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Assessment Strategies, Instructional Resources, Science Course Teaching Methods and Acquisition of Employability Skills by Potential Science Graduates: The Lecturers' Perspective

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Abstract: The study examines the interconnectedness of assessment strategies, instructional resources, and science course teaching methods relating to employability skills acquisition by potential science graduates from the lecturers' perspective. The study utilised a research survey design. A sample of 371 was drawn from the population of science lecturers in universities in South-west using a multi-stage sampling technique. This involved purposive, stratified, and quota sampling techniques. A well-structured questionnaire was used to collect data analysed using descriptive statistics (multiple bar charts) and inferential statistics of correlation and regression analyses. The key findings of the study showed that instructional resources [instructional material, physical facilities, and human resources], science course teaching methods, and assessment strategies had joint significant predictions on employability skills acquisition. This implies that these variables must be adequately provided for improved acquisition of employability skills by students. Also, lecturers' understanding of students' key employability skills revealed low ratings of information technology, initiative, leadership, problem-solving, and adaptability skills of students. The study recommends that higher education administrators should strive to provide instructional materials, physical facilities and human resources as instructional resources to implement excellent teaching techniques and assessment strategies. The study concludes that lecturers should consciously seek self-upgrade and improve teaching techniques and assessment strategies.

Keywords: Acquisition of Employability Skills, Assessment Strategies, Instructional Resources, Science Course Teaching Methods, Potential Science Graduates

INTRODUCTION

Globally, in universities, science undergraduates are among students who desire acquiring skills that will make them job-ready in a dynamic employment market. This discloses Nankervis et al.'s (2019) assertion that employers are interested in certified and skilled graduates possessing the competencies for present and future work opportunities. Diverse considerations are associated with the rise in contemporary discussions on employability skills, involving an apprehension about unemployment since the commodification of higher education (Sin & Neave, 2016). This is also not unconnected with the lack of employability skills by graduates, even with sundry enrichments in higher education approach to educational development (Harry et al., 2018; Hwang, 2017). Many science graduates end up with jobs that are not science-related and this advocates for additional efforts concerning advancing employability skills (Randstad, 2017). Demaria et al. (2018) argued that the importance of employability skills in science-related employment is frequently disregarded in teaching. This is not surprising, as Osmani et al. (2018) emphasised a growing demand for lecturers to provide training on skills to prepare graduates who are ready for the employment market.

Employability skills are a transnational notion with disparate names such as 21st-century skills, cross-disciplinary skills, and work-ready skills (George et al., 2022; Kenayathulla et al., 2019). They are skills that boost the ability to get and maintain an occupation, advance in the occupation and deal with occupation transformation, with the possibility of acquiring another job at any time if desired or sacked (Mello et al., 2021; Zainuddin et al., 2019). They include skills in adaptation, communication, innovation, ICT, interpersonal relationships, leadership, management, time management, problem-solving, self-awareness, teamwork, and *inter alia* (McGunagle & Zizka, 2020; Suleman, 2018; Watkins & Smith, 2018; Zainudden et al., 2019).

A survey carried out by Manpower Group, a leading workforce solutions organisation, in 2020, pointed out that around 42% of employers on a global level faced challenges in recruiting skilled employees (Tushar & Sooraksar, 2023). There are concerns over the most consequential challenge being the skills gap within organisations, a challenge that is projected to become even more deep-seated (Caseloads, 2022). Employers are likewise concerned with addressing skill gaps through various strategies, including hiring employees possessing skills for the modern workplace, retraining the existing employees, and using automation technology (Tushar & Sooraksar, 2023). Employers also consider that higher educational institutions are responsible for developing such required skills, as reported by some studies (Clarke, 2018; Petruzziello et al., 2023).

Key stakeholders, such as graduate employers and governments, play a critical role in employability skills acquisition. However, the significance of employability skills in the employment market puts calculated obligations on higher institutions that prepare graduates for the employment market (Segbenya et al., 2023; Shivoro et al., 2018). Lecturers in higher institutions stand as conveyors of knowledge to students. Consequently, Chigbu & Nekhwevha (2022) observed a relationship between faculty influence and the skills of potential graduates. Also, several studies have pointed to lecturers requiring more understanding regarding the acquisition of employability skills by students. First, Sanchez Carracedo et al. (2018) recalled that many lecturers are unsettled about trying fresh approaches as they have little or no experience bridging the gaps between academic programmes and employability skills. Second, a South African study found that academics struggle to integrate employability skills into the curriculum (Mtawa et al., 2021). Hence, this study will focus on the lecturers' perspective to understand the employability skills of potential science graduates.

It is noteworthy that existing studies have highlighted present-day employability skills as desired by employers (Botha & Botha, 2022; Prikshat et al., 2019; Segbenya et al., 2021). Chukwurah & Atah (2019) and George et al. (2022) established the connection between employability skills and instructional resources. Ademiluyi & Isiaka (2022) described the association between updated and standard instructional tools and the learning of employability skills. Taale & Ngman-Wara (2015) concentrated on assessment practices in higher education. The importance of pedagogics was accentuated by Haugland et al. (2022), Mpho (2018), and Taale & Ngman-Wara (2015), especially as connected with first-rate performance in scholastic endeavour. Ogwunte & Okolocha (2016) talked about teaching materials and methodologies. Segbenya et al. (2021) also centred on employability skills, teaching pedagogy and assessment. Despite these studies, there is a gap between the acquisition of employability skills and the combination of the variables of the current study: assessment strategies, instructional resources and science course teaching methods regarding potential science graduates. In addition, more studies are needed in Nigeria to reveal the interconnectedness among these variables. Further, there is scarcity of literature on how universities can incorporate all the study variables to improve the acquisition of employability skills by potential science graduates.

This study filled this gap by investigating assessment strategies, instructional resources and science course teaching methods predicting the acquisition of employability skills of potential graduates from their lecturers' perspectives. Specifically, this research answers the following research questions:

1. What is the level of acquisition of employability skills by potential science graduates?

2. Is there any relationship between assessment strategies and the acquisition of employability skills by potential science graduates?
3. Is there a joint significant relationship between instructional resource indicators and the acquisition of employability skills by potential science graduates?
4. Is there any relationship between science course teaching methods and the acquisition of employability skills by potential science graduates?
5. Is there any difference in the relative contributions of instructional resources, science course teaching methods, and assessment strategies to the acquisition of employability skills by potential science graduates?
6. Is there a joint significant prediction of instructional resources, science course teaching methods, and assessment strategies on the acquisition of employability skills by potential science graduates?

LITERATURE REVIEW

Employability Skills and Student Employability Skills

Employers require employment market recruits, including university graduates, to possess soft and technical employability skills (Botha & Botha, 2022). Employability is considered looking at three major categories, one of them being the reflection of personal assets or intrinsic characteristics of an individual strongly connected to the possession of skills that employers require (Cheng et al., 2022). Employability skills are skills transmitted to graduates to make them a productive workforce and desirable by employers (Zainudden et al., 2019). Jang (2016) and the World Economic Forum (2020) have highlighted skills that students require to survive and perform productively in the future, among them are active learning, active listening, cognitive flexibility, communication, complex problem-solving, critical thinking, judgement and decision making, and time management.

There are varying studies that have been carried out on employability skills possessed by science students. Okolie et al. (2020) emphasised that the lack of knowledge of generic skills such as communication, creativity and innovation among new science graduates is worrisome and poses a danger to the workforce's future. Additionally, they showed that final-year science students had some difficulties understanding the meaning of generic skills relating to interaction and leadership. Sule et al. (2020) also demonstrated that employability skill acquisition 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, but not enough for industrial demand. Gbadamosi (2021) associated this with laxity on the path of higher education institutions not contributing enough to students' employability skill acquisition.

Okonkwo & Samuel (2022) discovered that chemistry graduates do not possess a meaningful measure of employability skills and are incompetent because of an uninspiring low level of self-perceived possession of central employability skills, including communication, ICT, and independent study. Sarkar et al. (2019) revealed that several generic employability skills were not stressed in the undergraduate science programmes evaluated in this study. Skills such as leadership, flexibility or adaptability, commercial awareness, and ICT skills received no attention in more than half of the respondents' science units. This discovery regarding employability skills is consistent with the results of Sarkar et al. (2016), who identified development deficits for these skills; they were developed to a lower level at university relative to their usefulness in the workplace.

The comparative paucity of the teaching and assessment of some generic skills is of great concern, meaning that a more comprehensive revision of the science curricula is required (Sarkar et al., 2019). Tushar & Sooraksa (2023) in their research on 87 unique employability skills, identified problem-solving, communication, teamwork, adaptability, and willingness to learn among the most commonly reported skills over time. They uncovered a mismatch between

employers' expectations and graduates' possessed skills. However, the acquisition of employability skills by students of higher institutions depends on several factors which could be setting-inclined. From the aforementioned studies, the varying depictions and levels of employability skills imply that more research is needed to understand the employability skills of potential science students.

Teaching Methods and the Acquisition of Employability Skills

A major feature that assists higher education institutions in impacting graduate employability skills that leads to skill acquisition in this contemporary time is the teaching pedagogy (incorporating effective teaching and learning methods) used to deliver academic curricula in the classroom (Haugland et al., 2022; Mainga et al., 2022; Segbenya et al., 2023; Schildkamp et al., 2020). Hadromi et al. (2021) found that the implementation of learning strategies with a scientific approach significantly strengthens the employability skills of science-related students. Segbenya et al. (2023) identified that specific learner-centred methods greatly influence students to acquire employability skills. Therefore, any percentage increase in the usage of these learning methods results in the same percentage increase in the acquisition of employability skills. However, Mainga et al. (2022) in analysing graduating students' and lecturers' choices of learning methods most helpful in enhancing the acquisition of employability skills, discovered that there seems to be a broad agreement about the superiority of lecture-centric teaching approaches.

Igwe et al. (2020) demonstrated a disconnect between the teaching of theoretical knowledge and employability skills. Okonkwo & Samuel (2022) uncovered that chemistry graduates do not possess employability skills because they are not adequately exposed to employment skill development opportunities, as evidenced by the traditional lecture method used by the lecturers. They reported that other listed activity-oriented teaching methods and skill development-enhancing strategies are poorly utilised. Hence, the successful acquisition of employability skills by potential science students might involve the development of exceptional teaching and learning methods, and this intermingling is worthy of research.

Assessment Strategies and the Acquisition of Employability Skills

Another important element apart from pedagogy that has implications for the acquisition of employability skills by students is the assessment methods (Mpho, 2018; Taale & Ngman-Wara, 2015). Current trends suggest that assessment strategies should be revamped to harmonise with transferable skills for the workplace, as demonstrated by the university-wide concern in updating assessment practice (Sarkar et al., 2019). Ferns et al. (2019) discovered that students wanted more meaningful assessments in all their studied cases. A comprehensive selection of assessments is needed to encapsulate the holistic nature of learning (Winchester-Seeto & Rowe, 2017) because higher marks allotment for sit-down examination as compared to brainstorming, discussion, group work or project work only imply that learners will learn for examination and could hardly acquire any practical employability skills (Schildkamp et al., 2020).

Kaider et al. (2017) pointed out that veritable work-related assessments, when used to prepare students for employment by gathering proof of their employability skill development, could serve as an important learner engagement strategy. Zainudden et al. (2022) indicated regarding assessment, that understanding the academic and professional needs of science students from their 100 level should be prioritised. They further mentioned that engaging science students with employability elements as early in their degrees at the 100 level is crucial when considering career delivery making it easy for the students to engage in career education as they progress.

Formative and summative assessments have been found to positively affect the acquisition of different employability skills (Segbenya et al., 2023; Schildkamp et al., 2020). Segbenya et al. (2023) found that learner-centred pedagogy and summative assessment methods have a statistically significant relationship with employability skills. They added that the learner-

centred method significantly mediated the relationship between the teacher-centred method and employability skills and summative assessment also significantly mediated the relationship between formative assessment and employability skills. Therefore, review of extant studies demonstrates that further inquiry is needed to determine the role that assessment strategies and their accompanying factors play in determining the employability skills acquisition of potential science students.

Instructional Resource Indicators and the Acquisition of Employability Skills

According to Ogwunte & Okolocha (2016), teachers employ more theory than practice and an inquiry into their teaching materials and methodologies showed obsolescence making the acquisition of employability skills demanding. Nwajiuba et al. (2020) pinpointed that it is hard for higher education institutions (HEIs) to deliver quality education and develop the skills of students to respond to the 21st-century industry demand with the currently provided infrastructure. Several studies have demonstrated that instructional resources greatly influence employability skills acquisition (Ademiluyi & Isiaka, 2022; Chris & Atah, 2019; Chukwurah & Atah, 2019; George et al., 2022).

Ademiluyi & Isiaka (2022) established that the use of updated and standard instructional tools is necessary for the learning of employability skills by students. Chris & Atah (2019) showed a moderately strong positive relationship between instructional facilities and employability skills acquisition among undergraduates. Chukwurah & Atah (2019) found that the provision of instructional resources significantly and positively influences the acquisition of employability skills by undergraduates assisting in developing the right skills for the industry. George et al. (2022) revealed that undergraduates lack the essential employability skills after graduation due to instructional resources paucity in universities. Kaider et al. (2017) reiterated that given the importance of quality assessment, equal consideration must be given to the resourcing required to support it.

Bilgin et al. (2017) in their study revealed the complicatedness of the provision of quality assessment in HEIs with strong implications for the associated resources needed to deliver them. The explored existing studies show that instructional resources might have a role to play in determining employability skill acquisition. Also, there could be a significant prediction or contribution of the variables of instructional resources, science course teaching methods and assessment strategies to the acquisition of employability skills by potential science graduates.

METHOD

This study utilised a research survey design. A survey was used in this study due to its strengths including cost-effectiveness, generalisability, reliability, and versatility. However, its weaknesses of inflexibility and the lack of potential depth were addressed by (1) the choice of the right sample, (2) appropriate definition of the study objectives, (3) designing valid and reliable questions, (4) adequate preparation of data, and (5) the choice of the right analysis methods. The universities in the South-West region of Nigeria were covered. It is the region having the highest number of universities in Nigeria. In all, 36 universities are accredited by the National Universities Commission (NUC) in this region. These universities are comprised of private, state and federal institutions. The universities researched in this paper are not only among the biggest in the region but also nationally. They are also classified as faith-based and non-faith-based by Nigeria's National Universities Commission. These universities offer diploma, undergraduate and postgraduate courses. Regarding undergraduate studies, sciences and social sciences are the most common disciplines chosen in this region's universities. This is followed by administration and then management as the third most popular faculty. However, among postgraduate faculties, administration and management have the largest number of students. Altogether, there were 2,142 science lecturers in the Faculties of Science of these institutions. This study took place in the 2017/2018 academic year of these institutions. A sample of 371 science lecturers was drawn from the population as seen in Table 1.

Questions were asked about the final-year science undergraduates. At the final-year level, students start seeing employability from an insider outlook, attaching it to cultivating work experiences and gaining employability skills (Gedye & Beaumont, 2018; Thirunavukarasu et al., 2020). To achieve the sample, a multi-stage sampling technique was utilised.

Table 1. Sample Size of the Selected Universities

University	University Type	Number of Lecturers
Adeleke University	Private	18
Caleb University	Private	29
Wesley University	Private	23
Adekunle Ajasin University	State	50
Ekiti State University	State	98
Osun State University	State	40
University of Ibadan	Federal	113
Total		371

Stage one involved purposive sampling. This sampling technique was chosen because lecturers in Nigeria as a particular subset of the population share certain characteristics that include assessment strategies, instructional resources and science course teaching methods. This purposive sampling involved three processes. Firstly, the Faculties of Science were chosen to justify the 60-40 government strategy in admissions, allocating resources and staffing for science-based fields and homogeneousness of science curriculum and learning objectives. Secondly, the Southwest states comprising Lagos, Ogun, Oyo, Osun, Ondo and Ekiti were chosen based on proximity to the researchers and resource constraints (available funds). Thirdly, a further step to deliberately reduce the sample size (funding constraints) was taken to select three private universities, three state universities and one federal university. One federal university was chosen based on the number of lecturers in federal institutions being almost twice the number in private institutions and almost thrice that of state institutions.

Stage two involved stratified and simple random sampling techniques. These sampling techniques were chosen based on the fact that stratified sampling underlines differences among groups in a population and the simple random sampling treats all members of a population as equal, with an equal likelihood of being sampled. The names of all private and state universities were written on different papers – one name per paper. Two non-transparent bags were obtained and the names of private institutions were put in one bag and that of state institutions in the other. Three names were randomly picked from each of the bags.

Stage three involved a quota sampling technique. As a non-probability sampling method, quota sampling was chosen because it is the most likely to accurately represent the entire population, especially using proportional quotas. In this study, it assisted in avoiding over or underrepresentation and created a sample that was more likely to match the lecturers being studied. The University of Ibadan (a federal university) which was earlier chosen based on purposive sampling was further subjected to quota sampling where 226 lecturers were reduced by 50%, that is, to 113 due to financial constraints.

Concerning the data collection instrument, a structured questionnaire that comprised five different sections was used to measure the study concepts. The sections of the questionnaire included (1) demographic characteristics, (2) assessment strategies, (3) instructional resources, (4) science course teaching methods, and (5) acquisition of employability skills. The demographic characteristics section gathered information on university type, department, status/rank/designation, and gender. The second section measured assessment strategies on a four-point Likert scale: very large extent, large extent, to some extent, and a little extent. Instructional resources were measured by the second section on a four-point Likert scale: very adequate, adequate, fairly adequate, and not adequate. The fourth section measured science

course teaching methods on a five-point Likert scale: excellent, very good, good, fair, and poor. Finally, the acquisition of employability skills was measured in the fifth section using a four-point Likert scale: highly acquired, acquired, somehow acquired, and not acquired.

Reliability and validity values were above the minimum threshold, suggesting that the instrument was good for use after subjecting the questionnaire to a pilot test. Research question one results were presented using multiple bar charts and research questions two to six were analysed using the inferential statistics of correlation and regression analyses. All ethical considerations were ensured based on the University of Ibadan Research and Ethical Committee recommendations, including the freedom to participate and withdraw at will – freedom from harm and anonymity were also ensured.

RESULTS

Level of Acquisition of Employability Skills by Potential Science Graduates

The level of acquisition of employability skills by potential science graduates was reported as frequencies from the responses of the sampled lecturers as summarised in Figure 1 using Likert-scale values. As seen in Figure 1, 26% of the surveyed lecturers revealed that the students had the same level of problem-solving skills at the 'acquired' and 'somehow acquired' Likert-scale measures. Figure 1 presents that 27% of the respondents reported that students' adaptability skills had the highest 'not acquired' measure. Analysis of lecturers' responses to the Likert-scale items also revealed that 28% of them reported that teamwork skill was the highest in terms of the 'highly acquired' measure. Generally, with the summation of the Likert-scale frequencies, lecturers' understanding of the level of acquisition of students' employability skills revealed a moderate magnitude. Findings from Figure 1 indicated that the top ten employability skills were teamwork, analytical, interpersonal, self-confidence, communication (oral), presentation, creativity, decision-making, creative thinking, and independence. Key employability skills of IT, problem-solving, and adaptability were rated very low – 11th, 14th, and 15th respectively from the lecturers' responses.

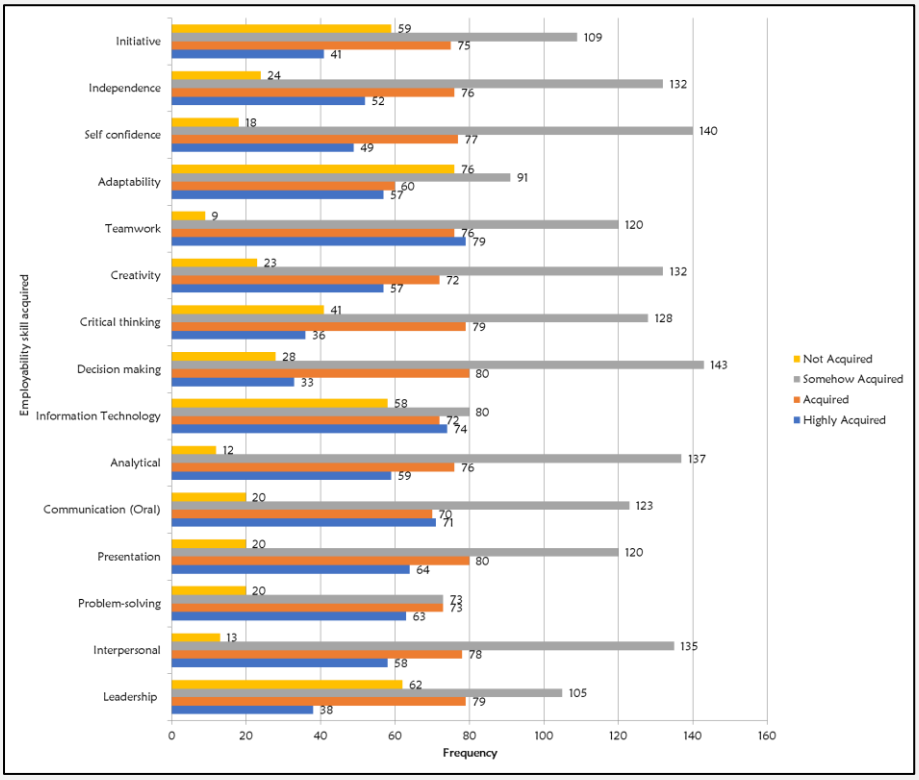

Figure 1. Level of Acquisition of Employability Skills.

Relationship between Assessment Strategies and the Acquisition of Employability Skills

Lecturers' understanding of the relationship between assessment strategies and the acquisition of employability skills by potential science graduates was explored using lecturers' responses to the Likert scale items as revealed in Table 2. The responses revealed a significant, positive and strong relationship between assessment strategies and the acquisition of employability skills (P = 0.01< 0.05; r = 0.696).

Table 2. Relationship between Assessment Strategies and the Acquisition of Employability Skills

Variable	Mean	Std Deviation	N	r	P Value	Remark
Assessment Strategies	40.8172	10.16088	284			
Employability Skills	41.0887	10.75558	284	0.696	0.010	*Sig

**Sig. at 0.05 level*

Further, the ANOVA analysis output (Table 3) of the lecturers' responses showed that a statistically significant difference exists between instructional resources indicators [instructional material, physical facilities, and human resources] and the acquisition of employability skills by potential science graduates (Sig. =0.00). This meant that there was a significant difference between at least two of the lecturers' groups, which could be concerning the university types, departments, ranks or genders. However, it does not specify which groups are significantly different from each other. However, this study was not set to measure this.

Joint Significant Relationship between Instructional Resource Indicators and the Acquisition of Employability Skills

The findings from the analysis of the lecturers' responses in Table 3 indicated that the acquisition of employability skills had a joint significant relationship with instructional resources (R = 0.786; P<0.05).

Table 3. Analysis of Variance – ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.	Remarks
Regression	19824	3	6608			
Residual	12234	271	45.145	146.37	0	Sig.
Total	32058	274				
R = 0.786						
R Square = 0.618						
Adjusted R Square = 0.614						
Std. Error of the Estimate = 6.71899						

a. Predictors: instructional resources (instructional materials, physical facilities, human resources)
b. Dependent variable: acquisition of employability skills

Additionally, in Table 3, the coefficient of determination revealed 61.8% of the total variations in the acquisition of employability skills and this accounted for the change in the independent variable - instructional resources. Table 3 also shows that a linear combination of all the independent variables had a significant joint relationship with the acquisition of employability skills (F=146.373).

Relationship between the Science Course Teaching Methods and the Acquisition of Employability Skills

The findings from Table 4 indicated a significant, moderate and positive relationship between science course teaching methods and the acquisition of employability skills (P = 0.00< 0.05; r = 0.544). A positive relationship indicated that the variables of science course teaching methods and acquisition of employability skills move in the same direction though at a moderate level. As the value of one variable increases, the value of the other variable also increases.

Table 4. Relationship between the Science Course Teaching Methods and the Acquisition of Employability Skills

Variable	Mean	Std Deviation	N	R	P Value	Remark
Science course teaching methods	25.500	7.0803	284	0.544	0.00	*Sig
Acquisition of Employability Skills	41.089	10.7556	284			

*Sig. at ≤0.05

Relative Contributions of Instructional Resources, Science Course Teaching Methods and Assessment Strategies to the Acquisition of Employability Skills

The findings from Table 5 revealed that instructional materials, physical facilities and human resources [as indicators of instructional resources] and science course teaching methods were significant in the acquisition of employability skills by potential science graduates. However, assessment strategies were not significant. This result showed that assessment strategies had a negative contribution to the acquisition of employability skills.

Table 5. Relative Contributions of Instructional Resources to the Acquisition of Employability Skills

Independent Variable	Unstandardized Coefficient		Stand. Coefficient	T	P value	Sig.
	B	Std. Error	Beta Contribution			
(Constant)	1.731	1.949		1.684	0	
Instructional Materials	0.218	0.097	0.195	2.238	0.026	Significant
Physical Facilities	0.228	0.087	0.214	2.623	0.009	Significant
Human Resources	0.052	0.078	0.034	0.673	0	Significant
Methods of Teaching	0.275	0.032	0.499	8.677	0.012	Significant
Assessment Strategies	-0.008	0.189	-0.003	-0.45	0.964	Not Significant

*Sig. at ≤0.05

Table 5 further reveals that science course teaching methods had the highest contribution to the acquisition of employability skills (β = 0.499). This was followed by physical facilities (β = 0.214), instructional materials, (β = 0.195) and then human resources (β = 0.034).

Joint Prediction of the Independent Variables on Acquisition of Employability Skills

The findings from the analysis in Table 6 showed that instructional resources (instructional material, physical facilities, and human resources), science course teaching methods, and assessment strategies had joint significant predictions on the acquisition of employability skills (R = 0.852).

Table 6. Joint Prediction of the Independent Variables on Acquisition of Employability Skills

Model	Sum of Squares	Df	Mean Square	F	Sig	Remarks
Regression	23272	5	3878.6			
Residual	8786.6	269	32.786	118.3	0	Sig.
Total	32058	274				
R = 0.852						
R Square = 0.726						
Adjusted R Square = 0.720						
Std. Error of the Estimate = 5.72588						

a. Independent: instructional resources, science course teaching methods and assessment strategies

b. Dependent variable: acquisition of employability skills

From Table 6, the coefficient of determination revealed that 72.0% of the total variations in the acquisition of employability skills were accounted for by the independent variables - instructional resources, science course teaching methods and assessment strategies. A high adjusted R2 value indicated that the study model was a good fit for the data. An adjusted R2 of 72% revealed that 72% of the variability observed in the target variable was explained by the regression model. It further assessed how well the model comprising the variables will explain and predict future outcomes. Further, the linear combination of all the independent variables had a joint significant prediction on the acquisition of employability skills (F=118.302).

DISCUSSION

The first research question of this study seeks to understand the level of employability skills of potential science graduates from the lecturers' perspective. The lecturers of potential science graduates are in a good position to know the level of employability skills acquired by these students since they have been assessing them through taught and practical courses for over three years. As mentioned by Cheng et al. (2022), among the broad categorisations of employability skills, employability skills can be measured considering personal assets and characteristics of individuals (in this case, students) connected to skills possession that the study lecturers can see, know and determine about their students. Generally, the potential science graduates' level of acquisition of employability skills as reported by the lecturers is moderate. A very striking result of the study is the lecturers' understanding of students' key employability skills of IT, initiative, leadership, problem-solving, and adaptability skills of students as being low. Fundamentally, four of these skills are soft skills except IT which essentially has soft and hard skills. Soft skills are expected to be character traits that specify relationships with other people/organisations and also complement hard skills in the workplace. Our result corroborates extant studies such as Okonkwo & Samuel (2022), Sarkar et al. (2016), Sarkar et al. (2019), Sule et al. (2020), and Tushar & Sooraksa (2023). These studies emphasised the deficient levels of IT, initiative, leadership, problem-solving, and adaptability skills. With the lecturers' low responses to these skills as demonstrated in this study, HEIs and their stakeholders must step up to solve this problem. Every workplace embraces IT now. We are in the technological era, and every work process is enabled with computing and IT gadgets, and hence IT skills deficiency must be addressed in students. The outcome of employability skill acquisition level does not agree with the findings of Jang (2016) and the World Economic Forum (2020). They underlined many of the lowly indicated employability skills in this study as critical ones that must be acquired and developed by students if they are to be employment-ready in this technology age.

Research question two indicates a significant, strong and positive correlation between assessment strategies and the acquisition of employability skills from the analysis of the lecturers' responses. This should be a motivation towards improved assessment techniques by the lecturers as the deficiency of employability skills would not be seen in potential science students unless all-embracing and adequate assessment techniques identify this. Unsurprisingly, contemporary inclinations have exemplified that the strategies in assessing science students should be updated considering modern work skills that can be taken from one job to another by employees (Sarkar et al., 2019). This was also mentioned by Winchester-Seeto & Rowe (2017) who clamoured for a broad-ranging variety of assessments that encapsulate the all-inclusiveness of any learning process, especially with lecturers and higher institutions ensuring that students are ultimately work-ready. Our findings also corroborate the results of Segbenya et al. (2023) and Schildkamp et al. (2020) that assessment strategies positively affect the acquisition of employability skills by students. This implies that lecturers should strive to adopt the right assessment strategies to uncover employability skill development in science students. It is not just about the right assessment strategies, assessments must be tailored in the direction of appreciating and discerning the academic and professional needs of science students from their 100 level [as they commence with their degree training] to inculcate into them formidable work transferable skills for the future (Zainudden et al., 2022).

The findings of the third research question reveal a statistically significant difference in the instructional resources used by the lecturers and the acquisition of employability skills by the potential science graduates. Also, further analysis indicates a joint and significant relation between the employability skills acquired by the students and the three indicators of instructional resources namely instructional materials, physical facilities and human resources. The variables determining the functionality of instructional resources must be consciously put in place by the administrators in universities – instructional materials must be adequate, physical facilities must be topnotch and there must be highly skilled human resources in terms of their proficiency. These findings are in line with the results of Ademiluyi & Isiaka (2022), Chris & Atah (2019), Chukwurah & Atah (2019), and George et al. (2022) – they all observed that the acquisition of employability skills is greatly enhanced with well-provided instructional resources.

The findings of research question four reveal that a significant relationship exists between science course teaching methods and the acquisition of employability skills by the potential science graduates of the studied universities based on the lecturers' understanding. The analysis of the responses also indicates a moderate and positive relationship between science course teaching methods and the acquisition of employability skills. The analysis above implies that the teaching methods used by the lecturers affect the level of acquisition of employability skills. However, the analysis further reveals that science course teaching methods are a moderate indicator of the acquisition of employability skills. This analysis of the lecturers' responses can be further explained by the findings of Hadromi et al. (2021) which demonstrated that guided and scientific application of learning by science-related students is a prerequisite for enhanced students' employability skill acquisition. Hence, if students do not methodically acquire knowledge through taught and practical courses, employability skill acquisition could be difficult. Comparably, a lack of applied connection between the teaching of theoretical knowledge and employability skills may also be responsible for the moderate-positive-correlation factor (Igwe et al., 2020). The study's findings agree with the results of Mainga et al. (2022) and Segbenya et al. (2023) that clear-cut teaching methods will positively affect the acquisition of employability skills by students.

The fifth research question indicates that instructional materials, physical facilities and human resources as indicators of instructional resources and science course teaching methods are significant in the acquisition of employability skills by potential science graduates. Assessment strategies are not significant implying that they have a negative contribution to the acquisition of employability skills. Science course teaching methods have the highest contribution to the acquisition of employability skills followed by physical facilities, instructional materials and then human resources. This shows the interconnectedness among the variables. There should be an intermingling of the study's independent variables and their indicators for the acquisition of employability skills to be possible. Science course teaching methods having the highest contribution is corroborated by Segbenya et al. (2023) who reiterated that a percentage increase in teaching techniques equally results in the same increment in the acquisition of employability skills. However, a negative contribution of assessment strategies to employability skills acquisition suggests that equal consideration has not been given to some resources such as human resource development, instructional materials and physical facilities (Kaider et al., 2017). Consequently, there could be intricacies in the delivery of valued assessment in the absence of resources (Bilgin et al., 2017).

Finally, research question six reveals that instructional resources, science course teaching methods and assessment strategies have joint significant predictions on the acquisition of employability skills by potential science graduates. This analysis suggests the possible representativeness of the measured constructs of the study and perhaps their being reliable components in predicting employability skills acquisition of potential science graduates. Worthy of note is the over two-thirds contribution of the independent variables - instructional resources (instructional material, physical facilities, human resources), science course teaching methods and assessment strategies to the acquisition of employability skills by potential science graduates.

CONCLUSION & RECOMMENDATIONS

The lecturers' understanding based on the survey's analysis indicates that instructional resources, science course teaching methods, and assessment strategies have joint significant predictions on the acquisition of employability skills. This interpretation demands specific actions on the part of administrators of HEIs, lecturers, learners and regulatory bodies. It is, therefore, recommended that administrators should provide the required instructional resources – instructional materials, physical facilities and the required human resources for the implementation of excellent teaching techniques and assessment strategies. Lecturers should consciously seek self-upgrade and improve teaching techniques and assessment strategies. Potential science graduates as learners should cooperate with the lecturers and administrators responding to them positively to favourably acquire and develop employability skills for the workplace. Lastly, regulatory bodies such as The Ministry of Education and its various parastatals as well as the Nigerian Universities Commission need to ensure that higher institutions and science programmes focus on effective assessment strategies and teaching methods to aid in employability skills acquisition by students. Further, the regulatory bodies must seek sufficient funding for higher education to help in the procurement of instructional resources for the growth and development of science.

This study is limited to the science lecturers of the selected universities in the South-west region of Nigeria. The standpoints of other stakeholders such as the government, students, civic society, and policymakers, among others via empirical studies could be considered in future studies. Empirical research could also explore the issue of visibility (the role of the academic curriculum in developing employability skills), and responsibility for students to develop employability skills within higher education institutions, working with the employers and policymakers consciously formulating policies for transferable skills implementation. The long-term impact of the employability skill agenda on the quality and equity of science education in universities, student empowerment and the development of society could also be valuable areas for future study.

Specifically, there is a discernible shift from the provision of traditional education which is discipline and pedagogy-oriented to vocationally focused provision which trains students to demonstrate their instrumental values of knowledge-for-use and the incorporation of information technology skills in today's workplace. Lecturers in this study stated their position, especially regarding the acquisition of employability skills of students in this region, but, it is important to note that lecturers' perceptions may change or shift due to different institutional policies on employability skills. There is a need to extend this study by conducting empirical research on lecturers' views and experiences of employability skills and the independent variables. Therefore, exploring regional variations in employability skills demands and offerings in conjunction with other determining variables could shed light on the unique requirements faced by diverse geographical regions, helping tailor educational and training programmes accordingly.

Comparative analysis across cultures and nations may uncover cross-cultural variations in employability skills preferences and their implications, aiding in the development of nationally applicable strategies. Certainly, addressing the evolving landscape of employability skills after the distressing effect of the COVID-19 pandemic in Nigeria and the future of work is a critical aspect of future research in this field. Measures must be taken to improve Information and Communications Technologies, especially as they apply to easing traditional education and developing students' information technology skills accelerating the adoption of remote work, digital technologies, and automation in education. These shifts are likely to have profound implications for the skills that employers seek in fresh science graduates. Research should, therefore, endeavour to connect the findings of this study with the emerging trends in the post-pandemic workforce.

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