

10. Sensitivity Analysis of Urban Forestry Practices Among Early-Stage Undergraduate Students of Agriculture in University of Uyo, Nigeria

By

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Abstract

This study estimated the sensitivity index of the early-stage undergraduate students of Agriculture, to ascertain their variations in sensitivity to urban forestry (SUF) based on socio-economic and academic background characteristics. Using Expo-facto design and purposive sampling procedure, 209 students that offered FOR 211 – Principles of Forestry, were studied. A 4-point Likert structured questionnaire was used to collect a multi-item data on perceived value, environmental consciousness and levels of patronage. Cronbach values ($\geq 0.714 \leq 0.823$) were obtained for measured variables. Composite index (CI), T-test and analysis of variance (ANOVA), were employed to spring the proportional levels of a measurable attribute of the environmental sensitivity index. Index level of SUF showed four categories: virtually insensitive (1%), low (4.8%), high (30.1%) and excellent (64.1%). Female students had greater sensitivity mean index (0.7926) than male (0.7796). On academic background, post-remedial students exhibited more sensitivity (0.7917) than others. There existed no significant differences in the students' SUF based on gender, residency, age, department of study and mode of admission. Study concluded that students were more robust in their SUF on exposure to FOR 211. It recommended introduction of environment-based course as one of the obligatory courses across all faculties in the University.

Keywords:

Sensitivity, Urban Forestry, Principles, Forestry, Early-stage undergraduate

Introduction

Sensitivity defines the ability to perceive and process information about one's environment. It is comprised of two main parts: the first is the ability to perceive sensory input from the environment, such as taste, smell, sound, and touch; the second is the cognitive processing of the perceived information about the environment, such as reflecting on and thinking deeply about experiences (Lionetti *et al.*, 2018). It focuses on the change in model output values that come from changes in model input values (Sattelli *et al.*, 2008). Although everyone is sensitive to an extent, it is often observed that some people are more sensitive than others due to the influence of their physical environment, knowledge acquired, social relationships, work conditions and upbringing (Lionetti *et al.*, 2018).

According to Pluess *et al.* (2017), for example, unfavourable early experiences may play a role in the development of increased sensitivity in adolescence and adulthood, especially in individuals with a higher genetic susceptibility to sensitivity. This infers in part that differences in sensitivity are genetic but also is shaped by the type and quality of our upbringing and environment. This corroborates Belsky and Pluess (2009) position that people's environment and experiences across their lives can equally shape their environmental sensitivity. Pluess (2015) had posited that individuals may not only be more sensitive to the negative effects of unfavorable experiences, but also more sensitive to the beneficial effects of positive environmental exposures.

The phrase "environmental sensitivity" incorporates other concepts like Highly Sensitive Person (HSP), orchids and dandelions, and differential susceptibility (Belsky and Pluess, 2009, Lionetti *et al.*, 2018). The highly delicate population has been labelled "Orchids" because, although they need the best care possible, they are especially lovely when they flourish. People in the low sensitivity group have been likened to "Dandelions," which are resilient and can sprout in any place. Since they are not as strong as dandelions but less delicate than orchids, the midway category has been referred to as "tulips" (Lionetti *et al.*, 2018). Individuals who belong to the low sensitivity category exhibit environmental sensitivity, albeit to a lesser extent than those in the other groups. Pluess *et al.* (2017) has shown that individuals typically fall into three different categories on sensitivity spectrum with 30% classed as low, 40% as medium and 30% as high in sensitivity. This also means that most people are relatively sensitive given that the medium and highly sensitive groups together account for 70% of the population. According to Sensitivityresearch.com (2020), sensitive persons have heightened perception, inclined to have a particularly well-developed understanding of relationships, more aware of subtleties in their environment and therefore perceive details more easily, process information more deeply and may get more easily overwhelmed in highly stimulating or chaotic environments.

In terms of gender, Sensitivityresearch.com (2020) reports that women tend to self-

report higher levels of sensitivity; nevertheless, elevated sensitivity in adult women and girls may be the result of social and cultural influences rather than biological ones. However, the report posited that sensitive males are really more influenced by their surroundings. This does not suggest that females are necessarily more sensitive rather, they are more likely to report sensitivity behaviours. Perceived value plays a crucial role in human behavioral decisions and it is an important concept influencing people's attitudes and behaviors toward a location (Park and Song, 2018). When someone value something, his/her disposition to that thing is not underrated because perceived value has been shown to have a positive effect on the behaviour of users. Park and Song (2018) found out that people with higher perceived value for a place, have higher rates of satisfaction and intention to revisit. As much advocacy have been made on reserving forest, seemingly, not much have been heard about urban forestry.

Urban forestry encompasses all activities geared towards increasing the vegetation of the urban corridors and spaces, in order to improve the quality of life and overall health (Bertram and Rehdenz, 2015; Tibesigwa *et al.*, 2018); provide climate change mitigation (Myeong *et al.*, 2006), biodiversity, beautification and ecosystem protection functions (Kuhn *et al.*, 2004). These activities range from green parks, green buffers, botanical gardens, ornamental trees on premises/campus, to strip trees on road shoulders and median (Tibesigwa *et al.*, 2018 and Badiu *et al.*, 2016).

There exists a mutual relationship between humans and the environment they live. Such relationships have led to conservation, modification, abuse and misuse of the environments. In urban environments, supervising authorities, organizations and individuals, have consciously attempted to ameliorate the impacts of the misuses or abuses on the such environment through practices of urban forestry which represents an amalgam of arboriculture, ornamental horticulture and forestry for the improvement of urban environment with a renewed touch of nature (Akpan-Ebe *et al.*, 2013; Inyang and Daniel, 2023). The contributions of the various urban forestry practices are expected to be valued owing to the visible impact they pose to mitigate the resultant effect of urbanization. However, Babalola and Raji (2016) contend that there is no concrete evidence to link people's perception to environmental services trees provide within their immediate environment. Nevertheless, they reported that majority of their respondents agreed that they love to be (91.2%) and prefer to work (74.8%) in tree environment. Less than half (41.3%) of the respondents accepted that having trees around office surrounding can improve job satisfaction.

There have been several agencies and individuals, who have communicated and created age-long awareness campaign on why there should be concerted behaviour to preserve, conserve and protect the green environmental resources. Quite often than not, there seem to be virtually no correlation between knowledge acquired and sensitivity of

students towards appreciation of principles of urban forestry. The continued adverse effects interplay of man and his environment call for investigation of the effectiveness of environmental education and sensitization programme. Therefore, this study estimated the sensitivity to urban forestry index of the early-stage undergraduate students in the Faculty of Agriculture; ascertained the variations in student's sensitivity to urban forestry based on socio-economic characteristics and academic background.

Methodology

The study adopted an expo-facto research design (Simeon and Goes, 2013). University of Uyo is located within the Uyo Capital City, which lies between latitudes 4°55'30" and 5°37'30"N and longitudes 7°51'0" and 8°20'30"E. The study area has a tropical climate marked by two distinct seasons: dry season (November – March) and wet season (April – October) usually interrupted by a short dry weather in August, often known as “August Break” (AKSMoED, 2014). Annual temperatures of the State ranges from 23.32°C to 31.29 °C. Study population consisted of all the students in the Faculty of Agriculture that offered FOR 211 – Principles of Forestry in the 2020/2021 academic session. A total of 209 people agreed to participate in the survey. Structured questionnaire as advocated by Sensitivityresearch.com (2020), was used to collect data on socioeconomic and academic background characteristics, and the performance indicators of sensitivity to urban forestry construct scale: perceived value, environmental consciousness, and patronage of urban forestry facilities, from the students.

Content validity and the constructs were adequate since the Cronbach's Alpha test showed the satisfactory reliability value of 0.714 for the perceived value scale, 0.823 for the levels of patronage scale and 0.804 for the environmental consciousness scale (Cortina, 1993). Data obtained were subjected to descriptive and inferential statistics like composite index, T – test and analysis of variance (ANOVA). Composite Index (CI) analytical technique as adopted in Inyang *et al.* (2004), Daniel *et al.* (2022) and Daniel (2022), was employed to derive the proportional levels of a measurable attributes of the environmental sensitivity index. In obtaining the index, summative rating of the scaled responses of each respondent were computed and subsequently normalized by the division of the scores by its maximum possible scores obtainable from a particular scale.

According to Kerlinger and Lee (2000), the index value is probabilistic in nature since the value only range from 0 to 1. It can also be expressed in percentages if multiplied by hundred. As the measurable attribute move towards 1.00 it suggests that the estimations of the respondents are very high and otherwise as the index estimation move toward 0.00. to guide meaningful discussion, the index distribution intervals were discretionally categorized into equal interval of choice. The distribution pattern was in broad category of virtually negligible (0.00 – 0.2509), low (0.251 – 0.5099), high (0.51 – 0.7509) and very

high (0.751 – 1.00) alongside their respective frequencies and percentages.

Results and Discussion

A. Level of Sensitivity to Urban

Forestry among Early-Stage Undergraduate Students

This subsection explored aggregately the level of sensitivity to urban forestry based on its performance indicators; perceived value of urban forestry, environmental consciousness of urban forestry, and patronage of urban forestry facilities. Despite the challenging state of environmental protection campaigns, it became necessary to explore the responsiveness of the students who has relative exposure to the advisory opportunities in principles of forestry. The level of perceived reasons for continuity in the needs to preserve the urban forestry were ascertained for each respondent considered for this study. The distribution pattern of the index level of sensitivity to urban forestry was derived and were analyzed using the broadly categorized four ranges as shown in Table 1. There were respondents with an index of sensitivity to urban forestry that fell within the range of figures being considered as virtually insensitive (1%) while those index range that were considered low as shown on Table 1 were 4.8 %. Only two categories of level of sensitivity to urban forestry were found by the composite index outcome as sensitively forward. Those that fell within the 0.6 – 0.7599 index range were 30.1% and above 0.76 index range constituted 64.1% of the respondents, respectively.

Unlike Lionetti *et al.* (2018) three ranges (Dandelion, Tulips and Orchids) for lowly, medium and highly sensitive persons, the research used four ranges of: virtually insensitive, low, high and excellent, in categorizing the respondents. The more ranges were to allow for wider spread of distribution so specific reality can be seen since the students are mostly test sensitive.

The results showed population that could be categorized as relatively sensitive (high and excellent) persons to be about 20% higher than Belsky and Pluess (2009) estimated 70%. This showed the respondents were more robust in their sensitivity because of exposure to FOR 211. The results thus agreed with Pluess (2015) that individuals become more sensitive to beneficial effect of positive environmental exposures.

Table 1: Levels of Sensitivity to Urban Forestry (SUF) of Respondents

Sensitivity to Urban Forestry Index Range	Interpretation of SUF Index Range	Frequency	Percent
0.00-0.2599	Virtually Insensitive	2	1.0
0.26-0.599	Low	10	4.8
0.60-0.7599	High	63	30.1
0.76-1.00	Excellent	134	64.1
Total		209	100.0

B. Variations in Students' Sensitivity to Urban Forestry Depending on Socioeconomic Characteristics.

To ascertain the variations in index of sensitivity to urban forestry among the students based on their socioeconomic characteristics, the study adopted t –test analysis. The variations in mean levels of sensitivity to urban forestry by gender is presented in Table 2. It showed the female students had a greater sensitivity to urban forestry mean index than the male. However, the t-test value was 0.700 while significant value (0.485) was greater than the P-value (0.05). This means that there were no significant differences in the levels of sensitivity to urban forestry by gender among the study population. The results corroborate Sensitivityresearch.com (2020) report that women and girls often tend to self-report higher levels of 'heightened' sensitivity as a reflection of social and cultural influence. The statistical insignificance further validated the claim that females are not necessarily more sensitive but rather that females are more likely to report sensitivity behaviours because of being so prone to spending more time visiting and relaxing in friendly ecotourism spots while building social relationships with the several friends (Sensitivityresearch.com, 2020).

With regards to the residence of the students (Table 2, item 2), the variation across its categories showed the sensitivity to urban forestry mean index of off-campus students were more than the on-campus resident student. Statistically, the categories showed no difference in between the sensitivity to urban forestry mean index. Despite the variations in the sensitivity to urban forestry mean index, the significant value (0.408) was greater than P-value (0.05), thus there were no significant differences in the sensitivity to urban forestry index. The result verifies that sensitivity is influenced by a variety of factors. However, on-campus students equally have daily opportunities of interfacing with the green infrastructure adorning the University campus.

With regards to age of the respondents, the result revealed that the index of sensitivity to urban forestry vary in their mean between the two age grades as depicted by Item 3 in Table 2. The pattern shows an increasing index with increase in age. Those within 32 years and above exhibited more level of sensitivity to urban forestry than those in the 31 and below. Further test revealed that there was no statistical significance as significant value (0.659) was greater than p-value (0.05) implying that irrespective of the age of student, the levels of sensitivity to urban forestry were virtually the same in the study. Researches (Khoiri *et al.*, 2021 and Fidan, 2016), had shown that sensitivity is partly genetics and are as well shaped by the type and quality of our upbringing and environment. Thus, the younger respondents may have had exposures and develop sensitivity to green infrastructure via area they grew up, secondary school attended.

Table 2: T-Test results of the Sensitivity to Urban Forestry (SUF) Based on Socioeconomics Characteristics

S/No.	Socioeconomics Variables	N	SUF Index Mean	T-test value	df	Sig. (2-tailed)
1.	Gender			-0.700	207	0.485
	Male	117	0.7796			
	Female	92	0.7926			
2.	Residence			-0.855	13.527	0.408
	On Campus	14	0.7351			
	Off Campus	195	0.7889			
3	Age			-.442	207	.659
	17-31	203	0.7846			
	32-46	6	0.8090			

C. Variations in Students Sensitivity to Urban Forestry based on Academic Background Characteristics.

The study considered the likely influence that career training inclination can have on the attitudinal disposition to sensitivity to urban forestry. The Department of the respondents were presented as shown on Item 1 in Table 3, which also highlighted the different variation in mean level of sensitivity to urban forestry. From the mean sensitivity to urban forestry index, those in Fisheries and Aquatic Environment exhibited greatest level of sensitivity to the urban infrastructure than those in other courses of study. Those in Crop Science exhibited the least sensitivity to urban forestry index. Though there was no regular pattern in the sensitivity to urban forestry mean index, the result revealed no statistical significance as significant value (0.786) was greater than P-value (0.05). This means that students irrespective of the likely career training specialization, their index of sensitivity to urban forestry were virtually the same in the study area.

With regards to mode of admission into the course of study, the respondents also exhibited different levels of sensitivity to urban forestry (item 2), there were similar in their sensitivity to urban forestry mean index across the four categories. Those who were admitted into year one exhibited more level of sensitivity to urban forestry than those who were admitted as direct entry students. The result revealed no statistical significance as significant value (0.658) was greater than P-value (0.05). This implied that there was no significant difference in the level of sensitivity to urban forestry based on the mode of entry into the university.

Table 3: ANOVA Results of the Sensitivity to Urban Forestry (SUF) Based on Academic Background Characteristics

S/N	Demographics Variables	N	SUF Index Mean	F-value	df	Sig. (2-tailed)
1.	Department of Studies			.487	208	.786
	Agricultural Economic and Extension	69	0.7974			
	Animal Science	69	0.7784			
	Crop Science	11	0.7481			
	Fisheries and Aquatic Environment	15	0.8083			
	Forestry and Wildlife	14	0.7946			
	Soil Science	31	0.7715			
2.	Mode of Admission			.537	208	0.658
	Post-Remedial	2	0.7917			
	JAMB	174	0.7903			
	IJMB/JUPEP	29	0.7579			
	OTHERS	4	0.7604			

Conclusion and Recommendation

The students were more robust in their sensitivity to urban forestry by reason of their exposure to Principles of Forestry (FOR 211) judging from the over 90% of the students that fell into the two composite index categories that depicts level of sensitivity to urban forestry found by the composite index outcome as sensitively forward. This leaves no doubt that individuals become more sensitive to beneficial effect of positive environmental exposures. The outcome variations and non-significance in the socio-economic and academic background characteristic verifies that sensitivity is influenced by a variety of factors. Given the role of urban forestry practices in mitigating the climate change challenges the world is facing, the study therefore recommends introduction of urban forestry and other environment-based courses to education curriculum developers, in order to expose young undergraduates across all the Faculties in the University system to climate change mitigation programs and raise graduates who are environmentally sensitive.

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