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Science Curriculum Quality, Instructional Resources Adequacy and Employability Skills Acquisition Level of Potential Science Graduates in Nigerian Universities

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Abstract

The study's primary purpose was to expose science curriculum quality and instructional resource adequacy as variables affecting the employability skills acquisition level of potential science graduates. With the adoption of the survey research design, the study employed three different questionnaires to collect data from three groups comprising potential science graduates, lecturers of various colleges/faculties of science of universities, as well as employers of labor in South-West Nigeria. The collected data were analyzed using various statistical methods such as frequency, percentage, mean, standard deviation, and multiple linear regression analysis. The results indicated that an increase in the science curriculum quality and the availability of instructional resources corresponded to an increase in employability skills acquisition level, and these relationships were found to be statistically significant. The study concludes by recommending the need for collaboration among stakeholders to develop and implement innovative and high-quality science curricula and instructional resources to foster relevant and modern employability skills in science graduates.

Keywords: Employability skills, higher education institutions, instructional resources adequacy, science curriculum quality, Nigeria

Introduction

The mutable and competitive world requires crucial skills from potential science graduates enabling them to contribute to the workplace and societal progression. The reproducibility of science demands that potential science graduates acquire skills that will enable them to replicate taught knowledge in universities when they get employed (Filazzola & Cahill Jr, 2021). The contemporary workforce requires a higher level of functional skills compared to conventional periods, aiming at a positive contribution of education to holistic future development (Kayode et al., 2015; Cheng et al., 2022). Universities worldwide produce skilled personnel for organizations with employable skills rooted in comprehensive education (Boud et al., 2021; Okolie et al., 2020). With disparate skills needed by employers from employees, universities should groom different categories of students for a multifaceted world of work (Chan, 2016).

The consensus in the literature has been that employability is core to higher education (Mawson & Haworth, 2018). Extant studies focusing on Nigerian higher education demonstrate a positive relationship between education and graduate employability (Pitan, 2017; Pitan & Atiku, 2017; Okolie et al., 2020; Okunuga & Ajeyalemi, 2018). Hence, the employability skills of fresh university graduates are a major concern to university bureaucrats, government departments, employers, and other stakeholders since they project the future (Romgens et al., 2020; Succi & Canovi, 2020; Suleman, 2018). Education, in support of the integration of essential skills including employability skills demands practicable curricula as the objectives of education are manifested in the curricula (Igbokwe-Ibeto et al., 2018). In agreement, Chan (2016), Gbadamosi (2021) and the Organization for Economic Co-operation and Development [OECD] (2018) maintain that education remains a potent force that plays a critical role in the

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advancement of skills empowering individuals to contribute and benefit from a progressive life.

Implementing comprehensive curricula in teaching and learning is perhaps embedded in supportive, efficient, and adequate instructional resources (Kosgei, 2015; Stabback, 2016). Among other reasons, Köper et al. (2022) established that employability skills are lacking in science graduates, making their employability characteristically lower than other disciplines. Could this be due to the factors of curriculum and instructional resources? Additionally, most of the literature consulted showed limited empirical studies, specifically concerning the connection between academic curriculum quality, instructional resources adequacy, and employability skills acquisition level of potential science graduates in Nigeria. Therefore, this study sought to close this gap by examining universities in South-West Nigeria. Identifying the relationship between these elements will greatly assist stakeholders in underdeveloped, developing, and developed nations.

Review of Related Literature

Tran (2016), after reviewing many studies, viewed employability as focusing more on individual student ability to get and retain a job after graduation. These would depend on the skills that are possessed. The different understandings among stakeholders suggest that employability is a contested issue (Cheng et al., 2022). Not surprisingly, a review of Malaysian institutions trying to entrench employability in the curriculum discovered indistinctness regarding the assessment of generic skills from the perspective of higher education (Fahimirad et al., 2019). Likewise, a South African study found that academics struggled to integrate employability skills into the curriculum (Mtawa et al., 2021). Hence, there is a need to research more about employability contributing factors and, in turn the accompanying employability skills. One supply-side approach to tackling underemployment and unemployment, especially that of graduates, is to concentrate on fortifying employability skills and understanding factors that can improve it, hence the embrace of studying this concept by scholars (Campbell et al., 2019; Pereira et al., 2020).

Employability skills are called many names such as generic skills, key competencies, key skills and soft skills (Doyle, 2020; Kenayathula et al., 2019). They are indispensable in the current era of technological interference and globalization (Fajaryati & Akhyar, 2020). Employers are looking for versatile graduates with a wide range of key skills that are needed to prosper on the job (Okolie et al., 2020; Succi & Canovi, 2020; Suleman, 2018). Okolie et al. (2020) stressed that the lack of knowledge of generic skills such as communication, creativity and innovation among new graduates is worrisome and poses a danger to the workforce's future. Additionally, Okolie et al. demonstrated that final-year students had some difficulties understanding the meaning of generic skills relating to interaction and leadership. Sule et al. (2020) also posited that the acquired employability skill levels of university final-year students are significantly low with respect to ICT, innovative thinking, problem-solving, and teamwork. Comparably, Gbadamosi (2021) showed that final-year students possess a moderate employability skills level but exhibit a high level of communication, personality and adaptability skills, which is not enough for industrial demand. Gbadamosi associated this with laxity on the path of HEIs not contributing enough to students' employability skill acquisition. Okonkwo and Samuel (2022) discovered that chemistry graduates do not possess a meaningful measure of employability skills and are considered incompetent because of a largely uninspiring low level of self-perceived possession of central employability skills, including communication, ICT, and independent study. Furthermore, deficient employability skills are related to the issue of education quality (Fajaryati & Akhyar, 2020), which is associated with academic curriculum quality.

The university's role should include designing, implementing and evaluating various levels of knowledge content (Carvalho & Yeoman, 2018) to deliver high student benefits.

The academic curriculum, in terms of content, is an important element of education, helping to promote employability skills. It represents a conscious and systematic selection of skills that shapes the way teaching and learning are organized by addressing questions such as what, why, when, and how students should learn (Stabback, 2016). The principal objective of a quality academic curriculum is its fairness and inclusiveness enabling students to acquire and develop skills to lead meaningful and productive lives (Stabback, 2016). Adjusting and implementing an academic curriculum is a necessity, especially given the fast-paced changes happening nowadays in the industry (Button, 2021).

Consequently, some employability studies are aimed at meeting the requirements of the shifting landscape of higher education (Mezhoudi et al., 2023). In the interviews with senior academics and students, Okolie et al. (2021) demonstrated that HEIs focus more on exploring theoretical concepts and teaching skills while other important skills are not adequately incorporated into the curriculum and learning activities. A disconnection exists between theoretical knowledge teaching and employability skills resulting in students' and lecturers' lack of motivation (Igwe et al., 2022).

Most undergraduates and lecturers in Adeyemi et al. (2021) indicated that the current curricula fall short of meeting desired employability needs. Yusuf et al. (2018) added that Nigerian lecturers think undergraduates need to acquire employability skills and broad-based experience, hence the need for university curricula review in partnership with employers and the articulation of relevant graduates' employability skills in learning. Gbadamosi (2021) maintained that the higher education curriculum in its current structure is lacking in upgrading students' employability skills. Likewise, Oludeyi (2022) demonstrated that the curricular contents of Nigeria Higher Education Institutions (HEIs) have not begun to incorporate content capable of enabling graduates to meet fast changes in the world concerning employability skills. In assessing the employability of science graduates, Koper et al. (2022) mentioned that it is typically lower than other vocational areas because of the lack of employability skills often neglected in curriculum design in favor of more discipline-specific content. Teachers recognizing the need for higher education curriculum restructuring commented on addressing the difficulties faced using the current curriculum to enhance students' skills development (Okolie et al., 2021). It is not surprising that universities in some developed and less developed economies are partnering with government and employers to formulate educational policies that focus on employability and quality assurance framework adoption in developing course curricula that integrate employers' demands in academic praxis (Tran, 2016).

Employability skills can be assimilated into education by incorporating workplace skills into the learning process, which could be accomplished with good instructional resources (Wagaskar et al., 2017). Instructional resources are educational holdings that enhance learning in the classroom (Lindgren & DeLiema, 2022). According to Ogwunte and Okolocha (2016), teachers employ more theory than practice. An inquiry into their teaching materials and methodologies showed obsolescence, making them irrelevant for teaching in the current IT era. In concurrence, George et al. (2022) revealed that undergraduates lacked the essential ES after graduation due to instructional resources paucity. Nwajiuba (2020) pinpointed that it is difficult for HEIs to deliver quality education and develop students' skills to respond to the 21st-century industry demand with the currently provided infrastructure. Aloysius et al. (2018) demonstrated that educational innovation (in the form of instructional resources) improves the school curriculum by integrating the necessary employability skills into its design. Chukwurah and Atah (2019) found that providing instructional resources significantly influences undergraduate employability skills acquisition, helping develop the right industry skills. Ademiluyi and Isiaka (2022) established that using updated and

standard instructional tools is necessary for students to learn employability skills.

This study was guided by the model of Lipnevich et al. (2016). The model describes student feedback interaction. It is one of the more recent models of art and the act of providing feedback. The description that Lipnevich et al. (2016) put forward is based on the feedback being the information communicated to a learner that is intended to modify his or her thinking or behavior to improve learning. In one of their model revisions, Lipnevich and his colleagues proposed a definition of feedback - instructional feedback is any information about a performance that learners can use to improve their performance or learning. Feedback might come from teachers, employers (especially during industrial training), peers, or the task itself. It may include information on where the learner is, where the learner is going, what steps should be taken, and strategies employed to get there. Based on this model, scholars have suggested that loads of feedback that come from external sources will have to be internalized and converted into self- or inner feedback (Nicol, 2021; Panadero et al., 2019). This internal feedback's effectiveness would differ depending on an assortment of variables.

Purpose of the Study

The study's primary purpose is to expose science curriculum quality and instructional resource adequacy as variables affecting the employability skills acquisition levels of students. This is determined from the viewpoints of potential science graduates (final year science undergraduates), lecturers, and employers in South-West Nigeria.

Research Questions

1. What are the employability skills types required by employers from potential science graduates?

2. What is the employability skills acquisition level of potential science graduates from students' and lecturers' perspectives?

3. What is the quality of the science curriculum for potential science graduates?

4. What is the instructional resources adequacy needed for the implementation of the science curriculum?

5. Do science curriculum quality and instructional resources adequacy affect the employability skills acquisition level of potential science graduates?

Methodology

This study adopted a descriptive survey research design. Since the study investigated science curriculum quality, instructional resources adequacy, and employability skills acquisition level of potential science graduates, primary data were collected from 1,330 potential science graduates, 371 lecturers, and 30 employers through a multi-stage sampling procedure. Final-year science undergraduates were considered for this study because as they move to this level, they start seeing employability from an insider perspective, attaching it to cultivating work experiences and gaining a good understanding of the industry they see themselves working (Gedye & Beaumont, 2018).

The samples were drawn from all six states in South-West Nigeria from randomly selected universities, lecturers, and organizations using three different questionnaires for the three groups. The potential science graduates and lecturers were taken from the Colleges/Faculties of Science. The questionnaire for potential science graduates had two sections: Section A consisted of socio-demographic items, while Section B measured employability skills using the Likert scale. The questionnaire for lecturers had five sections. Section A elicited questions on demographic characteristics, while Sections B to E extracted data on science curriculum quality and instructional materials adequacy using the Likert scale. The employers' questionnaire had two parts, A and B. Part A comprised background information questions. Part B incorporated general attributes/skills that were rated by employers using the Likert

scale. The collected data were analyzed and interpreted using frequency, simple percentage, mean, standard deviation, and multiple linear regression analysis.

Results and Discussion

One of the objectives of this study was for employers to identify the required employability skills type(s) in working science graduates to make potential science graduates know the employability skills type(s) required of them. Table 1 reveals that teamwork was the most required (mean = 3.62; SD = 0.571), followed by initiative (mean = 3.54; SD =0.582). Unexpectedly, IT skills turned out to be the last employability skills type (mean = 2.81; SD = 0.895). The SD values for teamwork and initiative are low, indicating that responses are not too polarized; however, there was a high SD value for IT. This showed a high polarization of the responses, where there is the possibility that some of the respondents could have rated the items as "4" – highly required. However, it could be deduced that all 15 employability skill types are required by employers even at varying levels (mean scores >2.5).

Table 1

Employability Skills Type(s) Required by Employers

Skills	Highly Required	Required	Less Required	Not Required	Mean	SD
Leadership	11	7	8	–		
	42.3%	26.9%	30.8%	0.0%	3.12	0.864
Interpersonal	14	11	1	–		
	53.8%	42.3%	3.8%	0.0%	3.50	0.583
Problem-solving	11	14	–	1		
	42.3%	53.8%	0.0%	3.8%	3.35	0.689
Presentation	7	11	8	–		
	26.9%	42.3%	30.8%	0.0%	2.96	0.774
Communication (Oral)	14	10	2	–		
	53.8%	38/5%	7.7%	0.0%	3.46	0.647
Analytical	11	13	1	1		
	42.3%	50.0%	3.8%	3.8%	3.31	0.736
IT	6	11	7	2		
	23.1%	42.3%	26.9%	7.7%	2.81	0.895
Decision-making	8	11	6	1		
	30.8%	42.3%	23.1%	3.8%	3.00	0.849
Critical thinking	10	13	2	1		
	38.5%	50.0%	7.7%	3.8%	3.23	0.765
Creativity	11	13	1	1		
	42.3%	50.0%	3.8%	3.8%	3.31	0.736
Teamwork	17	8	1	–		
	65.4%	30.8%	3.8%	0.0%	3.62	0.571
Adaptability	12	12	2	–		
	46.2%	46.2%	7.7%	0.0%	3.38	0.637
Self-confidence	12	12	2	–		
	46.2%	46.2%	7.7%	0.0%	3.38	0.637
Independence	10	12	4	–		
	38.5%	46.2%	15.4%	0.0%	3.23	0.710
Initiative	15	10	1	–		
	57.7%	38.5%	3.8%	0.0%	3.54	0.582
Weighted Mean = 3.29						

*Mean responses from: 0-1.4= Not Required; 1.5-2.4= Less Required; 2.5-3.4=Required; 3.5-4.0= Highly Required

Employers have indicated that all employability skills types are required in workplaces. This finding is backed up by Okolie et al. (2020), Succi and Canovi (2020) and Suleman (2018) who demonstrated that employers need multitalented graduates with core skills that will help their adaptability in a changing work environment. It is not surprising that lecturers advocated for a curriculum reassessment in conjunction with employers embracing employability skills articulation since they believe that undergraduates require diverse employability skills in support of the findings of the current study (Yusuf et al., 2018). The polarization of the responses of the employers about IT skills shows the high probability that they are still highly required despite being the least employability skills. Employability skills centre on IT in these days of technological inclusiveness (Fajaryati & Akhyar, 2020).

Employability Skills Acquisition Level of Potential Science Graduates

The students and lecturers responded to this objective. Table 2 shows the results from students' responses while Table 3 indicates that of the lecturers. From the students' viewpoint, leadership was the employability skill with the highest acquisition level (mean = 3.36; SD = 0.845) and analytical was the least (mean = 2.96; SD = 0.864). From the lecturers' perspective, teamwork was the employability skill with the highest acquisition level (mean = 2.79; SD = 0.831). However, leadership, rated as the highest by students, was the least rated by the lecturers (mean = 2.33; SD = 0.833). A similarity between the two perspectives showed that there was no employability skill in the range of highly acquired. However, SD values from students' responses were highly polarized. The weighted mean of students' responses was higher than that of lecturers, indicating that students rated their employability skills higher than lecturers' ratings. However, both ratings were at the acquired level of the Likert scale used.

Table 2

Employability Skills Acquisition Level of Students (Students' Rating)

Item	Highly Acquired	Acquired	Somehow Acquired	Not Acquired	Mean	SD
Leadership	688	394	113	64		
	54.6%	31.3%	9.0%	5.1%	3.36	0.845
Interpersonal	503	527	118	41		
	40.0%	41.9%	14.9%	3.3%	3.19	0.803
Problem-solving	478	486	242	53		
	38.0%	38.6%	19.2%	4.2%	3.10	0.855
Presentation	471	526	183	79		
	37.4%	41.8%	14.5%	6.3%	3.10	0.872
Communication (Oral)	430	591	168	70		
	43.2%	46.9%	13.3%	5.6%	3.10	0.830
Analytical	373	531	284	71		
	29.6%	42.2%	22.6%	5.6%	2.96	0.864
Information Technology	3.99	538	240	82		
	31.6%	42.7%	19.1%	6.5%	3.00	0.877
Decision-making	402	615	183	59		
	31.9%	48.8%	14.5%	4.7%	3.08	0.804
Critical thinking	521	454	242	42		
	41.4%	36.1%	19.2%	3.3%	3.15	0.846
Creativity	493	463	221	82		
	39.2%	36.8%	17.6%	6.5%	3.09	0.906
Teamwork	481	440	253	85		
	38.2%	34.9%	20.1%	6.8%	3.05	0.928
Adaptability	545	421	221	72		
	34.3%	33.4%	17.6%	5.7%	3.14	0.904
Self-confidence	620	377	199	63		
	49.2%	29.9%	15.8%	5.0%	3.23	0.892
Independence	544	469	159	87		
	43.2%	37.3%	12.6%	6.9%	3.17	0.899
Initiative	535	447	214	63		
	42.5%	35.5%	17.0%	5.0%	3.15	0.878
Weighted Mean = 3.13						

*Mean responses ranged from: 0-1.4= Not Acquired; 1.5-2.4= Somehow Acquired; 2.5-3.4=Acquired; 3.5-4.0= Highly Acquired

Table 3

Employability Skills Acquisition Level of Students (Lecturers' Rating)

Item	Highly Acquired	Acquired	Somehow Acquired	Not Acquired	Mean	SD
Leadership	38	79	105	62		
	13.4%	27.8%	37.0%	21.8%	2.33	0.833
Interpersonal	58	78	135	13		
	20.4%	27.5%	47.5%	4.6%	2.64	0.857
Problem-solving	63	73	73	20		
	22.2%	25.7%	25.7%	7.0%	2.63	0.806
Presentation	64	80	120	20		
	22.5%	28.2%	42.3%	7.0%	2.56	0.801
Communication (Oral)	71	70	123	20		
	25.0%	24.6%	43.3%	7.0%	2.68	0.829
Analytical	59	76	137	12		
	20.8%	26.8%	48.2%	4.2%	2.62	0.861
Information Technology	74	72	80	58		
	26.1%	25.4%	28.2%	20.3%	2.82	0.891
Decision-making	33	80	143	28		
	11.6%	28.2%	50.4%	9.9%	2.42	0.821
Critical thinking	36	79	128	41		
	12.7%	27.8%	45.1%	14.4%	2.38	0.846
Creativity	57	72	132	23		
	20.1%	25.4%	46.5%	8.1%	2.57	0.800
Teamwork	79	76	120	9		
	27.8%	26.8%	42.3%	3.2%	2.79	0.831
Adaptability	57	60	91	76		
	20.1%	21.1%	32.0%	26.8%	2.74	0.888
Self-confidence	49	77	140	18		
	17.3%	27.1%	49.3%	6.3%	2.55	0.849
Independence	52	76	132	24		
	18.3%	26.8%	46.5%	8.5%	2.55	0.886
Initiative	41	75	109	59		
	14.4%	26.4%	38.4%	20.8%	2.35	0.866
					Weighted Mean = 2.58	

Students' self-report of their employability skills acquisition level indicates their conviction about themselves despite their lecturers rating them lower. In this study, lecturers' ratings should be more predictive of students' employability skills acquisition level. Okolie et al. (2020) observed that final-year students, including science students, struggled to understand the meaning of generic skills. Understanding generic skills should help in the acquisition process; without it, acquisition becomes problematic. Okolie et al.'s study gives credence to the large divergence in SD values as students also demonstrate not having a full grasp of employability skills.

Additionally, the present findings closely align with the observations made by Sule et al. (2020) and Okonkwo and Samuel (2022). Sule et al. (2020) reported that final-year students' employability skills acquisition level was substantially low regarding generic skills. Okonkwo and Samuel (2020) also observed that science graduates do not have a significant degree of employability skills based on a self-perceived rating of possessed fundamental employability skills.

Science Curriculum Quality

The lecturers' questionnaire covered this objective. Table 4 shows that the lecturers rated all the indicators of science curriculum quality - coherency, relevancy, rigor, flexibility, and currency high as the mean scores fell in the mean responses category of "agree." Coherency was the topmost

indicator with the lowest polarization (mean = 3.24; SD = 0.811). The last indicator was the currency with the highest polarization (mean = 3.01; SD = 0.934). Nonetheless, the weighted mean of 3.11 implied that the lecturers agreed that the science curriculum quality was satisfactory.

Table 4

Science Curriculum Quality

Item	SA	A	D	SD	Mean	SD
Coherency: Philosophy and values visibly incorporated into the course and linkages	131 46.1%	96 33.8%	52 18.3%	5 1.8%	3.24	0.811
Relevancy: Evidence of stakeholders' involvement and learning outcomes representing students' knowledge and abilities	108 38.0%	112 39.4%	51 18.0%	13 4.6%	3.11	0.857
Rigour: Comprehensive, clear and understandable course content	124 43.6%	98 34.5%	59 20.8%	3 1.1%	3.21	0.804
Flexibility: Recognition of individual learning needs with a course design that reflects delivery options and diverse assessment methods	94 33.1%	111 39.1%	58 20.4%	21 7.4%	2.98	0.913
Currency: Evidence of current knowledge use; current industries and field professionals met appropriately and current/appropriate teaching/learning methods	107 37.8%	91 32.0%	68 23.9%	18 6.3%	3.01	0.934
Weighted Mean = 3.11						

*Mean responses: Strongly Disagree (0-1.4); Disagree (1.5-2.4); Agree (2.5-3.4); Strongly Agree (3.5-4.0)

It is fundamental to note that the lecturers admitted to the flexibility of the curriculum (mean = 2.98), but the lowest among the five indicators also indicates the second highest polarization (SD = 0.913). This seems to negate the description of a quality curriculum as described by Stabback (2016). Stabback depicts a quality curriculum as fair and inclusive where individual learning is sufficiently recognized with the course design options that will assist students in understanding the basics. This will adversely affect curriculum implementation even if it has been designed to impart employability skills. Currency, despite having a mean of 3.0l has the highest polarization (SD = 0.934). The large SD is a pointer to a lot of variances in the observed data around the mean. This implies that the current science curriculum needs a knowledge update that should involve professionals from the industry who embrace more contemporary techniques. It is not surprising as reported in the literature that universities in some developed and less developed economies are partnering with government and employers to employ a quality assurance framework to develop course curricula assimilating employers' demands into academics (Tran, 2016). This also confirms Oludeyi's (2022) contention, which mentioned that the curricular contents of Nigeria HEIs need to integrate content that will help graduates meet rapid changes in workplace employability skills.

Instructional Resources Adequacy

The lecturers' questionnaire covered the objective. Table 5 shows that printed and duplicated materials were the most adequate instructional resources (mean = 2.79; SD = 0.887). The least were technological instructional media, which also had the second to the last SD value. Still-projected-display materials also had the second to the last mean score (mean = 2.35) and the most polarized (SD = 0.966). Though the

weighted mean of 2.55 was considered adequate, mean scores for all items were generally low and very polarized. This implies a very high variance in the observed data around the mean.

Table 5

Instructional Resources Adequacy for Science Curriculum Implementation

Item	Very Adequate	Adequate	Fairly Adequate	Not Adequate	Mean	SD
Printed/duplicated Materials	79	76	120	9		
	27.8%	26.8%	42.3%	3.2%	2.79	0.887
Non-projected display materials	33	80	143	28		
	11.6%	28.2%	50.4%	9.9%	2.42	0.821
Still-projected-display materials	41	75	109	59		
	14.4%	26.4%	38.4%	20.8%	2.35	0.966
Technological instructional media	38	79	105	62		
	13.4%	27.8%	37.0%	21.8%	2.33	0.963
Computed-mediated materials	52	76	132	24		
	18.3%	26.8%	46.5%	8.5%	2.55	0.886
Spaces: offices, classrooms, lecture	57	72	132	23		
theatres, resource rooms etc.	20.1%	25.4%	46.5%	8.1%	2.57	0.900
Equipment: laboratories, workshops,	49	77	140	18		
studios	17.3%	27.1%	49.3%	6.3%	2.55	0.849
Library and information management	58	78	135	13		
	20.4%	27.5%	47.5%	4.6%	2.64	0.857
Academic staff: lecturers/ranks	63	73	73	20		
	22.2%	25.7%	25.7%	7.0%	2.63	0.906
Non-academic: technical &	71	70	123	20		
administrative staff	25.0%	24.6%	43.3%	7.0%	2.68	0.929
Weighted Mean = 2.55						

*Mean responses: 0-1.4=Not Adequate; 1.5-2.4=Fairly Adequate; 2.5-3.4=Adequate: 3.5-4.9= Very Adequate

The most striking result to emerge is the mean of technological instructional media being 2.33. Interestingly, one would not have thought that the adequacy of the kind of instructional material should be foremost. In a fast-changing world, any modern learning process should be soft- or hard-skill-driven (Oludeyi, 2022). The current study provides further evidence for this as the most adequate instructional resource is printed and duplicated materials followed by non-academic staff, especially the administrative cadre. Our study corroborates Nwajiuba (2020). He emphasized that it is challenging for HEIs to deliver 21st-century quality education and associated skills to students with existing infrastructure. Our result also offers compelling support to Ogwunte and Okolocha (2016). They stated that teachers employ theory more than practice, particularly with printed and duplicated materials rated as first among other instructional resources. Of course, this is old-fashioned in an era where students are expected to have a mastery of up-to-date employability skills.

Science Curriculum Quality and Instructional Resources Adequacy Effect on Employability Skills Acquisition Level

The lecturers' questionnaire answered this objective. A multiple linear regression was fitted to explain students' employability skills acquisition level based on science curriculum quality and instructional resources adequacy (Table 6). The result shows that with a one-unit increase in science curriculum quality, the employability skills acquisition level increases by .50, which was found to be a significant change, t=3.11, p < .02; and with a unit increase in instructional resources adequacy, the employability skills acquisition level increases by .12, which was also found to be a significant change, t=3.83, p = .01.

Table 6

The Significance of the Effect

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics		
		B	Std. Error	Beta		t	Sig.	Tolerance	VIF.
1	(Constant)	-10.934	8.101			-1.312	0.05		
	science curriculum quality	.501	.168	.437		3.112	**0.02***	.424	2.234
	instructional resources adequacy		.107	.054	.563	3.827	**0.01***	.453	2.184

a. Dependent Variable: Employability skills acquisition level

This finding appears to be well substantiated by Chukwurah and Atah (2019) who observed that the provision of instructional resources significantly influences the employability skills acquisition of undergraduates and George et al. (2022) who demonstrated that technical education undergraduates [also science students] lacked the essential employability skills after graduation due to the dearth of instructional resources. The finding might not also be unconnected with studies that showed that there exists a positive relationship between education and graduate employability (Pitan, 2017; Pitan & Atiku, 2017; Okolie et al., 2020; Okunuga & Ajeyalemi, 2018) because when education (learning) is supported with the appropriate instructional resources, employability skills of students will improve (Ademiluyi & Isiaka, 2022).

Conclusion

The fast pace of technological advancement and the COVID-19 pandemic are clear indications of borderless workplaces that should not be taken for granted by education stakeholders. The result of this study uncovers a most surprising and unacceptable exposé that employers require IT skills the least. It is also revealed that the results for instructional resources adequacy related to IT are generally unwelcomed, considering their low mean values. In a country like Nigeria, where corporations are investing in ICTs to ease their work processes and possibly reduce costs and the government spending a lot of funds on technology [even in HEIs], one wonders why employers would demand anything less. The lecturers also acknowledge that the best they can get in terms of instructional resources is printed and duplicated materials. This is a lacuna that can only be filled by the stakeholders. In this technological era, all hands must be on deck – potential science graduates must be holistically trained and exposed to technology by all stakeholders. Innovation and technology drive today's business and the scientific world. That is why Kayode et al. (2015) and Tran (2016) strongly recommend a synergy among HEIs, employers and the government. With the variables of science curriculum and instructional resources having an increasing effect on employability skills acquisition level, it implies just one thing - all stakeholders must become partners in progress in building workplace-ready-science-students via a continuum from schools to corporations through consciously created and adopted innovative and qualitative science curriculum and instructional resources to build contemporary and relevant employability skills in science graduates.

Many of the results on employability skills possessed by students are at variance compared to lecturers' and employers' positions, with no students' employability skills in the range of highly acquired. There should be synergy among the stakeholders. A more standard rating scale must be devised for the appropriate measurement and transfer of employability

skills. Flexibility returned the lowest mean for curriculum adequacy. It has to be wilfully built into the science curriculum where individual learning needs and education delivery options are maximally considered. This will eventually bring to fruition the clamored rounded development desired by students, HEIs, education policymakers, employers, and the government. Finally, with many SD values from the different viewpoints' responses being highly polarized, it calls for considering other instruments to measure the study variables, such as the interview and focus group discussion. This will further provide a rich standpoint for our study.

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Conflicts of interest: none.

References

Ademiluyi, L. W., & Isiaka, O. J. (2022). Perceived influence of instructional methods and adequacy of business education lecturers on employability skills acquisition of business education students in universities in southwestern Nigeria. *Al-Hikmah Journal of Business Education, 2*(1), 30-42.

Adeyemi, B. A., Adeyemi, B. B., & Adeyemi, I. D. (2021). Education for employability in Nigeria: Stakeholders' assessment of missing gaps in the current schools curricula. *EAS Journal of Humanities and Cultural Studies, 3*(2), 97-102.

Aloysius, O. I., Ismail, I. A., Suandi, T., & Arshad, M. M. (2018). Enhancing university's and industry's employability collaboration among Nigeria graduates in the labor market. *International Journal of Academic Research in Business and Social Sciences, 8*(7), 32-48. http://dx.doi.org/10.6007/IJARBSS/v8-i7/4322

Boud, D., Costley, C., Marshall, S., & Sutton, B. (2021). Impacts of a professional practice doctorate: A collaborative enquiry. *Higher Education Research & Development, 40*(3), 431-445. https://doi.org/10.1080/07294360.2020.1765744

Button, L. (2021). *The Scope of Curriculum and Development of Curriculum. Curriculum Essentials: A Journey*. Pressbooks.

Campbell, M., Berni, C., Caroline, R., & Judith, S. (2019). Reimagining student employability: A case study of policy and practice transformation. *Journal of Higher Education Policy and Management, 41*, 500–517. https://doi.org/10.1080/1360080X.2019.1646379

Carvalho, L., & Yeoman, P. (2018). Framing learning entanglement in innovative learning spaces: Connecting theory, design, and practice. *British Educational Research Journal, 44*(6), 1120–1137. https://doi.org/10.1002/berj.3483

Chan, R. Y. (2016). Understanding the purpose of higher education: An analysis of the economic and social benefits for completing a college degree. *Journal of Education Policy, Planning and Administration, 6*(5), 1-40.

Cheng, M., Adekola, O., Albia, J., & Cai, S. (2022). Employability in higher education: A review of key stakeholders' perspectives. *Higher Education Evaluation and Development*, *16*(1), 16-31. https://doi.org/10.1108/HEED-03-2021-0025

Chukwurah, C., & Atah, C. A. (2019). Influence of student-teacher relationship and instructional facilities on employability skills acquisition among business education students in tertiary institutions in Cross River State. *British International*

Journal of Education and Social Sciences, 6(5), 1-9.

Doyle, A. (2020). What are employability skills? Definition & examples of employability skills. Available at: https://www.thebalancemoney.com/employability-skills-list-and-examples-4143571 (accessed 16 April 2023).

Fajaryati, N., & Akhyar, M. (2020). The employability skills needed to face the demands of work in the future: Systematic literature reviews. *Open Engineering, 10*(1), 595-603. https://doi.org/10.1515/eng-2020-0072

Fahimirad, M., Nair, P. K., Kotamjani, S. S., Mahdinezhad, M., & Feng, J. B. (2019). Integration and development of employability skills into Malaysian higher education context: Review of the literature. *International Journal of Higher Education, 8*(6), 26–35. https://doi.org/10.5430/ijhe.v8n6p26

Filazzola, A., & Cahill Jr, J. F. (2021). Replication in field ecology: Identifying challenges and proposing solutions. *Methods in Ecology and Evolution, 12*(10), 1780-1792. https://doi.org/10.1111/2041-210X.13657

Gbadamosi, V. T. (2021). University of Ibadan undergraduates' level of employability skills. *Humanity & Social Sciences Journal, 16*(1), 1-9. https://doi.org/10.5829/idosi.hssj.2021.01.09

Gedye, S., & Beaumont, E. (2018). The ability to get a job: Student understandings and definitions of employability. *Education and Training, 60*(5), 406-420. https://doi.org/10.1108/ET-10-2017-0159

George, W. K., Ikpe, S. A., & Udom, N. A. (2022). Assessment of technical education undergraduate students' employability skills in colleges of education in Nigeria. *Universal Scientific Bulletin (USB), 5*(1), 109-122.

Igbokwe-Ibeto, C. J., Agbodike, F. C., & Osakede, K. O. (2018). Entrepreneurial curriculum in African universities: A panacea to graduates' unemployment if? *Africa's Public Service Delivery and Performance Review, 6*(1), 1-8. https://doi.org/10.4102/apsdpr.v6i1.222

Igwe, P. A., Lock, D., & Rugara, D. G. (2022). What factors determine the development of employability skills in Nigerian higher education? *Innovations in Education and Teaching International, 59*(3), 337-348. https://doi.org/10.1080/14703297.2020.1850319

Kayode, D. J., Yusoff, N. B., & Veloo, A. (2015). Relationship between the curriculum and attributes of Nigerian faculty of education graduates towards teaching in Kwara State, Nigeria. *African Higher Education Review (AHER), 9*(1&2), 18-26.

Kenayathulla, H. B., Ahmad, N. A., & Idris, A. R. (2019). Gaps between competence and importance of employability skills: Evidence from Malaysia. *Higher Education Evaluation and Development, 13*(2), 97–112. https://doi.org/10.1108/HEED-08-2019-0039

Köper, I., Young, J., Hunter, N., Tan, L. F., & Barker, J. (2022, September). Increasing employability in Science graduates through longitudinal course design. In *Proceedings of the Australian Conference on Science and Mathematics Education* (pp. 42-42).

Kosgei, K. K. (2015). Assessment of the influence of school-based factors on the implementation of alternative 'B' mathematics curriculum in secondary schools in Koricho County. *International Jour-*

nal of Humanities and Social Science Invention, 4(21), 29-35.

Lindgren, R., & DeLiema, D. (2022). Viewpoint, embodiment, and roles in STEM learning technologies. *Educational Technology Research and Development, 70*(3), 1009-1034. https://doi.org/10.1007/s11423-022-10101-3

Lipnevich, A. A., Berg, D. A., & Smith, J. K. (2016). Toward a model of student response to feedback. In *Handbook of human and social conditions in assessment* (pp. 169-185). Routledge.

Mawson, M., & Haworth, A. C. (2018). Supporting the employability agenda in university libraries: A case study from the University of Sheffield. *Information and Learning Science. 119*(1/2), 101-108. https://doi.org/10.1108/ILS-04-2017-0027

Mezhoudi, N., Alghamdi, R., Aljunaid, R., Krichna, G., & Düştegör, D. (2023). Employability prediction: A survey of current approaches, research challenges and applications. *Journal of Ambient Intelligence and Humanized Computing, 14*, 1489–1505. https://doi.org/10.1007/s12652-021-03276-9

Mtawa, N., Fongwa, S., & Wilson-Strydom, M. (2021). Enhancing graduate employability attributes and capabilities formation: A service-learning approach. *Teaching in Higher Education, 26*(5), 679–695. https://doi.org/10.1080/13562517.2019.1672150

Nwajiuba, C. A., Igwe, P. A., Akinsola-Obatolu, A. D., Icha-Ituma, A., & Binuomote, M. O. (2020). What can be done to improve higher education quality and graduate employability in Nigeria? A stakeholder approach. *Industry and Higher Education, 34*(5), 358–367. https://doi.org/10.1177/0950422219901102

Nicol, D. (2021). The power of internal feedback: Exploiting natural comparison processes. *Assessment & Evaluation in Higher Education, 46*(5), 756–778. doi:10.1080/02602938.2020.1823314

Ogwunte, P. C., & Okolocha, C. C. (2016). Strategies considered effective by business teachers in South-South, Nigeria for teaching new business subjects in secondary schools. *International Journal of Innovative Education Research, 4*(2), 60-70.

Okolie, U. C., Igwe, P. A., Nwosu, H. E., Eneje, B. C., & Mlanga, S. (2020). Enhancing graduate employability: Why do higher education institutions have problems with teaching generic skills? *Policy Futures in Education, 18*(2), 294-313. https://doi.org/10.1177/1478210319864824

Okolie, U. C., Nwajiuba, C. A., Eneje, B., Binuomote, M. O., Ehiobuche, C., & Hack-Polay, D. (2021). A critical perspective on industry involvement in higher education learning: Enhancing graduates' knowledge and skills for job creation in Nigeria. *Industry and Higher Education, 35*(1), 61-72. https://doi.org/10.1177/0950422220919655

Okonkwo, I. G. A., & Samuel, N. N. C. (2022). Chemistry education and acquisition of employability and production skills: A case study. *Unizik Journal of Educational Research and Policy Studies, 11*(1), 116-128.

Okunuga, R. O., & Ajeyalemi, D. (2018). Relationship between knowledge and skills in the Nigerian undergraduate chemistry curriculum and graduate employability in chemical-based industries. *Industry and Higher Ed-*

ucation, 32(3), 183–191. https://doi.org/10.1177/0950422218766913

Oludeyi, O. S. (2022). Soft skills and didactic pathways in Nigeria university education: Implication for graduate employability. *International Journal of Social Sciences (IJSS), 12*(1), 1-9.

OECD. (2018). *Education at a glance 2018: OECD Indicators*. https://doi.org/10.1787/19991487

Panadero, E., Broadbent, J., Boud, D., & Lodge, J. M. (2019). Using formative assessment to influence self- and co-regulated learning: The role of evaluative judgement. *European Journal of Psychology of Education, 34*(3), 535–557. doi:10.1007/s10212-018-0407-8

Pereira, E. T., Madalena, V., & Catia, F. C. (2020). University curricula and employability: The stakeholders' views for a future agenda. *Industry & Higher Education, 34*, 321–329. https://doi.org/10.1177/0950422220901676

Pitan, O. S. (2017). Graduate employees' generic skills and training needs. *Higher Education, Skills and Work-Based Learning, 7*(3), 290–303. https://doi.org/10.1108/HESWBL-04-2017-0026

Pitan, O. S., & Atiku, S. O. (2017). Structural determinants of students' employability: Influence of career guidance activities. *South African Journal of Education, 37*(4), 1-13. https://doi.org/10.15700/saje.v37n4a1424

Romgens, I., Scoupe, R., & Beausaert, S. (2020). Unravelling the concept of employability, bringing together research on employability in higher education and the workplace. *Studies in Higher Education, 45*(12), 2588–2603. https://doi.org/10.1080/03075079.2019.1623770

Succi, C., & Canovi, M. (2020). Soft skills to enhance graduate employability: Comparing students and employers' perceptions. *Studies in Higher Education, 45*(9), 1834–1847. https://doi.org/10.1080/03075079.2019.1585420

Sule, M. A., Odigwe, F. N., Okpa, O. E., Essien, E. S., & Ushie, M. I. (2020). Institutional variables and student's employability skills development in public universities in Cross River and Akwa Ibom States, Nigeria. *International Education Studies, 13*(11), 33-43. https://doi.org/10.5539/ies.v13n11p33

Suleman, F. (2018). The employability skills of higher education graduates: Insights into conceptual frameworks and methodological options. *Higher Education, 76*, 263–278. https://doi.org/10.1007/s10734-017-0207-0

Stabback, P. (2016). What makes a quality curriculum? In-Progress Reflection No. 2 on "Current and Critical Issues in Curriculum and Learning". *UNESCO International Bureau of Education*.

Tran, T. T. (2016). Enhancing graduate employability and the need for university-enterprise collaboration. *Journal of Teaching and Learning for Graduate Employability, 7*(1), 58-71.

Wagaskar, K., Tripathy, A. K., Chauhan, K., Malaji, A., & Yadav, D. (2017). Employ ... able a tool to achieve 7e's of employability. In *International Conference on Advances in Computing, Communications and Informatics (ICACCI)*, 1756–1761.

Yusuf, F. A., Okanlawon, A. E., & Metu, V. D. (2018). Lecturers' perspectives on enhancing university graduates' employability in Nigeria. *Cypriot Journal of Educational Science, 13*(3), 400-407.