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Knowledge, Perceptions and Readiness of Nigeria's Beginning Teachers for Sustainability Education

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Abstract

Beginning teachers should be adequately prepared for their roles as propagators of sustainable development core messages. Using a mixed method approach, this study assessed current knowledge, perceptions and readiness of beginning teachers for sustainability education. Two hundred (200) randomly selected final-year undergraduates from the Faculty of Education of the Nigerian University participated in the study. Results revealed gaps in the awareness and understanding of sustainability concepts and issues among the respondents. However, a high level of interest in handling the core issues was expressed. The respondents differed according to gender and age, but there were no significant differences according to mode of entry. The study recommended infusion of sustainability concepts in teacher education curricula and promotion of sustainable development issues through students' activities within and outside university campuses to address knowledge gap and sustain interests in sustainability education among beginning teachers.

Keywords: beginning teachers, knowledge, perceptions, readiness, sustainability

Introduction

Interest in pre-service or beginning teachers has grown tremendously since the United Nations Decade of Education for Sustainable Development (UNDESD), 2005–2014. Beginning teachers are sustainability actors whose capacities and interests are crucial for transforming the ecological, socio-cultural and economic outlooks of their schools and society. The role expectations of beginning teachers, within the curricular and co-curricular activities of the education system, place them as critical agents of pro-sustainability consciousness and behavior among students and the citizenry (Alkaher & Carmi, 2019; Buchanan & Crawford, 2015; Kabadayi, 2016; Muthersbaugh & Kern 2012; Nation & Feldman, 2021). However, it has been observed that there "is the general limited awareness of a sustainable world view" among teacher trainees (Down, 2011, p. 54).

Sustainability is about mitigating risks and maximizing opportunities for improving people's quality of life at the local, regional and global levels. It is widely agreed that the current socio-economic development trends are unsustainable and equipping citizens with requisite knowledge and competences will move society towards sustainability (Goller & Rieckmann, 2022; Sundh, 2020). At the 2015 World Education Forum in Korea, the need for pro-sustainability educators was recognized as critical to actualizing the 2030 Global Agenda for Sustainable Development. All the five Ps (People, Planet, Peace, Partnership and Prosperity) of the framework for the Global Agenda have educational elements for which teachers are critical to actualizing.

In the Berlin Declaration (UNESCO, 2021), teachers and teacher education program are recognized as key agents and platform for delivering education for sustainable development (ESD) goals. Goller and Rieckmann (2022) insist that teacher educators and teachers have an important role to play in attaining the goals of sustainability beyond the targets set in ESD. In the metaphorical analogy of Kabadayi (2016), "if teachers are equipped with adequate professional knowledge and personal practical knowledge, they will become active curriculum planners at schools and will have the potentials to transform from 'cook' to 'chef' in teaching" (p. 6). The import of Kabadayi's submission lies in adequate preparation of 21st century teachers not only in terms of knowledge of planning for teaching about sustainability, but also with respect to skills and values in delivering sustainable development core messages in schools and the larger society. It is therefore important to continually assess the readiness of pre-service teachers as sustainability change agents to address needs and gaps in their education at that level.

Education is the key driver of the UN's 17 sustainable development goals (SDGs). Goal 4 specifically focuses on quality education while target 4.7 addresses education for sustainable development. ESD promotes skills such as critical thinking, group decision-making, and creative problem solving by engaging important sustainable development concerns through active teaching and learning strategies that inspire and equip students to alter their behavior (Kohl & Hopkins, 2020). Therefore, sustainability education should be holistic and transformational with focus on learning content, pedagogy and environments, learning outcomes and societal transformation (UNESCO, 2017). All these have serious implications for the training of sustainability conscious prospective teachers.

Although advocacy and technical intervention may support incremental achievement in sustainable development, it is from the school system, supported by effective sustainability teacher education, that the enduring gains of sustainability consciousness would come (Down, 2011; Rodrigo-Cano et al., 2019). The centrality of teacher education in sustainability education therefore places enormous responsibility on researchers in teacher education to identify needs and gaps for remediation within the context of the SDGs (Buchanan & Crawford, 2015; Effeney & Davis, 2013; Kabadayi, 2016).

Available evidence suggests that not much is being achieved in promoting sustainability education through teacher education. For instance, USTESD Network (2013) reported that, out of about a dozen institutions of higher education with environmental and sustainability academic programs surveyed, "only 6 institutions...mention teacher education programs, none of which have a sustainability focus" (p. 4). This suggests that there exist knowledge and skills gaps in teacher education for sustainability. Down (2011) maintains, "The teacher education programs which have provided these teachers, to a great extent, with the knowledge of the technical aspects of teaching and have

inuenced their understanding of teaching have, however, been unsuccessful in helping them to position their teaching in the context of the macro picture (of sustainability education)." Among commonly identified reasons for the current teacher education gap are the lack of commitment from teacher education institutions, low level of consciousness/knowledge about sustainable development issues, lack of motivation to engage sustainability and lack of disposition on the part of student-teachers and their educators (Cankaya & Iscen, 2015; Kohl & Hopkins, 2020; Ogunyemi & Ifegbesan, 2011).

Teacher education in ESD in Africa, unlike in the Western world, is yet to gain a solid footing, and continuous assessment of pre-service teachers' knowledge, perceptions and preparation of sustainability issues and practices could go a long way in addressing the research and teacher education gaps. Many scholars (e.g., Muthersbaugh & Kern, 2012; Rodrigo-Cano et al., 2019; Sundh, 2020) have argued that prospective teachers' knowledge, attitudes or beliefs do significantly influence what and how they teach during their professional practices. Therefore, their ability to teach sustainability issues could depend on their knowledge and perceptions of sustainability at the point of graduation. This was the initial motivation for the present study.

The Research Problem

Nigeria, like many other African countries, is bedeviled with sustainable development challenges but little is known about beginning teachers' knowledge, perceptions and preparation towards sustainability education. If the maxim that "no country can rise above the quality of its teachers" (Federal Republic of Nigeria, 2013, p. 11) is anything to go by, it is germane to address the place of teachers for Nigeria's aspirations for sustainability.

This study was conceived within the foregoing context. The study explored existing knowledge, perceptions and readiness of pre-service teachers in relation to sustainability issues and practices at the Nigerian University with reference to background variables of the respondents. Questions addressed by the study are as follows:

1. What is the current level of awareness and knowledge of sustainability problems among beginning teachers?
2. What sustainable development concerns in Nigeria are perceived as critical by the beginning teachers?
3. How do beginning teachers rate their pedagogical competencies for handling sustainability issues within the context of the Nigerian school system?
4. Are background variables of beginning teachers (gender, mode of entry, age and subject area) significantly related to their knowledge, perception and preparation for sustainability issues?
5. Are background variables of beginning teachers significantly related to their pedagogical competencies for handling sustainability issues within the Nigerian school system?

Methods

This study is a descriptive survey of the mixed-method (quantitative-qualitative) paradigm. It relied on the use of questionnaire and focus group discussion (FGD) to assess beginning teachers' awareness, perceptions and preparedness for handling sustain-

ability issues. Data were gathered using the Beginning Teachers' Sustainability Knowledge and Practices Questionnaire (BTSKPQ). The BTSKPQ has four sections. Part A consists of seven items on personal information of the respondents. Part B, with 10 items, focuses on sustainability knowledge while part C consists of 15 items on sustainability issues. The last section (Part D) has 21 items on perception of sustainability and sustainable development.

The statements for the BTSKPQ perception component were rated on a 5-point Likert scale, from strongly agree to strongly disagree. Three-point scale of "Yes", "No", and "Not sure" is used for the knowledge section of the questionnaire. Six focus group discussions (two in the Social Science group, one in other three groups) were also conducted to elicit further responses from the students to complement and illuminate information obtained from the survey instrument. Participants at the FGDs were students who volunteered to be involved in groups of between six and eight.

A total of two hundred (200) final year beginning teachers from five departments at the Faculty of Education, Olabisi Onabanjo University, were administered with the questionnaire. The Statistical Package for the Social Science was used to analyze the survey data (SPSS version 23.0) while information gathered with the questionnaire was supplemented with excerpts from the transcribed records of FGD session. To interpret the data, mean values of 3.00 and above were considered as implying agreement while mean values below 3.00 were regarded as implying disagreement. A standard deviation greater than 1.00 was taken to suggest a high variability among responses.

Presentation of Findings

Background Variables

The demographic distribution of the sampled beginning teachers shows that a majority (88.5 %) of the respondents gained admission through the University Tertiary Matriculation Examination (UTME), while only 11.5 % were admitted as direct entry students. There were 35 % and 65 % male and female participants respectively, indicating a higher percentage of female student-teachers. The mean age of students in the sample was 16.8 years (SD = .71); 64.5 % were between 18 and 24 years, 25.5 % between 25–30 years, while 8.5 % were 30 years or above. A total of 16.5 % of the beginning teachers were at the arts program, 41.5 % were majoring in social sciences, 22 % were studying sciences, 6.5 % – guidance and counselling and 13.5 % – human kinetics and health.

Awareness/Knowledge of Sustainability

According to Figure 1, a majority (73 %) of the respondents said "Yes" to the question "*Are you aware of the concept of sustainability*?", while 14 % said "No" and 12.5 % – "Do not know". This implies that beginning teachers' awareness level was high.

On the follow-up item – *If Yes, how much of the concept do you know?* – Figure 2 shows that 16 % claimed to have high knowledge, 52 % of respondents had moderate knowledge, 20.5 % – little knowledge, while 11.5 % were not knowledgeable. This suggests that their knowledge is not adequate enough to promote sustainability in their personal life and professional practice.

Figure 1

Awareness of the Sustainability Concept

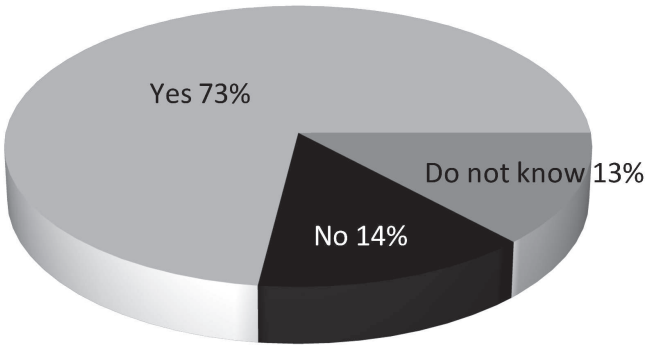


Figure 2

Knowledge of the Sustainability Concept

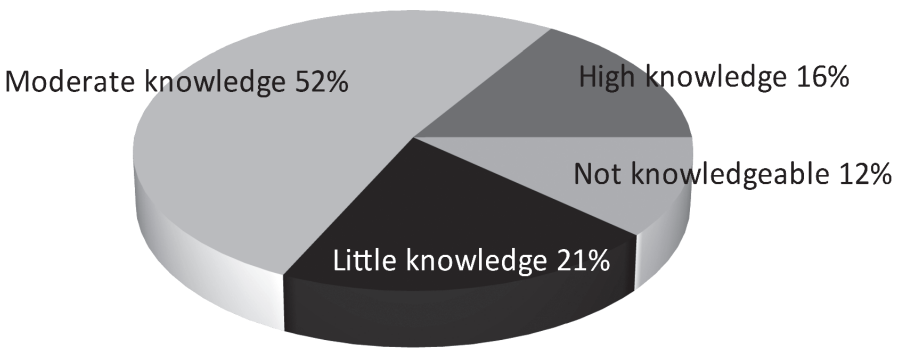


Figure 3

Have You Taken Course(s) Related to Sustainability

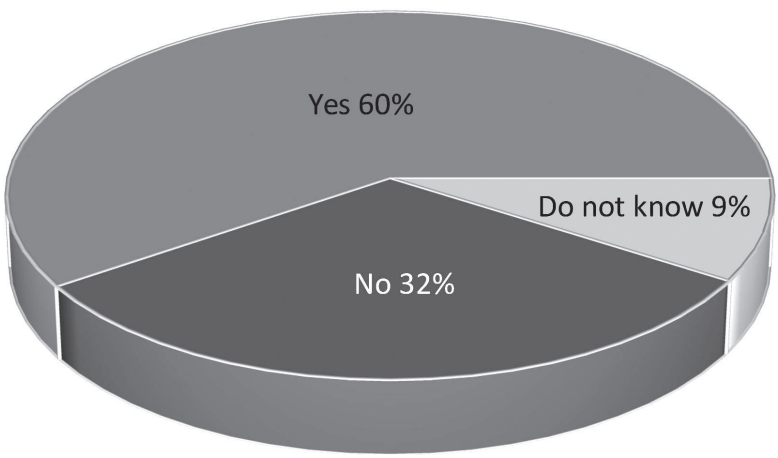


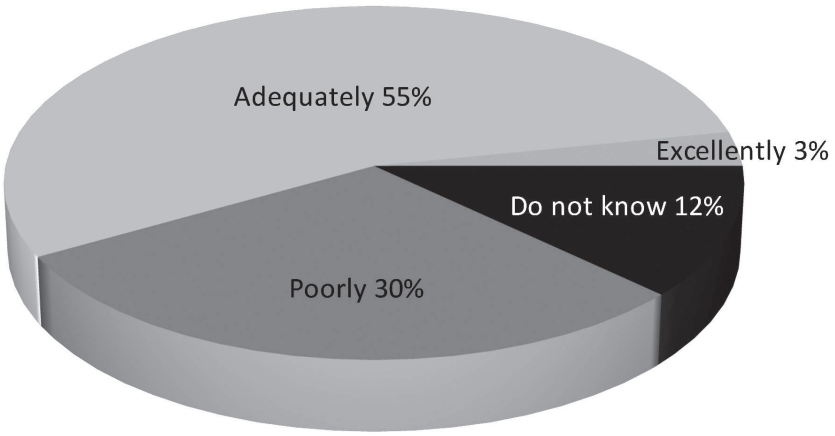
Figure 3 shows the respondents' response to the item *Have you taken course(s) on issues related to sustainability?* The result shows that almost 60 % responded "Yes", 31.5 % said "No", while 9 % – "Do not know". This suggests that sustainability related issues are taught in some courses at the university program.

In Figure 4, which is a follow-up item – *If Yes, how well did your course prepare you for teaching for sustainability?* – only 2.5 % of the respondents chose "Excellent", 43.5 % said "Adequate", and 23.5 % "Poor". During the FGDs, the same question was posed to the participants. Although about two-third of the prospective teachers may have offered courses in sustainability, this was in terms of content. As for pedagogical skills for integrating and teaching sustainability issues, their preparation could be judged as poor. All the participants said they were not taught how to teach the issues and concepts. This verdict coming from the prospective teachers' self-assessment was found by the researchers to be a serious gap. In the words of one of the FGD participants,

> *We were never told that we may have to teach the issues in schools. We were only taught the meaning on sustainable development, why it is important to have knowledge of it, and the various international declarations (related to sustainability). We were not taught that there were ways or pedagogies, skills and techniques of teaching sustainability issues* (Male participant, FGD, August 8, 2018).

Figure 4

How Well did Your Course Prepare You for Teaching Sustainability



In Table 1, beginning teachers' knowledge of sustainability issues was measured using six items on the 3-point scale of "Yes", "No" and "Do not know". From the results in Table 1, a majority of the students responded affirmatively to the items. This implies that a majority of the students are knowledgeable about the concept of sustainability.

Table 1

Knowledge of Sustainability

	Yes	No	Do not know	Mean
Sustainability involves decision making that integrates both long and short-term economic, environmental, social and equitable considerations	141 (70.5)	27 (13.5)	32 (16.0)	1.46
Sustainability seeks to balance human and economic well-being with culture, tradition and respect for the earth's natural resources	145 (72.5)	13 (6.5)	42 (21.0)	1.48
Sustainability is about gender equity	123 (61.5)	31 (15.5)	46 (23.0)	1.62
Sustainability supports cultural diversity	116 (58.0)	33 (16.5)	51 (25.5)	1.76
Sustainability is a strategy to ensure the survival of humanity	153 (76.5)	21 (10.5)	26 (13.0)	1.37
Ecological sustainability is one of the elements of sustainability	137 (68.5)	21 (10.5)	42 (21.0)	1.53

Knowledge of issues was also measured on a three-point scale from 1 to 3 (1: Do not know to 3: Yes). The beginning teachers were asked if they knew that the listed concepts were sustainability issues. With the exemption of "disaster prevention and mitigation" and "HIV/AIDS" with less than 50 % answering "Yes", two-third and more than majority of respondents replied affirmatively to all other issues. This suggests that beginning teachers have high knowledge of sustainability issues. Table 2 presents the results.

Table 2

Knowledge of Sustainability Related Issues

	Yes	No	Do not know	Mean
Natural Resources	169 (84.5)	19 (9.5)	12 (6.0)	1.21
Climate Change	120 (60.0)	57 (28.5)	23 (11.5)	1.51
Rural Development	138 (69.0)	41 (20.5)	21 (10.5)	1.40
Sustainable Urbanization	119 (59.5)	46 (23.0)	34 (17.0)	1.60
Disaster Prevention and Mitigation	97 (48.5)	67 (33.5)	36 (18.0)	1.69
Human Right	137 (68.5)	40 (20.0)	23 (11.5)	1.43
HIV/AIDS	87 (43.5)	63 (31.5)	50 (25.0)	1.81
Gender Equality	137 (68.5)	36 (18.5)	27 (13.5)	1.45
Peace and Human Security	143 (71.5)	24 (12.0)	33 (13.5)	1.45
Health	134 (67.0)	43 (21.5)	23 (11.5)	1.44
Governance	123 (62.5)	46 (23.0)	29 (14.5)	1.52
Cultural Diversity and Intercultural Understanding	118 (59.0)	42 (21.0)	40 (20.0)	1.65
Poverty Reduction	115 (57.5)	54 (27.0)	31 (15.0)	1.58
Corporate Responsibility and Accountability	119 (59.5)	43 (21.5)	38 (19.0)	1.60
Economic Development	150 (75.0)	30 (15.0)	20 (10.0)	1.36

To gain deeper insights into the level of knowledge among the respondents, FGDs were conducted. Some excerpts from comments of student-teachers at the FGDs are presented below:

> *Sustainability, in my opinion, is using the resources around us wisely so that generations coming after us will also be able to enjoy the same resources* (FGD, Female Science student who watched the TV documentary, August 8, 2018).

Participant's reply with regard to society concern about sustainability issues:

> *It is good for people to make money and use the resources in the environment, but they must do so in such a way that is affordable and cost effective. Also, it must be environmentally sustainable. We must try to make our activities and behavior compatible with the natural environment and look for how to minimize the use of resources* (FGD, Male Social Studies student, August 8, 2018).

Another respondent equally declared:

> *I think that sustainable development or sustainability is more about the environment, how to effectively and efficiently utilized our resources. But it is also about sustainable economic development and other social issues* (FGD, Female Social Studies student, August 8, 2018).

From the perspective of another participant:

> *Although I'm not sure but I have a feeling that sustainable development is much more than the issue of environmental sustainability that we were taught in the environmental awareness course we took* (FGD, Female Social Studies student, August 10, 2018).

A male student who equally took the same course with the last respondent was more forthcoming in his response:

> *Sustainability issues or topics are more than the use and protection of natural resources. It includes environmental issues, health issues, social issues and economic growth. Sustainability is also about topics such as design, urban planning, and transportation policy. I think it also deals with sustainability of culture. There is a lot of our culture that has been eroded as a result of western civilization. People no longer give local names to their children. They do not allow their children to speak their indigenous language. By so doing we are not promoting our culture. That is culturally unsustainable, if I can say that* (FGD, Male Social Studies student, August 10, 2018).

In Table 3, almost all the twenty-one items exhibited high mean scores above 3.00 which is the mid-point, thus indicating that beginning teachers were favorably disposed to the environmental, cultural and economic issues of sustainability.

Table 3

Perceptions of Sustainability Issues

	Statements	Strongly disagree	Disagree	Not sure	Agree	Strongly agree	Mean
1	Developmental activities in Nigeria such as construction, agriculture and industrialization are addressing future needs of younger generation	41 (20.5)	18 (9.0)	15 (7.5)	62 (31.0)	64 (32.0)	3.45
2	Sustainability is about activities that are beneficial to all	28 (14.0)	31 (15.5)	35 (17.5)	55 (27.5)	51 (25.5)	3.35
3	Every citizen needs to learn about sustainability	32 (16.0)	33 (15.5)	18 (9.0)	66 (33.0)	51 (25.5)	3.36
4	For a healthy life, people should be concerned about the quality of air, water and land in their environment	28 (14.0)	24 (12.0)	23 (11.5)	54 (27.0)	69 (34.4)	3.78
5	People should be encouraged to reduce, reuse and recycle the waste they generate	30 (15.0)	23 (11.5)	28 (14.0)	56 (28.0)	63 (31.5)	3.50
6	The primary responsibility for solving environmental problems lies with government rather than individuals	45 (22.5)	47 (23.5)	32 (16.0)	49 (24.5)	25 (13.5)	2.83
7	Nature would be at peace and in harmony if only human beings left it alone	37 (18.5)	51 (25.5)	35 (17.5)	46 (23.0)	30 (15.0)	3.01
8	The current pattern of economic activities in Nigeria is good for environmental sustainability	27 (13.5)	26 (13.0)	24 (12.0)	63 (31.5)	60 (30.0)	3.52
9	Human beings should respect nature because it was created by the God	21 (10.5)	26 (13.0)	25 (12.5)	75 (37.5)	53 (26.5)	3.57
10	Global warming is not the problem the world is making it to look	27 (18.5)	36 (18.0)	44 (22.0)	67 (33.5)	26 (13.0)	3.15
11	The primary responsibility for solving environmental problems lies with individuals rather than the government	43 (21.5)	56 (28.0)	33 (16.5)	47 (23.5)	21 (10.5)	2.74
12	As far as I am concerned, working for gender equality is not a problem	30 (15.0)	70 (35.0)	35 (17.5)	39 (19.5)	26 (13.0)	2.81
13	I respect and encourage cultural diversity among people	27 (13.5)	4 (17.0)	38 (19.0)	57 (28.5)	44 (22.0)	3.32
14	Increasing opportunities for women to participate in socio-economic activities is the best way to eliminate gender discrimination	15 (7.5)	38 (19.0)	23 (11.5)	77 (38.5)	47 (23.5)	3.52
15	How minority ethnic groups are treated should be the concern of every citizen	34 (17.0)	24 (12.0)	26 (13.0)	71 (35.5)	45 (22.5)	3.35
16	Cultural rights are part of human rights that should be included in teacher education programs	21 (10.5)	19 (9.5)	30 (15.0)	72 (36.0)	58 (29.0)	3.64

See next page for continuation of table

Continuation of Table 3

17	Accepting and valuing people from diverse cultures will help in treating them equitably	21 (10.5)	28 (14.0)	24 (12.0)	68 (34.0)	59 (29.5)	3.58
18	The world will be a better place when people learn to live with other people who are culturally different from themselves	24 (12.8)	16 (8.0)	29 (14.5)	68 (34.0)	63 (31.5)	3.65
19	The economy is much more important for society than the environment and culture	30 (15.0)	10 (5.0)	24 (12.0)	71 (35.5)	65 (32.5)	3.65
20	To achieve sustainable economy all the people's needs for a wide range of consumer goods must be met	28 (14.0)	25 (12.5)	26 (13.0)	72 (36.0)	49 (24.5)	3.45
21	Current economic development patterns in the world are NOT compatible with environmental sustainability	24 (12.0)	12 (6.0)	34 (17.0)	73 (36.5)	57 (28.5)	3.64

Some of the beginning teachers provided clearer perspectives on the trends observed in Table 3 at the FGD sessions as reflected in the excerpts below:

> *We need to sustain our health, education, culture, behavior of our society and environment for the sake of the coming generations* (FGD, Male Science student, August 10, 2018)
>
> *Learning about sustainability or sustainable development will help enlighten others on how to maintain the environment. It is necessary to teach people about the 3R (reduce, reuse, recycle) that we are taught in our course* (FGD, Male Social Studies student, August 10, 2018).
>
> *It has affected the way I think now, how to make the environment better and cleaner. The kind of products I buy and consume. I do not just buy something because it is trendy. Yes, it makes me see the effects of waste much clearer* (FGD, Female Social Studies student, August 10, 2018).
>
> *Yes, it encourages us to become environmentally responsible citizens. However, as you said, sustainable development is not only about environment. Also, it helps develop socially responsibility citizens* (FGD, Female Social Studies student, August 10, 2018).

Students were also asked if the course(s) they took adequately prepared them to effectively teach or promote sustainability issues in school. There was a consensus among the students that their training was inadequate.

In Table 4, t-test results reveal that there are significant differences between beginning teachers who are male and female in terms of their knowledge about and perceptions toward sustainability issues, indicating that there is a gender gap in knowledge and attitude about sustainability.

Table 4

Test of Significant Difference of Knowledge and Perception of Sustainability Issues by Gender

	Gender	N	Mean	Std. D	T	Sig.
Knowledge of sustainability	Male	69	9.64	4.10	1.205	.230s
	Female	130	8.96	3.56		
Knowledge of sustainability issues	Male	70	22.91	6.93	.410	.682ns
	Female	128	22.54	5.68		
Perception of sustainability	Male	70	68.11	18.09	-1.512	.132s
	Female	130	72.26	18.73		

Table 5 reveals that there is no significant difference between beginning teachers' knowledge of sustainability with regard to the mode of entry, either UME or Direct. However, significant difference is observed in the knowledge of sustainability issues and perception of sustainability.

Table 5

Test of Significant Difference of Knowledge, Sustainability Issues and Perception of Sustainability by Mode of Entry

	Mode of entry	N	Mean	Std. D	T	Sig.
Knowledge of sustainability	UME	176	9.18	3.77	-.146	.884ns
	Direct	23	9.30	3.84		
Knowledge of sustainability issue	UME	175	22.44	6.10	-1.470	.143s
	Direct	23	24.43	6.26		
Perception of sustainability	UME	177	71.32	18.20	1.082	.280s
	Direct	23	66.87	21.20		

ANOVA was used to analyze the data to see if there were any differences in the knowledge and perceptions of students regarding sustainability according to their subject of specialization and age. Table 6 reveals that significant difference exists in beginning teachers' awareness and knowledge of sustainability issues among the age group.

Table 6

Analysis of Variance of by Age Group

		Sum of squares	df	Mean square	F	Sig.
Knowledge of sustainability	Between groups	150.376	3	50.125	3.668	.013s
	Within groups	2664.980	195	13.667		
	Total	2815.357	198			
Knowledge of sustainability issue	Between groups	293.662	3	97.887	2.666	.049s
	Within groups	7124.000	194	36.722		
	Total	7417.662	197			
Perception of sustainability	Between groups	2354.269	3	784.756	2.322	.076
	Within groups	66248.511	196	338.003		
	Total	68602.780	199			

Turkey HSD pairwise comparison was carried out to ascertain the locations of the differences in sustainability by age. Table 7 displays the outcomes.

Table 7

Summary of Pairwise Comparisons of the Differences in Sustainability by Age

Dependent variable			Mean difference (I-J)	Std. error	Sig.	95% Confidence interval	
						Lower bound	Upper bound
Awareness of sustainability	18–24 yrs	Under 18 yrs	-1.12500	2.15923	.954	-6.7203	4.4703
		Above 30 yrs	-3.12500*	.95430	.007	-5.5979	-.6521
	25–30 yrs	Under 18 yrs	-.98039	2.19625	.970	-6.6716	4.7108
		Above 30 yrs	-2.98039*	1.03532	.023	-5.6632	-.2975
	30 yrs above	Under 18 yrs	2.00000	2.31505	.823	-3.9990	7.9990
		18–24yrs	3.12500*	.95430	.007	.6521	5.5979
		25–30yrs	2.98039*	1.03532	.023	.2975	5.6632
Knowledge of sustainability issues	Under 18 yrs	18–24yrs	10.19531	4.31830	.088	-.9953	21.3859
		25–30yrs	11.41176*	4.36816	.047	.0919	22.7316
	18–24 yrs	Under 18 yrs	-10.19531	4.31830	.088	-21.3859	.9953
	25–30 yrs	Under 18 yrs	-11.41176*	4.36816	.047	-22.7316	-.0919

* The mean difference is significant at the 0.05 level.

The findings show a statistically significant difference between the levels of sustainability awareness and knowledge of people aged 18 to 24 years and 25–30 years. In the same vein, there existed a statistically significant difference in knowledge of sustainability issues of respondent under 18 years and those aged 25–30 years.

Table 8 reveals that no significant difference exists in beginning teachers' awareness, and knowledge and perception of sustainability issues among the subject groups.

Table 8

Analysis of Variance by Subject Areas

		Sum of squares	df	Mean square	F	Sig.
Knowledge of sustainability	Between groups	129.650	5	25.930	1.863	.103ns
	Within groups	2685.706	193	13.916		
	Total	2815.357	198			
Knowledge of sustainability issue	Between groups	326.775	5	65.355	1.770	.121ns
	Within groups	7090.886	192	36.932		
	Total	7417.662	197			
Perception of sustainability	Between groups	162.833	5	32.567	.092	.993ns
	Within groups	68439.947	194	352.783		
	Total	68602.780	199			

Discussion and Recommendations

This study investigated the beginning teachers' knowledge and perception of sustainability issues. Overall, it has been found that the levels of awareness and knowledge of sustainable development and sustainability issues among the beginning teachers are moderate because of some misconceptions. This is not surprising because a majority of the beginning teachers reported that the academic courses taken in their teacher education programs were not capable of preparing them to handle sustainable development core messages as professional teachers irrespective of subject specialization.

Since universities in Nigeria operate uniform curricula, the finding about knowledge gap in this study suggests that teacher education institutions may not have consciously integrated sustainable development issues into their programs. Similar conclusion was reached by Down (2011) and USTESD Network (2013). Karpudewan et al. (2012) also found that Malaysian beginning teachers' understanding of sustainable development concepts were minimal or low because of inadequate teacher preparation. Therefore, there is an urgent need to review teacher education programs in Nigeria so as to make adequate provision for sustainability issues and activities within the curricular and extracurricular activities of the programs. For maximum results, teacher educators across subject disciplines should equally be exposed to refresher courses that would equip them with pedagogical content knowledge in sustainability education.

The beginning teachers scored highly on most of the items of sustainable development and sustainability issues. The findings indicate that the beginning teachers possessed positive disposition towards handling sustainability issues. This is in line with evidence from previous research that suggests that teachers were mostly interested in learning because their ideas of sustainability typically involved an environmental focus (Birdsall, 2014; Sundh, 2020). However, there is a need for balance with other elements of sustainability (economic and cultural) to fully equip beginning teachers with the knowledge and competencies they need as change agents in sustainability education. Our recommended program review should take full cognizance of this dimension of sustainability.

This study has found significant gender and age differences with reference to beginning teachers' knowledge and perception of sustainability. However, there has been no significant difference between pre-service teachers' knowledge and perception of sustainability by their mode of entry into the university (UME or Direct) and subject area. Previous research findings were in line with these findings (Alkaher & Carmi, 2019; Effeney & Davis, 2013; Goller & Rieckmann, 2022). Therefore, further research is recommended to support or refute the findings of this study.

Conclusion

Teacher education in Nigeria is operated within two pathways – the Nigeria Certification in Education (NCE) obtainable in Colleges of Education and the bachelor's degree awarded by universities. Certification at both the college and university levels is highly regulated through the Basic Minimum Academic Standards (BMAS) designed and implemented by the National Commission for Colleges of Education (NCCE) and the National Universities Commission (NUC) respectively. One implication of the results of this study, within the context of a centralized teacher education curriculum, is that the trajectory of beginning teachers at the university level should be directed at increasing opportunities for learning and teaching about sustainable development and sustainability

issues. Beginning teachers should not only be taught content knowledge but also the pedagogical skills for their future professional practice as sustainability educators. To achieve this goal the content of the current teacher education program at the university level in Nigeria should be revised and updated to increase curricular and extra-curricular activities for beginning teachers.

However, the above conclusion can only be tentative with implications for further research; additional studies are required to arrive at more generalizable conclusions than presented in this initial investigation. For instance, the study relied mainly on qualitative and quantitative data obtained through self-assessment of beginning teachers and did not undertake an analysis of the curricular content of existing teacher education program to determine its adequacy or otherwise for sustainability education. Also, the views of other critical stakeholders such as teacher educators within the sampled university were not factored into our tentative conclusion. Furthermore, multi-stakeholder studies with samples from across the six geo-political zones of the country and across ownership patterns (public-federal, public-state and private universities) could provide a national profile on beginning teachers' knowledge, perceptions and readiness for sustainability education in Nigeria.

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