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Digital Competence and the Gender Gap: A Case Study of Hospitality Students

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Abstract

While digital technologies are opening up new avenues for learning, they are also leading to social inequalities; for instance, they have given rise to the digital gender gap. Though a significant effort is being made to make internet access universal, currently, there exists a significant gender gap concerning access, ownership of digital devices, and digital competence (DC). Digital gender equality is one of the critical enablers of sustainable development, so there is a need to assess this gap and develop meaningful indicators for use in designing and implementing effective policies. Accordingly, this study aims to examine this gender divide in DC, specifically among the hospitality students in India. We use the quantitative survey method based on DigiComp framework 2.1 to collect data from a total of 359 hospitality graduates to capture their level of DC in terms of information and data literacy, communication, content creation, safety and problem-solving. Our findings suggest no gender difference in the parameters under study except for problem-solving competence, which includes the ability to solve technical problems, use technology creatively and identify needs and technological responses.

Keywords: Digital competence, hospitality students, digital divide, gender gap.

1. Introduction

Due to rapid growth in new technologies in education, digital competence (DC) has opened up a crucial debate among academic researchers. The discussion has picked up pace in this current COVID 19 pandemic period, necessitating the adoption of new digital technology to conduct almost all human activity. A recent survey (Farnell et al., 2021) shows that although the students positively evaluated the delivery of emergency remote teaching, a significant proportion encountered severe challenges in their learning. In addition to excess workload, the major factors impacting education outcomes were lack of access to online communication tools and the internet and a lack of DC amongst the students. The COVID- 19 pandemic resulted in an unprecedented rise of online teaching and learning using technologies such as Zoom, Google class, Microsoft Team etc.

Meanwhile, competency frameworks are increasingly being adopted in the recruitment and contemporary HR practice in most organizational assessment procedures. DC is a key competence for lifelong learning (European Commission, 2006) and one of the eight critical life skills (Zhao et al., 2021). It is defined as "a set of abilities to use technology to optimize our daily lives effectively" (Ferrari et al., 2013) and understood as "the confident, critical and responsible use of the technologies from the society of information for work, entertainment and education" (European Commission, 2006) DC is a keystone for both men and women; however, it is reported that women continue to lag behind men in accessing, using, and affording digital tools (OECD, 2018). Gender gaps also occur when it comes to digital skills and confidence. Women, for example, are less likely to apply for employment online or utilize internet banking services than men. Additionally, when

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female education levels and income are lower, the gender digital divide becomes more evident. This divide is significantly more apparent in terms of access to mobile phones, digital devices, and digital literacy (OECD, 2018). Contrary to the general assumption, the digital gender gap is broadening instead of narrowing and quickly exceeding the digital access gap, despite a decade of national and international efforts to close it (UNESCO, 2019). Though men and women have a similar attitude towards technology at an early age, the gender difference starts appearing from the secondary school level (Volman et al., 2005).

However, different studies have analyzed the role of gender on the acquisition of DC with inconclusive findings. While some studies provide evidence for the existence of the digital gender gap (Davaki, 2018), others testify against it (Colmenero et al., 2015; Vota et al., 2011). Further, as against the general assumption that self-perception amongst males about the DC is higher, studies show this difference in favour of women (Vota et al., 2011). Though few studies have attempted to investigate the role of DC in learning (Esteve-Mon et al., 2020; Gómez-Trigueros, 2020; Holguin-Alvarez et al., 2021; Štemberger, Konrad, 2021), none have focused on the gender DC gap. Thus, the current study aims to address this gap in the literature and analyze the role of gender in the perceived level of DC using data compiled from hospitality students in India.

The rapid growth in ICTs has impacted all aspects of human life, including social, economic, and educational (Starkey, 2020). It is predicted that DC amongst the workforce would be a primary requisite to perform in the workplace (WEF, 2020). From the academic point of view, digital skill is one of the ardent skills for today's pedagogical processes (Lopez-Belmonte et al., 2020). Thus, developing DC for teachers and students is vital for the teaching-learning process (Lopez-Belmonte et al., 2020). It is also found that students with high DC can easily understand online learning materials and perform well in learning (Lopez-Belmonte et al., 2020). Meanwhile, few studies have outlined the different areas of digital competence (Calvani et al., 2008; Erstad, 2015; Janssen et al., 2013; Ng, 2012). However, the Digital Competence Framework for Citizens (DigComp) published in 2013 by the European Commission (European Commission, 2006) is one of the most used frameworks to understand DC. This DigComp framework identifies five major areas across 21 digital competencies under the subheads: Information and data literacy, Communication, Content Creation, Safety and Problem Solving (Table 1).

The concept of the digital divide was first coined in the 1980s by the Maitland Commission to reflect the social impact of ICTs. However, this assumption of inequality of access and usage across genders changed over the period, became more complex, and incorporated new factors. According to a report by OECD (OECD, 2008), the digital divide refers to "the gap between individuals, households, businesses and geographic areas at different socio-economic levels concerning both their opportunities to access ICTs and to their use of the internet for a wide variety of activities". It also relates to access to hardware, software and digital skills to make meaningful use of technological devices.

A recent survey suggests that men have always dominated the digital technology landscape (Prieto et al., 2020), with women lagging. For example, Jiménez and Fernández (Jiménez, Fernández, 2016) found low-level women participation in designing and creating software for technology companies. Though a new generation of women has been ICT users, they remain a minority in the design and development of new technologies (Prieto et al., 2020). Further, male and female students differ in their computer knowledge, programming, design, spreadsheets, software, and multimedia productions (Prieto et al., 2020). However, though men exhibit a higher vision and attitude towards technology, this gender difference does not exist at the basic and moderate knowledge (Aranda Garrido et al., 2019; Garrido-Lora et al., 2016). Thus, based on existing literature, we can conclude that males and females have equal DC at the user level. However, at a specialized level, the emergence of many modern technologies broadens the digital gap between them. The spread of gender inequality through ICT is a social threat and needs to be eradicated in all spheres of life, including the higher education level.

A recent study conducted in Spain, Colombia, Mexico and Ecuador among university students investigates the digital gender gap and testifies the existence of gender differences every day and the academic use of the Internet (Pérez Escoda et al., 2021). It also finds that male students were more up-to-date and informed than female counterparts in daily Internet use. However, female students exhibited better skills in terms of following secure use practices. In using the Internet for learning, the gender digital divide seems evident. Male students are found to be more capable of solving technical problems and sharing content. In contrast, female students are more concerned about the quality and presentation of academic work. They are also more cautious

while sharing content. Thus, based on existing literature, we postulate no difference between male and female respondents in terms of64 basic DC (Information, communication). However, at intermediate (e.g., content creation and safety) and advanced levels (e.g., problem solving), there is an existence of a gender gap. Thus, the following hypotheses proposed

Hypothesis 1: With regards to information and data literacy competence, there is no difference between male and female students.

Hypothesis 2: Concerning communication competence, there is no difference between male and female students.

Hypothesis 3: Regarding content creation, there is a difference between male and female students.

Hypothesis 4: Male and female students differ in terms of safety competence.

Hypothesis 5: Male and Female students differ with regards to the problem-solving competence.

2. Materials and methods

This study is conducted at one of the hospitality institutes in India, which is affiliated with a private deemed university. The institute offers a four-year Bachelor's degree in Hotel Management and a three-year Bachelor's degree in Culinary Arts. It also offers two Master's programs: Masters in Hotel Management and Applied Dietetics and Nutrition. The institute has a well-established library where students and faculty members can access e-journals, e-magazines, and hospitality and tourism studies databases. It also offers remote access to the subscribed online content to its readers. The subscribed online databases for hospitality students are as follows: EBSCO Hospitality & Tourism Complete, Hospitality, Tourism & Leisure Collection, Culinary Arts Collection, Scopus and Web of Science.

The data for this study was collected using online Microsoft forms. The authors distributed the online form to the students in the class and briefed the respondents about the objective and importance of the study. The purposive sampling technique was used to collect data. Only the students with at least six months of online learning experience were considered. In total, 359 valid responses were received. Of these, 224 (62.4 %) were male students, and 135 (37.6 %) were female. Regarding the educational status, 315 (87.7 %) were undergraduates, and 44 (12.3 %) were postgraduates.

The survey instrument had two sections: the first section consists of 21 items of DC under five dimensions, namely, information, communication, content creation, safety, and problem-solving. The dimension information had three items, whereas those under communication had six items. The dimensions content creation, safety, and problem-solving had three items each. All these dimensions were measured on a 5-point Likert scale, where 1 was conceptualized as a low level and 5 a very high level of competence. The respondents were asked to rate their level of competence on these parameters. All these items were borrowed from the DigiComp framework (Ferrari et al., 2013). The second section of the survey instrument captured the demographic data, such as the participants' age, gender, and education.

3. Discussion

The Kaiser-Meyer-Olkin (KMO) test was conducted to test the sample adequacy and it is found that the KMO value was above the recommended value of 0.6. Further, it is also found that the Bartlett's test of Sphericity was significant at $p<.001$ ($\chi 234$ (210) = 4478). Therefore, it can assumed that data were suitable for factor analysis. Additionally, the mean and standard deviation (SD) for each item is calculated and presented in Table 1.

The factorability of all the 21 items of DC was examined using exploratory factor analysis (EFA). The result suggests that all the 21 items were loaded onto the respective dimensions (Table 2). The EFA extracted five dimensions with an Eigenvalue greater than 1, explaining 66.6 % of the variance. The factor loading values ranged from 0.528 to 0.848.

Furthermore, the reliability coefficient (Cronbach's alpha) was calculated, and all the values were above the recommended value of 0.6. Before testing the hypotheses, the measurement model's psychometric properties were assessed using the confirmatory factor approach. The model displayed good model fit indices (CFI = 0.95; TLI = 0.94; RMSEA = 0.05; SRMR = 0.05; x 2 /df = 2.64). It was further tested for reliability and convergent validity (Table 2).

Table 1. Mean, SD, and Cronbach's Alpha

Area	*Competences*	*Item code*	*Mean*	*SD*	*Cronbach's alpha*
Information &literacy browsing	Information literacy Browsing, finding and clarifying in	INF1	3.77	0.74	0.834
	Evaluating information	INF2	3.6	0.72	
	Storing and retrieving information	INF3	3.64	0.77	
Communication	Interacting through technologies	COM1	3.66	0.89	0.874
	Sharing information and content	COM2	3.76	0.86	
	Engaging in online citizenship	COM3	3.42	0.84	
	Collaborating through digital channels	COM4	3.52	0.89	
	Netiquette	COM5	3.59	0.88	
	Managing digital identity	COM6	3.56	0.87	
Content creation	Developing content	CON1	3.35	0.95	0.862
	Integrating and re-elaborating	CON2	3.31	0.86	
	Copyright and licenses	CON3	3.09	1.04	
	Programming	CON4	2.83	1.15	
Safety	Protecting devices	SAF1	3.66	0.85	0.855
	Protecting personal data	SAF2	3.84	0.89	
	Protecting health	SAF3	3.77	0.92	
	Protecting the environment	SAF4	3.76	0.92	
Problem-solving	Solving technical problems	PRO1	3.49	0.85	0.865
	Identifying needs and technological responses	PRO2	3.55	0.81	
	Innovating and creatively using technology	PRO3	3.58	0.83	
	Identifying digital competence gaps	PRO4	3.38	0.83	

Reliability was assessed based on the composite reliability (CR), and convergent validity was assessed based on the average variance extracted (AVE) values. According to Hair (Hair et al., 2014) the value of CR and AVE should be more than 0.70 and 0.50, respectively. All these values were above the recommended value (Table 2), suggesting the presence of reliability and convergent validity of the constructs.

Table 2. Construct Reliability and Validity

Variables and their indicators	SL	t-value	CR	AVE
Information and data literacy				
INF1	0.756	1	0.836	0.630
INF2	0.811	14.718		
INF3	0.813	14.747		
Communication				
COM1	0.731	13.069	0.874	0.536
COM2	0.729	13.354		
COM3	0.727	12.871		
COM4	0.756	12.904		
COM5	0.739	12.927		
COM6	0.711	1		
Content Creation				
CON1	0.811	1		

CON2	0.850	14.454	0.866	0.619
CON3	0.760	15.057		
CON4	0.720	13.570		
Safety				
SAF1	0.823	1	0.856	0.600
SAF2	0.859	12.324		
SAF3	0.765	12.620		
SAF4	0.632	11.733		
Problem-solving				
PRO1	0.823	1	0.868	0.623
PRO2	0.859	14.608		
PRO3	0.765	17.480		
PRO4	0.632	16.203		

Notes: SL – Standardized loadings; CR – Composite reliability; AVE – Average variance extracted

An independent sample t-test was performed to determine whether a significant difference existed between male and female students across the five different areas of DC. The results suggest that except for "problem-solving", students did not show any significant difference in the areas of DC. They also revealed that the perceptions of the male students were higher (mean [M] = 3.606, standard deviation [SD] = 0.64) than female students (M = 3.32, SD = 0.75) but did not differ significantly ($p < .05$; Table 3). The results of the independent sample t-test are shown in Table 3.

Table 3. *t*-Test for Gender Perceptions Toward the Digital Competence Level

		Gender	N= 359	Mean	SD	T	Sig.(2-tailed)	Support
H1	Information mean	Male	224	3.6786	0.64683	0.345	0.73ns	Yes
		Female	135	3.6543	0.64313			
H2	Communication mean	Male	224	3.5893	0.70178	0.345	0.917ns	Yes
		Female	135	3.5815	0.65343			
H3	Content Creation mean	Male	224	3.1931	0.85714	0.291	0.164ns	No
		Female	135	3.0648	0.82009			
H4	Safety mean	Male	224	3.7757	0.74431	0.564	0.573ns	No
		Female	135	3.7296	0.75561			
H5	Problem solving mean	Male	224	3.606	0.64202	3.784	0.001***	Yes
		Female	135	3.3222	0.75919			

Ns= non-significant, ***= significant at $p < 0.001$ level

4. Results

The outbreak of the Covid-19 pandemic forced nations worldwide to implement stringent lockdowns to contain the spread of the virus. These measures limited human interaction and activity, and as one of the consequences, all schools and colleges were forced to close their physical campuses. Higher educational institutes rapidly adopted the emergency remote teaching approach to ensure undisrupted learning. While the shift to the online medium has demonstrated the usefulness of technology in advancing learning opportunities, it has also revealed gaps in our current education practices, for instance, the digital gap between genders in accessing the Internet and digital devices. Considering this, the study investigates the possible gender digital gap, mainly DC, among hospitality students in an institute in India. Their DC was assessed based on the five areas as recommended by Ferrari (Ferrari et al., 2013). The proposed hypotheses were tested using an independent sample t-test, and support was found for three hypotheses. The independent sample t-test supports hypothesis 1 (H1); that is, there is no difference between the male and female students with regard to information

and data literacy competencies. This finding aligns with Aranda Garrido et al. (Aranda Garrido et al., 2019), who find that gender difference does not exist at the basic and moderate knowledge levels. Similarly, hypothesis 2 (H2) postulates no difference in the communication competence between male and female students is also supported. Hypothesis 3 (H3) proposes a difference between male and female students regarding content creation competence; however, the results do not support this hypothesis. In other words, both male and female students perceive the same level of content creation competence. This finding contradicts Aranda Garrido et al. (Aranda Garrido et al., 2019). Similarly, the fourth hypothesis, that is, there is a difference between male and female students concerning safety in the digital environment, finds no empirical support.

However, the fifth hypothesis, which postulates that male and female students differ in problem-solving competence, is supported. We find a significant difference between male and female students with regards to their problem-solving competence. Male students had better competence in solving technical problems, identifying needs and technological responses, innovating using technology creatively, and identifying DC gaps. This finding aligns with a study conducted by Aranda Garrido et al. (Aranda Garrido et al., 2009).

5. Conclusion

To sum up, though the digital access divide is significantly decreasing, different inequalities persist (for example, DC, digital skill). Bridging the gender digital divide can accelerate global economic growth and support the implementation of the 2030 Agenda for Sustainable Development. According to a new UNICEF study, factors that need to be considered to close the gender digital divide can be grouped into three interconnected areas: access, digital literacy, and online safety. However, initiatives to close the digital gender gap must go beyond meeting learners' immediate practical needs; they must be integrated with gender-responsive education systems.

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