years	1 (12.5%)	7 (87.5%)	0 (0.0%)
Total	**71 (37.2%)**	**105 (55.0%)**	**15 (7.9%)**
2. "On average, how often do you check LinkedIn? (Frequency)"			
a. At least once a week	8 (33.3%)	16 (66.7%)	0 (0.0%)
b. Once to several times a month	17 (32.1%)	30 (56.6%)	6 (11.3%)
c. At least once a day	9 (50.0%)	7 (38.9%)	2 (11.1%)
d. Once several times a week	21(48.8%)	19 (44.2%)	3 (7.0%)
e. Once every 2-3 months	16 (30.2%)	33 (62.3%)	4 (7.5%)
Total	**71 (37.2%)**	**105 (55.0%)**	**15 (7.9%)**
3. "How many LinkedIn 'Connections' do you have? (Connection)" *			
a. None	6 (20.0%)	23 (76.7%)	1 (3.3%)
b. Up to 10	19 (35.8%)	29 (54.7%)	5 (9.4%)
c. 11-50	26 (41.9%)	30 (48.4%)	6 (9.7%)
d. 51+	18 (41.9%)	22 (51.2%)	3 (7.0%)
Total	**69 (36.7%)**	**104 (55.3%)**	**15 (8.0%)**

To be continued Table 2.

Questions	Business Major	STEM Major	Others
4. "What do you mostly use LinkedIn for? (Purpose)" **			
a. A relevant community	0 (0.0%)	1 (50.0%)	1 (50.0%)
b. Stay up to date	4 (20.0%)	16 (80.0%)	0 (0.0%)
c. Get new connections	16 (50.0%)	11 (34.4%)	5 (15.6%)
d. Check out how connections doing	0 (0.0%)	1 (100.0%)	0 (0.0%)
e. Update profile	4 (66.7%)	2 (33.3%)	0 (0.0%)
f. Helpful for career	45 (40.5%)	58 (52.3%)	8 (7.20%)
Total	**69(40.1%)**	**89(51.8%)**	**14(8.1%)**

Notes: * 2 business and 1 STEM respondents have no response for Q3; ** 2 business respondents choose both a and b; 14 STEM respondents choose the combined six answers; and 1 other respondent chooses the combined six answers.

Question 3 of the survey is: "how many LinkedIn 'connections' do you have? (connections)". The results show that 44 out of 69 (64%) business majors' respondents and 52 out of 104 (50%) STEM majors' respondents have more than 11 connections. For question 4: "what do you mostly use LinkedIn for (purpose)?", about 65% (45 out of 69) of business majors and 65% (58 out of 89) of STEM majors believe LinkedIn is "helpful for career".

We further conduct Chi-squared test for the LinkedIn's using experience and the results indicate that there are no significant differences at all dimensions between the two groups: business students and STEM students. In summary, the results of the survey in Table 2 indicate that the majority of the business students and the majority of the STEM students in our sample have over one year' experience of using LinkedIn. 64% of business students and 50% STEM have built over 10 connections. They have incentives to check LinkedIn, which include building new connections, searching jobs and developing careers.

4.2. H_1: LinkedIn as a Platform of Social and Professional Identity

Tables 3 reports survey questions and results for five statements (statements 1-5) to evaluate social and professional identity in LinkedIn users' perceptions. Panel A in Table 3 summarizes the descriptive statistics of the five statements about LinkedIn as a platform of social and professional identity. To test whether there are significant differences of the perceptions and usage of LinkedIn between the two major groups, business students and STEM students in terms of the five statements, Anova and post hoc Turkey tests are conducted and the results are presented in panel B of Table 3.

Insert Table 3 here.

The mean scores of the two major groups (business and STEM) on statement 1 ("I try to present myself in a favorable way on LinkedIn") are 4.52 and 4.32 on the five-Likert scale. The Anova result is not significant (F= 1.866, p= 0.158). "LinkedIn helps me to present my best sides to others". The mean scores of the two major groups on statement 2 ("LinkedIn helps me to present my best sides to others") are the same (4.04) on the five-Likert scale. The Anova result is not significant (F= 0.104, p= 0.901).

On statement 3: "I often update or edit my profile information on LinkedIn", the mean scores of the two major groups are 3.28 and 3.53 on the five-Likert scale. The Anova result is significant (F= 3.697, p= 0.050). However, the post hoc Turkey test result indicates that there are no significant differences (p= 0.331) between business and STEM students' perceptions of LinkedIn to "update or edit my profile information on LinkedIn". The mean scores of the two major groups on statement 4 ("I would like to post my professional photo") are 4.10 and 3.96 on the five-Likert scale. The Anova result

is not significant (F= 0.943, p= 0.391). The mean scores of the two major groups business and STEM on statement 5 ("I would like to list my college/university as the place where I am studying/studied") are 4.55 and 4.24 on the five-Likert scale. The Anova result is significant (F= 4.745, p= 0.010). Furthermore, post hoc Turkey test in Panel C of Table 3 shows that the difference is statistically significant between business and STEM students' perceptions of LinkedIn as a platform of social and professional identity ($p<0.010$).

Table 3

H_1 - LinkedIn as a Positive Social Capital to Construct Social and Professional Identity

Statement 1	"I try to present myself in a favorable way on LinkedIn"
Statement 2	"LinkedIn helps me to present my best sides to others"
Statement 3	"I often update or edit my profile information on LinkedIn"
Statement 4	"I would like to post my professional photo"
Statement 5	"I would like to list my college/university as the place where I am studying/studied"

Panel A: Descriptive Statistics

	Statement 1	Statement 2	Statement 3	Statement 4	Statement 5
	Mean (Standard Deviation)				
Business	4.52 (0.629) n= 71	4.04 (0.842) n= 46	3.28 (1.259) n= 69	4.10 (0.777) n= 71	4.55 (0.604) n= 71
STEM	4.32 (0.726) n= 112	4.04 (0.868) n= 54	3.53 (1.082) n= 112	3.96 (0.924) n= 112	4.24 (0.729) n= 111
Others	4.47 (0.743) n= 15	4.08 (0.706) n= 13	2.79 (1.188) n= 14	4.20 (0.676) n= 15	4.20 (0.676) n= 15
Total (n)	**198**	**113**	**195**	**198**	**197**

Panel B: Analyses using 1 X 3 ANOVA

ANOVA Results	DF	Sum of Squares	F-Value	p-Value
Statement 1	2	1.797	1.866	0.158
Statement 2	2	0.150	0.104	0.901
Statement 3	2	8.109	3.697	**0.050**
Statement 4	2	1.387	0.943	0.391
Statement 5	2	4.423	4.745	**0.010**

Panel C: Post Hoc Turkey HSD Multiple Comparisons

Statement	Pairs of Majors	p-Value
Statement 5	Business vs STEM	**0.010**

Notes: significant p-values (one-tailed) are bold with significance at the 0.05 level.

In terms of the perceptions of LinkedIn as a platform of social and professional identity, the results of the survey indicate that both business and STEM students present themselves in a favorable way, update the profile often, and post the professional photos. They perceive that LinkedIn as a great channel increases their visibilities to others (Damnianović et al., 2012; McCorkle & McCorkle, 2012). The results are in alignment with the social identity theory, and extrinsic and intrinsic benefit discussed earlier (Kwon & Wen, 2010; Reiss, 2012). Therefore, the overall results support H_1.

4.3. H_2: Linked in as a Platform of Building up Connections and Relationship with Trust

Table 4 reports survey questions and results for five statements (statements 6-10) on users' perceptions of LinkedIn as an online social network to build up connections and relationship with trust. Statement 6 is as follows: "LinkedIn helps me to expand my network". The mean scores of the two major groups business and STEM are 4.20 and

4.24 on the five-Likert scale. The Anova result is not significant (F= 0.194, p= 0.824). Statement 7 is as follows: "I do not participate in discussions, just watch communities for updates". The mean scores of the two major groups business and STEM are 3.71 and 3.67 on the five-Likert scale. The Anova result is not significant (F= 0.281, p= 0.755).

Table 4

H_2 - LinkedIn as a Platform for Building Relationship with Trust

Statement 6	"LinkedIn helps me to expand my network"
Statement 7	"I do not participate in discussion, just watch communities for updates"
Statement 8	"I trust information obtained via professional communities on LinkedIn"
Statement 9	"Other LinkedIn members are open and receptive to the needs of each other"
Statement 10	"I would like to respond to the invitations in a timely way"

Panel A: Descriptive Statistics

	Statement 6	**Statement 7**	**Statement 8**	**Statement 9**	**Statement 10**
	Mean (Standard Deviation)				
Business	4.20 (0.668) n= 71	3.71 (0.925) n= 69	3.77 (0.778) n= 71	3.58 (0.710) n= 71	3.87 (0.735) n= 71
STEM	4.24 (0.750) n= 112	3.67 (0.981) n= 112	3.68 (0.811) n= 111	3.69 (0.870) n= 112	3.78 (0.948) n= 111
Others	4.13 (0.640) n= 15	3.87 (1.060) n= 15	3.87 (0.990) n= 415	3.73 (0.799) n= 15	4.00 (0.756) n= 15
Total (n)	**198**	**196**	**197**	**198**	**197**

Panel B: Analyses using 1 X 3 ANOVA

ANOVA Results	**DF**	**Sum of Squares**	**F-Value**	**p-Value**
Statement 6	2	0.198	0.194	0.824
Statement 7	2	0.527	0.281	0.755
Statement 8	2	0.746	0.563	0.570
Statement 9	2	0.635	0.482	0.618
Statement 10	2	0.802	0.538	0.585

Notes: significant p-values (one-tailed) are bold with significance at the 0.05 level.

Statement 8 is as follows: "I trust information obtained via professional communities on LinkedIn". The mean scores of the two major groups business and STEM are 3.77 and 3.68 on the five-Likert scale. The Anova result is not significant (F= 0.563, p= 0.570). Statement 9 is as follows: "other LinkedIn members are open and receptive to the needs of each other". The mean scores of the two major groups business and STEM are 3.58 and 3.69 on the five-Likert scale. The Anova result is not significant (F= 0.563, p= 0.570). Statement 10 is as follows: "I would like to respond to the invitations in a timely way". The mean scores of the two major groups business and STEM are 3.87 and 3.78 on the five-Likert scale. The Anova result is not significant (F= 0.538, p= 0.585).

In terms of the perceptions of LinkedIn as a platform to build up connections and relationship with trust, the Anova results indicate that both business and STEM students trust LinkedIn as a platform to expand the network, obtain information from the professional communities. Both the business and STEM students are open minded and willing to receptive to peers' needs, instead of watching communities for updates. Therefore, the results support H_2.

In summary, the results of the survey in Table 4 suggest that young adults trust LinkedIn as a professional platform to establish and develop their social identity trust (Grabner-Kräuter & Bitter, 2015). They are more willing to share information, connect

with their professional peers in order to endorse the attributes and support the branding image (Krasnova et al., 2010; Lin & Lu, 2011; and Grabner-Kräuter & Bitter, 2015).

4.4. H_3: LinkedIn as a Platform of Career or Professional Development

Table 5 presents the survey questions and results for five statements (statements 11-15) on users' perceptions of LinkedIn as a platform of career or professional development. Statement 11 is as follows: "at LinkedIn I find some information about job and career". The mean scores of the two major groups business and STEM are 4.03 and 4.02 on the five-Likert scale. The Anova result is not significant (F= 0.0166, p= 0.847). Statement 12 is as follows: "LinkedIn helps me to contact recruiters directly". The mean scores of the two major groups business and STEM are 3.60 and 3.73 on the five-Likert scale. The Anova result is not significant (F= 0.343, p= 0.710).

Table 5

H_3 - LinkedIn as a Platform for Career or Professional Development

Statement 11	"At LinkedIn, I find some information about job and career"
Statement 12	"LinkedIn helps me to contact recruiters directly"
Statement 13	"LinkedIn helps me to make professional and business contacts"
Statement 14	"I would like to promote a business"
Statement 15	"Using a business college's alumni group, I can network with alumni to find internship or career opportunities"

Panel A: Descriptive Statistics

	Statement 11	**Statement 12**	**Statement 13**	**Statement 16**	**Statement 15**
	Mean (Standard Deviation)				
Business	4.03 (0.736) n= 71	3.60 (0.942) n= 60	3.99 (0.886) n= 71	3.32 (0.968) n= 71	3.96 (0.917) n= 71
STEM	4.02 (0.759) n= 112	3.73 (0.930) n= 64	3.99 (0.847) n= 111	3.33 (1.126) n= 112	3.84 (0.876) n= 112
Others	4.13 (0.352) n= 15	3.62 (0.870) n= 13	3.73 (0.799) n= 15	3.47 (0.743) n= 15	3.87 (0.640) n= 15
Total (n)	**198**	**137**	**197**	**198**	**198**

Panel B: Analyses using 1 X 3 ANOVA

ANOVA Results	**DF**	**Sum of Squares**	**F-Value**	**p-Value**
Statement 11	2	0.177	0.166	0.847
Statement 12	2	0.593	0.343	0.710
Statement 13	2	0.907	0.616	0.541
Statement 14	2	0.269	0.122	0.885
Statement 15	2	0.615	0.400	0.671

Notes: significant p-values (one-tailed) are bold with significance at the 0.05 level.

Statement 13 is as follows: "LinkedIn helps me to make professional and business contacts". The mean scores of the two major groups business and STEM are 3.99 and 3.99 on the five-Likert scale. The Anova result is not significant (F= 0.616, p= 0.541). Statement 14 is as follows: "LinkedIn helps me to promote a business". The mean scores of the two major groups business and STEM are 3.32 and 3.33 on the five-Likert scale. The Anova result is not significant (F= 0.122, p= 0.885). Statement 15 is as follows: "using a college's alumni group, I can network with alumni to find internship or career opportunities". The mean scores of the two major groups business and STEM are 3.96 and 3.84 on the five-Likert scale. The Anova result is not significant (F= 0.400, p= 0.671).

The results of the survey in Table 5 indicate that there is no significant difference between business students and STEM students' perception of LinkedIn as a platform of professional or business opportunities. Therefore, H_3 is supported. Specifically, both business and STEM students perceive that LinkedIn provides information about jobs and connections with the recruiters. Therefore, LinkedIn benefits them in expanding their professional network (Albrecht, 2011).

4.5. H_4: LinkedIn as a Platform of Interactive Learning Resources

Four statements (statements 16-19) and their results are presented in Table 6 to evaluate users' perceptions of LinkedIn as a platform of interactive learning resources. Statement16 is as follows: "LinkedIn allows me to save time when I want to share information and ideas with my connections". The mean scores of the two major groups business and STEM are 3.44 and 3.86 on the five-Likert scale. The Anova result is significant (F= 6.830, p= 0.001). Additionally, the post hoc Turkey test in Panel C of Table 5 shows that business students and STEM students' perception are significantly different (p<0.004). Statement 17 is as follows: "I'm an active participant in terms of comments and discussion topics starting". The mean scores of the two major groups business and STEM are 1.87 and 2.87 on the five-Likert scale. The Anova result is significant (F= 18.232, p= 0.000). The post hoc Turkey test shows that business students and STEM students' perception are significantly different(p<0.000).

Table 6

H_4 - LinkedIn as an Interactive Learning Resource

Statement 16	"LinkedIn allows me to save time when I want to share information and ideas with my connections"
Statement 17	"I am an active participant in terms of comments and discussions"
Statement 18	"LinkedIn helps me to learn skills with expert-led courses"
Statement 19	"Social networking sites such as LinkedIn is more distracting than helpful to students for academic work"

Panel A: Descriptive Statistics

	Statement 16	Statement 17	Statement 18	Statement 19
		Mean (Standard Deviation)		
Business	3.44 (0.806) n= 71	1.87 (0.877) n= 71	3.07 (1.087) n= 71	2.07 (0.976) n= 71
STEM	3.86 (0.899) n= 111	2.87 (1.248) n= 112	3.67 (0.990) n= 112	2.93 (1.292) n= 112
Others	3.27 (1.033) n= 15	2.07 (1.033) n= 15	3.33 (1.175) n= 15	2.53 (1.125) n= 15
Total (n)	**197**	**198**	**198**	**198**

Panel B: Analyses using 1 X 3 ANOVA

ANOVA Results	DF	Sum of Squares	F-Value	p-Value
Statement 16	2	5.259	6.830	**0.001**
Statement 17	2	22.606	18.232	**0.000**
Statement 18	2	7.876	7.287	**0.001**
Statement 19	**2**	16.027	11.583	**0.000**

Panel C: Post Hoc Turkey HSD Multiple Comparisons

Statement	Pairs of Majors	p-Value
Statement 16	Business vs STEM	**0.004**
Statement 17	Business vs STEM	**0.000**
Statement 18	Business vs STEM	**0.001**
Statement 19	Business vs STEM	**0.000**

Notes: significant p-values (one-tailed) are bold with significance at the 0.05 level.

Statement 18 is as follows: "LinkedIn helps me learn skills with expert-led courses". The mean scores of the two major groups business and STEM are 3.07, and 3.67 on the five-Likert scale. The Anova result is significant ($F= 7.287$, $p= 0.001$). The post hoc Turkey test shows that business and STEM students' perception are significantly different ($p<0.001$). Statement 19 is as follows: "social networking sites such as LinkedIn is more distracting than helpful to students for academic work". The mean scores of the two major groups business and STEM are 2.07 and 2.93 on the five-Likert scale. The Anova result is significant ($F= 11.583$, $p= 0.000$). The post hoc Turkey test shows that business students and STEM students' perception are significantly different at ($p<0.000$).

While previous studies show that social networking sites provide college students great educational opportunities (Buzzetto-More, 2012; Junco, 2013), the results of the survey in Table 6 further suggest that business and STEM students have different perceptions of LinkedIn as an interactive learning resource. Therefore, H4 is supported. Due to the very distinct features of the discipline, business and STEM students have statistically significant different perceptions of LinkedIn as a platform of interactive learning resources. Specifically, STEM students have stronger tendency to utilize LinkedIn to participate in sharing information with connections thanks to the emerging technology and to learn new skills. More interestingly, business students are less active than STEM students in participating the comments and discussions on LinkedIn. Compared to business students, STEM students believe that LinkedIn causes more distraction, which is less beneficial to their academic work.

V. CONCLUSION

Our study extends Zhang and Chen (2019) to conduct a survey to investigate LinkedIn users' perceptions and the impact of LinkedIn on their career development and interactive learning process among business students, STEM students, and students of Humanity and other majors at one HBCU and one Caucasian dominate private university. The results indicate that both business students and STEM students believe that the information shared on LinkedIn is trustable, which incentivizes them to respond the information and share with communities, present themselves favorably on the profiles, connect others in future career development. Meanwhile, business and STEM students' perceptions of LinkedIn as a platform of interactive learning resources are significantly different, suggesting that STEM students believe that LinkedIn causes more distraction, which is less beneficial to their academic work than business students do.

We use questionnaire among students in accounting classes and computer science classes at two higher educational institutions to collect the data. We find that both business and STEM students at HBCUs or at Caucasian dominate university trust and more likely to share the information on LinkedIn. Based on the trust, the students are more likely to utilize LinkedIn as a social networking tool to present themselves. They believe that LinkedIn is helpful in developing professional network and future career. The study also finds that there are no statistical differences in business students or STEM students' perceptions and usage of LinkedIn in terms of building relationship with trust and future career development. However, our findings show that there are significant differences between business students and STEM students' perceptions of LinkedIn as an interactive learning resource.

The study benefits college students especially business students and STEM students, future business professionals, future IT professionals and engineering professionals, educators, and the society. Specifically, the study benefits college students in realizing the impacts of LinkedIn and using it as an effective tool on their life and

career. Furthermore, the study benefits educators at different universities in considering providing education for both business students and STEM students in utilizing LinkedIn to benefit the society.

There are some limitations in our study. First, the survey in the study is conducted at one HBCU and one Caucasian dominant private university in the U.S. Future study with more surveys conducted at different institutions may generalize the conclusions in our study. Second, the study focuses on business students and STEM students. Future study may conduct surveys among students from other majors to evaluate their perceptions and usage of LinkedIn. Third, the statistic technique is limited to descriptive statistics due to the small sample size. Future study can collect more data and develop analysis of group difference via Anova and other multivariate analysis approaches. Fourth, another future study can focus on the comparison of LinkedIn and other professional network. Finally, it is promising to explore how universities' educators can apply LinkedIn to assist with students' awareness of the importance of LinkedIn in social networking world.

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