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Problem-Solving and Digital Collaboration Skills for 21st-Century Job Readiness Among Business Education Undergraduates in Niger Delta, Nigeria

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Abstract

This study examined the reasons for problem-solving and digital collaboration skills needed by Business Education undergraduates for 21st-century job readiness in the Niger Delta, Nigeria. A descriptive survey research design was adopted. The population comprised 912 final-year Business Education undergraduates from eight tertiary institutions, while a sample of 280 respondents was selected using the Taro Yamane formula and proportionate sampling technique. Data were collected using a researcher-developed questionnaire titled: Problem-solving and Digital Collaboration Skills Needed by Business Education Undergraduates Questionnaire (PSDCSNBEQ). Mean and standard deviation were used to answer the research questions, while t-test was employed to test the hypotheses at the 0.05 level of significance. The findings revealed that problem-solving skills (grand mean=3.28 for males; 3.29 for females) and digital collaboration skills (grand mean = 3.21 for males; 3.27 for females) were highly required for 21st-century job readiness. The study concludes that problem-solving and digital collaboration are indispensable competencies for preparing Business Education undergraduates for the contemporary labour market. It was recommended that Business Education programmes integrate experiential learning and technology-supported collaborative activities into their curricula to strengthen graduates' employability.

Keywords: *Business Education, Problem-solving skills, Digital collaboration, Employability, 21st-century job readiness, Niger Delta*

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Background to the Study

The changing nature of work in the twenty-first century has reshaped employers' expectations of university graduates. Rapid technological advancement, globalization, and the increasing use of digital technologies have shifted the emphasis from academic qualifications alone to the acquisition of transferable skills that enable graduates to perform effectively in dynamic workplaces. Consequently, higher education institutions are increasingly expected to prepare graduates with employability skills that support workplace productivity, innovation, and career success. Among the competencies considered essential for employability are problem-solving and digital collaborative skills. Problem-solving enables individuals to identify workplace challenges, analyze available information, evaluate alternatives, and implement effective solutions in complex situations. Jonassen (2011) describes problem-solving as a higher-order cognitive process that involves reasoning and the application of knowledge to resolve real-world issues. As organizations continue to operate in increasingly uncertain and competitive environments, employees with strong problem-solving abilities are better equipped to make informed decisions, adapt to change, and contribute to organizational performance.

Previous studies consistently identify problem-solving as a critical employability competency. Employers value graduates who can think independently, address organizational challenges, and respond effectively to changing workplace demands (Finch et al., 2013; Jackson, 2014; Pang et al., 2019; Robles, 2012). Similarly, Heckman and Kautz (2012) found that problem-solving significantly influences labour market success, while Clarke (2018) and Ritter et al. (2018) associated the skill with innovation, adaptability, and workplace effectiveness. However, evidence suggests that many graduates still lack adequate problem-solving competence despite its growing importance (Succi & Canovi, 2020; Tymon, 2013). Within Nigeria, studies by Okolie et al. (2020, 2021), Ogunleye and Oyekanmi (2020), Akinyemi and Oke (2015), Eze and Nwosu (2018), and Okoye and Arimonu (2016) further highlight problem-solving as a key determinant of graduate employability and emphasize the need for Business Education programmes to strengthen its development.

Alongside problem-solving, digital collaborative skills have become indispensable in today's technology-driven workplace. Organizations increasingly rely on virtual teams and digital platforms that require employees to communicate, coordinate tasks, and work collaboratively regardless of geographical location. Consequently, graduates are expected to demonstrate competence in using digital technologies to support teamwork and organizational effectiveness. The importance of digital collaboration is well established in the literature. van Laar et al. (2017), Ferrari (2013), and Redecker and Punie (2017) identified digital collaboration as a core twenty-first-century competency required for effective participation in technology-enabled workplaces. Likewise, Dabbagh and Kitsantas (2012), Trust et al. (2016), Schmidt et al. (2014), and Hämäläinen et al. (2015) demonstrated that digital collaboration enhances teamwork, communication, shared decision-making, and workplace performance. Other studies have linked digital collaborative competence to employability, innovation, and lifelong learning (Bennett et al., 2017) Within Nigeria, however, inadequate

integration of digital collaborative skills into university curricula continues to limit graduates' workplace readiness (Okolie et al., 2020, 2021; Akinyemi & Oke, 2015; Eze & Nwosu, 2018).

Business Education programmes are expected to equip students with the competencies required to succeed in contemporary workplaces. Ito and Okudaye (2025) Their study found a significant positive relationship between experiential learning and entrepreneurial intentions. its findings are relevant to the present study because they demonstrate the importance of authentic learning experiences in preparing Business Education students for activities beyond the classroom. Such experiences provide settings in which students can interpret situations, analyze problems, make decisions and apply disciplinary knowledge. Beyond disciplinary knowledge, graduates must possess problem-solving and digital collaborative skills that enable them to respond effectively to workplace challenges and function within increasingly digital work environments. Although these competencies have received considerable attention in employability research, limited empirical evidence exists on the specific problem-solving and digital collaborative skills required by Business Education undergraduates in the Niger Delta. This study therefore examined the problem-solving skills and assessed the digital collaborative skills needed by Business Education undergraduates for 21st-century job readiness in the Niger Delta.

The twenty-first-century workplace increasingly requires graduates who can solve complex problems and collaborate effectively through digital technologies. While Business Education programmes are expected to develop these competencies, many graduates continue to experience difficulties in analyzing workplace challenges, making informed decisions, and working effectively in digitally enabled environments. These shortcomings contribute to the growing mismatch between university training and employers' expectations, thereby reducing graduates' employability. Although previous studies have established the importance of problem-solving and digital collaborative skills, much of the existing evidence has focused on employer expectations, graduate outcomes, or general employability frameworks. Within the Nigerian context, relatively little empirical evidence exists on the specific problem-solving and digital collaborative skills required by Business Education undergraduates, particularly in the Niger Delta. This lack of context-specific evidence limits efforts to improve curriculum design and better prepare graduates for the realities of the modern labour market. It is against this background that this study examined the problem-solving skills and assessed the digital collaborative skills needed by Business Education undergraduates for 21st-century job readiness in the Niger Delta.

Research Questions

1. What are problem-solving skills needed by Business Education undergraduates for 21st-century job readiness in the Niger Delta.
2. What are digital collaboration skills needed by Business Education undergraduates for 21st-century job readiness in the Niger Delta.

Research Hypothesis

1. **$H_0$1:** There is no significant difference in the mean responses of male and female Business Education undergraduates on the problem-solving skills needed for 21st-century job readiness in the Niger Delta.
2. **$H_0$2:** There is no significant difference in the mean responses of male and female Business Education undergraduates on the digital collaboration skills needed for 21st-century job readiness in the Niger Delta.

Method

This study employed a descriptive survey research design to identify the problem-solving and digital collaboration skills required by Business Education undergraduates for 21st-century job readiness in the Niger Delta, Nigeria. The study was conducted in Niger Delta, Nigeria using some selected tertiary institutions offering Business Education programmes. The population comprised 912 final-year (400-level) Business Education undergraduates: Delta State University, Abraka (86), Niger Delta University, Wilberforce (44), University of Uyo (96), University of Benin (46), Cross River State College of Education Affiliate (38), Ignatius Ajuru University of Education, Port Harcourt (440), Alvan Ikoku Federal University of Education, Owerri (77), Federal University of Agriculture, Umudike (85) from departmental handbook (2026). A sample of 280 respondents was drawn from the population using the Taro Yamane (1967) formula. The sample was proportionately allocated across the participating institutions to ensure adequate representation. Data were collected using a researcher developed questionnaire titled Problem-solving and Digital Collaboration Skills Needed by Business Education Undergraduates Questionnaire (PDCSNBUQ). The instrument comprised two sections. Section A captured respondents' demographic characteristics, while Section B measured problem-solving and digital collaboration skills using a four-point rating scale ranging from Strongly Agree (4) to Strongly Disagree (1). The instrument was subjected to face and content validation by two experts in Business Education and one expert in Educational Measurement and Evaluation. A pilot study involving 30 final-year Business Education students from the University of Nigeria, Nsukka, yielded an overall Cronbach's alpha coefficient of 0.76 indicating satisfactory internal consistency. The data were analyzed using mean and standard deviation to answer the research questions, hypotheses were tested using the independent-samples *t*-test at the 0.05 level of significance to determine whether significant differences existed between the mean responses of male and female Business Education undergraduates regarding the problem-solving and digital collaboration skills required for 21st-century job readiness.

Results

Research Question 1: What are problem-solving skills needed by Business Education undergraduates for 21st-century job readiness in the Niger Delta?

Ho1: There is no significant difference in the mean response of male and female Business Education undergraduates on the problem-solving skills needed for 21st-century job readiness in the Niger Delta.

Table 1: Mean Ratings of Male and Female Respondents on Problem-Solving Skills

		Male (N = 126)			Female (N = 154)		
S/N	**Questionnaire Statement**	$\bar{X}$	**SD**	**Remark**	$\bar{X}$	**SD**	**Remark**
1	The ability to identify workplace problems is essential for job readiness.	3.32	0.64	Agreed	3.23	0.72	Agreed
2	The ability to generate alternative solutions to business problems is important.	3.38	0.62	Agreed	3.34	0.68	Agreed
3	Decision-making skills are necessary for handling workplace challenges.	3.19	0.67	Agreed	3.23	0.68	Agreed
4	The ability to resolve conflicts effectively is necessary for organizational success.	3.24	0.71	Agreed	3.34	0.60	Agreed
Grand Total		3.28	0.43	Agreed	3.29	0.43	Agreed

The results presented in Table 1 indicate that male respondents had a grand mean score of 3.28 with a standard deviation of 0.43, while female respondents had a grand mean score of 3.29 with a standard deviation of 0.43 on problem-solving skills. The grand mean scores of both groups exceeded the criterion mean of 2.50, indicating that both male and female respondents agreed that problem-solving skills are essential for 21st-century job readiness. This suggests that respondents perceived the ability to identify workplace problems, generate alternative solutions to business problems, make decisions, and resolve conflicts effectively as important skills for job readiness in the 21st century.

Table 2: Independent Samples t-test Analysis of Male and Female Respondents' on Problem-Solving Skills

Gender	**No. of Respondents (N)**	**($\bar{X}$)**	**SD**	**Df**	**LS**	**t-cal**	**t-crit**	**Decision**
Male	126	3.28	0.43	278	0.05	-0.108	±1.968	Accepted
Female	154	3.29	0.43					

The t-test revealed that there was no statistically significant difference between the mean ratings of male respondents (M = 3.28, SD = 0.43) and female respondents (M = 3.29, SD = 0.43) on problem-solving skills, t-cal = -0.108, p = .914 > .05. Since the calculated t-value (-0.108) is less than the critical t-value (±1.968), the null hypothesis was accepted, indicating that gender did not significantly influence respondents' perceptions of problem-solving skills.

Research Question 2: What digital collaboration skills are needed by Business Education undergraduates for job readiness in the Niger Delta?

$H_0$2: There is no significant difference in the mean responses of male and female Business Education undergraduates on the digital collaboration skills needed for job readiness in the Niger Delta.

Table 3: Mean Ratings of Male and Female Respondents on Collaboration Skills

		Male (N = 126)			Female (N = 154)		
S/N	**Questionnaire Statement**	**$\bar{X}$**	**SD**	**Remark**	**$\bar{X}$**	**SD**	**Remark**
5	Ability to work effectively using online collaborative tools is essential.	3.30	0.64	Agreed	3.33	0.65	Agreed
6	Skills in virtual teamwork are necessary for modern workplaces.	3.32	0.56	Agreed	3.35	0.65	Agreed
7	Competence in using video conferencing platforms is required for job readiness.	3.04	0.72	Agreed	3.13	0.78	Agreed
8	Digital networking skills are important for professional growth.	3.19	0.71	Agreed	3.26	0.70	Agreed
Grand Total		3.21	0.42	Agreed	3.27	0.48	Agreed

The results presented in Table 3 indicate that male respondents had a grand mean score of 3.21 with a standard deviation of 0.42, while female respondents had a grand mean score of 3.27 with a standard deviation of 0.48 on collaboration skills. The grand mean scores of both groups exceeded the criterion mean of 2.50, indicating that both male and female respondents agreed that collaboration skills are essential for workplace effectiveness. This suggests that respondents perceived the ability to work effectively using online collaborative tools, participate in virtual teamwork, utilize video conferencing platforms, and engage in digital networking as important skills for 21st-century job readiness.

Table 4: Independent Samples t-test Analysis of Male and Female Respondents' on Collaboration Skills

Gender	**No. of Respondents (N)**	**($\bar{X}$)**	**SD**	**Df**	**LS**	**t-cal**	**t-crit**	**Decision**
Male	126	3.21	0.42	278	0.05	-1.018	±1.968	Accepted
Female	154	3.27	0.48					

The independent samples t-test revealed that there was no statistically significant difference between the mean ratings of male respondents (M = 3.21, SD = 0.42) and female respondents (M = 3.27, SD = 0.48) on collaboration skills, t-cal = -1.018, p = .310 > .05. Since the calculated t-value (-1.018) is less than the critical t-value (±1.968), the null hypothesis was accepted,

indicating that gender did not significantly influence respondents' perceptions of collaboration skills.

Discussion of Findings

From research question one, the findings revealed that problem-solving skills are highly needed by Business Education undergraduates in preparation for 21st-century job readiness in the Niger Delta region, as evidenced by the grand mean scores of 3.28 (SD = 0.43) and 3.29 (SD = 0.43) obtained by male and female respondents, respectively, which exceeded the criterion mean of 2.50. Specifically, the respondents agreed that the ability to identify workplace problems, generate alternative solutions to business problems, make sound decisions, and resolve conflicts effectively are essential competencies for 21st-century job readiness. The findings agree with Okolie *et al.* (2020), who found that higher education institutions face significant challenges in developing generic employability skills such as problem-solving. This supports Kolb's Experiential Learning Theory (1984), which posits that problem-solving competencies are best acquired through active engagement, reflection, and practical application. Additionally, Okolie *et al.* (2021), Ogunleye and Oyekanmi (2020), and Akinyemi and Oke (2015) established that problem-solving significantly enhances graduate employability and workplace effectiveness in Nigeria. Their studies provide empirical support for the present finding that problem-solving remains a critical determinant of preparation for 21st-century job readiness among Business Education undergraduates. The study further revealed that there was no statistically significant difference between the mean ratings of male respondents (M = 3.28, SD = 0.43) and female respondents (M = 3.29, SD = 0.43) regarding problem-solving skills needed for preparation for 21st-century job readiness, t-cal = -0.108, p = .914 > .05. This implies that both male and female respondents shared similar perceptions concerning the importance of problem-solving skills. The finding suggests that the demand for problem-solving skills transcends gender and reflects a common understanding among undergraduates regarding the competencies needed for preparation for 21st-century job readiness.

Regarding requestion two, the findings of this study revealed that digital collaboration skills are highly needed by Business Education undergraduates in preparation for 21st-century job readiness in the Niger Delta region, as evidenced by the grand mean scores of 3.21 (SD = 0.42) and 3.27 (SD = 0.48) obtained by male and female respondents, respectively, which exceeded the criterion mean of 2.50. Specifically, respondents agreed that the ability to work effectively using online collaborative tools, participate in virtual teamwork, use video conferencing platforms, and engage in digital networking are essential competencies for preparation for 21st-century job readiness. This finding reflects the realities of the contemporary labour market, where workplace interactions have increasingly shifted from traditional face-to-face settings to technology-mediated and hybrid work environments.

The finding aligns with the position of van Laar *et al.* (2017), who identified digital collaboration as one of the core competencies required for effective functioning in technology-driven workplaces. Their study emphasized that the ability to communicate, solve

problems, and coordinate tasks through digital technologies has become fundamental for workforce participation. The respondents' strong agreement on the importance of online collaborative tools suggests growing awareness of workplace digitization and the changing nature of business operations. This is consistent with Dabbagh and Kitsantas (2012), who found that digital learning environments significantly improve learners' ability to collaborate, share knowledge, and coordinate tasks effectively. Their findings suggest that when students are exposed to digital collaboration during academic training, they are more likely to transfer these competencies into professional contexts. This supports the present study's argument that Business Education programmes should deliberately integrate collaborative technologies into teaching and learning processes.

The finding on virtual teamwork further aligns with Schmidt *et al.* (2014), who observed that successful virtual collaboration depends on effective communication, coordination, and shared responsibility among team members. Trust *et al.* (2016) found that digital tools improve professional collaboration by enhancing communication efficiency and shared decision-making processes. The high rating accorded to video conferencing platforms and digital networking skills in the present study confirms that Business Education undergraduates understand the necessity of mastering these tools in preparing for 21st-century job readiness. Furthermore, the findings are consistent with Bennett *et al.* (2017), who argued that digital networking and collaboration are central features of knowledge-based economies. Ng (2012) similarly established that digital communication and collaboration skills directly improve graduate employability by expanding access to information and career opportunities. The findings also support the position of the OECD (2018), Ferrari (2013), and Ilomäki *et al.* (2016), who emphasized that collaborative problem-solving in digital environments and digital competence are indispensable for lifelong learning and career development. These studies collectively reinforce the importance of digital collaboration skills in preparing Business Education undergraduates for successful participation in contemporary workplaces.

The study further revealed that there was no statistically significant difference between the mean ratings of male respondents ($M = 3.21$, $SD = 0.42$) and female respondents ($M = 3.27$, $SD = 0.48$) regarding digital collaboration skills needed for preparation for 21st-century job readiness, $t\text{-cal} = -1.018$, $p = .310 > .05$. This implies that both male and female respondents shared similar perceptions concerning the importance of digital collaboration skills. The finding suggests that awareness of digital collaboration requirements transcends gender boundaries, likely due to the widespread integration of digital technologies into education, communication, and everyday life. This result lends further support to Okolie *et al.* (2020) and Okolie *et al.* (2021), who observed that digital collaborative competencies significantly influence graduate employability outcomes in Nigeria. Although students recognize the importance of these skills, higher education institutions need to provide adequate opportunities for their acquisition through improved ICT infrastructure and the integration of collaborative technologies into Business Education curricula. Such efforts would better equip undergraduates in the Niger Delta with the competencies required for preparation for 21st-century job readiness.

Conclusion

This study concludes that problem-solving and digital collaboration are essential competencies required by Business Education undergraduates for 21st-century job readiness in the Niger Delta. The findings demonstrate that skills such as identifying and resolving workplace problems, making informed decisions, collaborating through digital platforms, participating in virtual teams, and using online communication tools are fundamental for effective workplace performance in today's technology-driven labour market. Furthermore, the absence of significant gender differences indicates a shared recognition among male and female undergraduates of the importance of these competencies for employability. The study therefore underscores the need for Business Education programmes to deliberately integrate experiential learning and technology-enhanced collaborative practices into the curriculum to better prepare graduates for the demands of the contemporary workplace.

Recommendations

1. Universities in Niger Delta should provide students with opportunities to engage in practical tasks, simulations, business challenges, and experiential learning activities that foster workplace problem identification, decision-making, conflict resolution, and solution-generation skills.
2. Managers of higher institutions in Niger Delta should ensure that collaborative digital technologies, including online teamwork platforms, video conferencing applications, and professional networking tools are integrated into Business Education teaching and learning to prepare students for digitally mediated work environments.

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