



Potentials of Non-Motorized Transport as Sustainable Options for Intra Campus Trips Post Covid 19 Era

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ABSTRACT

Covid 19 pandemic has imposed a new normal in the public bus transit system, which dictates that buses operates below capacity, student shuttle bus is no exception. This study aims at examining the potential of non-motorized transport as sustainable options for intra campus trips post Covid 19 era. The study objectives include examining the use of bicycle as sustainable non-motorized transport mode for intra campus journey, analyse student trip characteristics and perception of student on the use of bicycle as alternative non-motorized mode of travel. Structured questionnaire prepared on google form were shared with the students of Federal Polytechnic, Ilaro. Within a period of one week, 319 responses were received and processed using descriptive statistics and Chi-Square independent test. Findings revealed that 71.8% of the student travel between and within campus on daily basis, given vehicle modal split of 32.6% motorcycle, 2.2% car, 14.1% shuttle buses and 48.6% walking. The use of bicycle is accepted by 48.3% comprising of 7.5% female and 40.8% male. While 51.7% decline for the reasons of not having one or inability to ride. It also revealed that gender is not independent of preference for bicycle use. The study concludes that bicycle use is an acceptable alternative mode for intra campus trip and that gender is a factor in the usage of bicycle, it therefore recommends that bicycle intervention programme be introduced among the youth, government and management of tertiary institutions should provide opportunity for youth to access bicycle and develop necessary bicycle infrastructure on campus.

Keywords: Covid 19, Intra campus trips, Non-motorised, Sustainable transport

1 INTRODUCTION

The global outbreak of Covid 19 creates a crisis situation that required a drastic solution to curtail, the spread of the virus which of course is transmissible through interpersonal contact with the carrier has become worrisome. The world health organization and local diseases control agencies in individual nation came up with protocol to stop the spread of the virus which includes isolation of people with the virus, restriction on public gathering, observance of social or physical distancing, and the lockdown of the state by government. Other measures include use of face mask, regular hand washing and the use of sanitizer to keep safe from the infectious disease (WHO, 2020).

Public transport mode is been identified as one of the high-risk potential due to density of commuters interacting both at stations and onboard the vehicle (Hemant, Agarwal, and Nomes, 2020). Also, transport has higher potency of spreading the disease between localities, through human mobility provided by the public transport system, hence public transport system was shut down during the peak of the pandemic. Because of the role of public transport as a catalyst to socio-economic development, society cannot but exist with transportation, thus the question of curtailing the spread of the virus through public transport became desirable, therefore maintaining social or physical distancing became a requirement in public vehicle.

Public transport before now in most urban settlement is in short supply compared to commuter's demand (Agrawal, Suman, Bolia, 2020), the new normal imposed by the need to curtailed the virus necessitate reduction in the capacity of public vehicle, for example during May 2020 in New South Wales, Australia, the capacity of a standard 12-meter-long bus and of a train carriage have been reduced to 12 and 32 passengers, respectively (Terrill 2020). In some other countries seating and standing spaces in vehicle were clearly marked (2 meters distance) to ensure physical distancing. This requirement further reduced the already short supply and bring to fore the need to either increase the vehicle fleet or provide alternative mode that will ensure urban mobility.

Scholars has raised the issue of wider financial gap between maintaining supply and reduced vehicle



passenger carrying capacity and come to conclude that except through more subsidies (Welle and Avelleda 2020), public transport services may not be able to surmount this unprecedented decline in passenger demand and revenue accrued to transport company (Alejandro and Oded 2020). Alejandro and Oded (2020) also added that reduction in public transport capacity challenge the very concept of mass transportation, and promote private car use. The fear of contamination in the crowded vehicle is causing a large behavioral change in mode choice to the detriment of public transport (Koehl, 2020). Likewise, the changing in the work habit and the increase acceptance of virtual interaction, like working from home or attending virtual classes. Public transport in the time to come will lose patronage to private mode.

The likelihood of a shift to private car use as a way of maintain social distancing could be catastrophic as more energy and cost expenditure will be involve (Koehl, 2020). Further to this, the negative externalities from transport which public transport is curtailing will be reintroduced to the urban environment such as air pollution, noise, traffic congestion/delay and occurrence of fatal road crashes. To minimize this, Countries across the globe is refocusing on other mode of transport through various guidelines issued to the public. The United Kingdom clearly advise commuters to consider other mode of transport before using public transport (DFT 2020), similarly, the United State offers incentives to employees to use other forms of transport that minimize close contact with public, hence biking and walking are recommended (CDC 2020).

Walking and cycling are sound mobility options that were prominently used during the peak of the pandemic, though many resulted to walking due to the high cost of other modes (Richard, 2020). The comparative advantage of walking and cycling was recorded during the period as including reducing emission which in turn reduced health impacts of air pollution in countries like China and Europe during the lockdowns (Myllyvirta and Thieriot 2020). Scholars (Hérick, Marko, Anna, Phil, Andy, Nelson, Carlos, and James (2017) and Wu, Nethery, Sabath, Braun, and Dominici, (2020)) have enumerates the health benefits of using active transport such as cycling as including increase physical activity, enhanced air quality, reduced exposure to air pollution and Noise, road crashes and even reduce mortality for lung-related transmittable disease like Covid 19. Corroborating this Pate, Pratt, Blair, Haskell, Macera, and Bouchard, (1995) acknowledge that active transport like cycling promote physical activities which reduces the chances of heart related diseases and improve functions of heart, lungs and biomechanical system of the body.

The use of bicycle as a means of transportation is not new in Nigeria though overtime, it uses has not been prominent especially in the urban areas, reasons could be attributed to increased motorization with no facilities for cycling which made it to be of high risk (Emanuel. 2015). Koehl, (2020) is of the opinion that the hindering factors to a modal shift to cycling could be the negative social view of the mode and the historic biasness in the cycling habit of female gender, he also identify inability of the mode shield users during extreme weather, none integration to the transport grid, lack of understanding needs for bicycle for local runs which public transport cannot provide, especially at this time of social distancing.

Student mobility within Campus as largely been met by institution-based shuttle buses, carbs and motorcycle, some institution had proscribed the use of motorcycle due to reoccurring safety and security issues often linked to motorcycle use and the prevailing need for social distancing is reducing available public transport supply to students on campus. This paper study the Potentials of Non-Motorized Transport as Sustainable Options for Intra Campus Trips Post Covid 19 era with the objectives of examining the use of bicycle as sustainable non-motorized transport mode for intra campus journey. It also identifying student trip characteristics and analyse the perception of student on the use of bicycle as alternative non-motorized mode of travel with a few to provide policy outline for the use of bicycle in tertiary institution campuses.

2 METHODOLOGY

Federal polytechnic Ilaro is a public tertiary institution, located on about 739 hectares of land situated at



Ilaro, a town within the Yewa South Local government area of Ogun State, southwest Nigeria. The polytechnic is a residential institution with a population of over 12,000 students, facilities within the campus were laterally developed between two enclave i.e. east and west campuses linked together with network of roads and walkways.

The selection of the sample is based on convenience sampling techniques because of the covid 19 pandemic which necessitate limited social contact and lockdown restrictions imposed by government. This made the convenience sampling procedure the preferred method of gathering the data for this study. A well-structured multiple-choice questionnaire were designed on google form and the web links shared with various departmental and students' social groups as well as individual via WhatsApp and email respectively. To ensure that respondent were students, department and level of study were inquired.

Analysis of the responses revealed that students from 78% of the academic departments participated in the survey and all levels of student were relatively represented. Within a window period of one week, 319 responses were received based on convenience sampling technique, a non-randomised selection of individual that have access to the interment facilities within the period. This technique is preferred due to the restriction in social contact. Data spread sheet were exported to SPSS version 21, descriptive analysis and Chi-Square independent test were carried out.

3 DATA PRESENTATION AND DISCUSSION

3.1 Respondents Background Information

Background information of the students were examined with basic characteristics such as gender, age, class or level of study and place of residence. Table 1 presents respondents background information, it revealed that 27.6% of the respondent were female students while 72.4% are male. This could mean that female interest in attending to survey online is low as more male student (72.4%) attended to the survey. The overall implication on the study is that because of the vigor of male they may be yielding to bicycle riding than female. The age structure of the respondent revealed that 22.9% are younger than 20 years, 50.5% are within the age bracket of 20 – 24 years, 22.6% are between 24 -28 years while 3.1% are above 28 years of age. This revealed that majority of the polytechnic students are within the age of 20 – 24 years (50.5%) by implication this is an active age of full strength and vitality that could enhance bicycle riding, though this could depend on the proportion of the population in physical disability. this was not examined because the population of students in this category in the entire student population is insignificant.

Four streams of classes are obtainable in the polytechnic system, two in the national diploma (ND 1 and ND 2) and two in the higher national diploma (HND 1 and HND 2) programme. The study revealed that the composition of respondents is made up of 10.3% of HND 1 students, 18.2% are in HND 2 while 37.9% and 33.5% are in the ND 1 and 2 respectively in the national diploma programme. This result show that more respondents are from the national diploma programme. This is not unconnected with the observed level of enthusiasm display by new students as opposed to older students, it is however good for the study because the larger percentage (71.4%) represent the present and the future students.

Analysis of student place of resident revealed that 16.6% of respondent live within the campus, 78.1% live outside the campus but within Ilaro town while 5.3% live outside Ilaro town. Mobility need of these three categories of student within the campus is affected by location of activities and their relative place of resident. Though the polytechnic is a residential institution but the level of accommodation provided is far shorter than the accommodation needs of the student population, hence the need for student to get accommodation in locations that will enhance access to the campus. The implication is that 16.6% of the student who live within the campus will have shorter walking distance to cover between place of resident and different learning facilities within the camps than the greater proportion (78.1%) who live outside the campus.



Table 1: Respondent Background Information

Variables		Frequency	Percent
Gender	Female	88	27.6
	Male	231	72.4
	Total	319	100.0
Age	18 - 20 years	73	22.9
	20 - 24 years	161	50.5
	24 - 28 years	72	22.6
	above 28 years	10	3.1
	less than 18 years	3	.9
	Total	319	100.0
Class or Level	HND 1	33	10.3
	HND 2	58	18.2
	ND 1	121	37.9
	ND 2	107	33.5
	Total	319	100.0
Place of Residence	On campus	53	16.6
	Outside campus, but within Ilaro	249	78.1
	Outside Ilaro town	17	5.3
	Total	319	100.0

Sources: Online Survey, 2020

3.2 Analysis of Student Trip Characteristics on Campus

The travel characteristics of respondents were considered in this section, travel pattern, purpose and mode of travel were the three major characteristics analysed. The study revealed that 71.8% of the students commute between the two campus areas on daily basis, 14.1% move between campuses on weekly basis, and 12.9% occasionally makes a trip between the campuses while 1.3% did not. frequency of movement between the two campus areas - east and south revealed high demand for mobility between and within the campus areas.

Further to the high mobility recorded, the purpose of the journey were examine and the study revealed that 90.6% commute between campuses to attend lectures and practical classes, 2.5% equally makes the journey to visit the library while 4.4% commute for the purpose of meeting a friend, 1.9% make it for the purpose of shopping and 0.6% for administrative purpose. Majorly, the journey purpose revealed that most trip (90.6%) are compulsory because it is the primary purpose for which the student comes to the campus (education). Hence these journeys are obligatory and of significant importance to the existing transport system capabilities as a whole.

The vehicle modal split analysis revealed that, walking accounted for 48.6% of the trips within the campus while 2.2% are by private cars, 14.1% by shuttle buses, 32.6% by motorcycle and 2.5% are by other mode such as tricycles. The modal split revealed that about half (48.6%) of the respondents used active non-motorised mode (walking) followed by motorcycle which also accounted for about one-third (32.6%) of the trips. The use of shuttle buses is relatively low (14.1%), this may be due to the number of buses available for the shuttle service. However, the limitation imposed by Covid 19 pandemic on public buses operations to reduce capacity by 50% will force many of the student to drop bus patronage for other



modes presumably walking and motorcycle.

Table 2: Students Trip Characteristics: Pattern, Purpose and mode

		Frequency	Percent
Frequency of Movement	Every day	229	71.8
	Not at all	4	1.3
	Occasionally	41	12.9
	Weekly	45	14.1
	Total	319	100.0
Purpose of journey	Administrative	2	.6
	Meet a friend	14	4.4
	Shopping at the campus market	6	1.9
	To attend lectures/practical	289	90.6
	Visit to the library	8	2.5
	Total	319	100.0
Mode of travel	Motorcycle	104	32.6
	Private Car	7	2.2
	Shuttle bus	45	14.1
	Walking	155	48.6
	Others (specify)	8	2.5
	Total	319	100.0

Sources: Online Survey, 2020

3.3 Student Perception of Bicycle Use within the Campus

Table 3 revealed the perception of students on the use of bicycle for intra campus journey. Analysis revealed that 48.3% of the respondent subscribe to the use of bicycle on campus while 51.7% decline the use. However, those who decline the use of bicycle gave reasons of not been able to ride (21.3%) and not owning a bicycle (24.5%) while 4.1% attribute their position to the risk involve in riding, 1.9% gave other unspecified reasons. From the reason given it implies that accessibility to bicycle and riding education are lacking among the student, probably this may be due to increase motorization and the disappearance of bicycles and it uses in most urban society in the country.

Table 3: Use of Bicycle for intra campus journey

		Frequency	Percent	Percent
Yes		154	48.3	48.3
No	I can't ride bicycle	68	21.3	51.7
	I don't have one	78	24.5	
	Is risky to ride	13	4.1	
	Others	6	1.9	
	Total	319	100.0	100.00

Sources: Online Survey, 2020

Further analysis of gender biasness towards bicycle use were examine with the use of crosstabulation of gender and bicycle use by students. The result revealed in Table 4 show that, out of 48.3% who accepted the use of bicycle within the campus only 7.5% are female while 40.8% are male, this is in agreement with earlier study which suggests that female student may for fare of falling abandoned largely the use of bicycle for campus movement.

Table 4: Crosstabulation Gender and Bicycle use by students

			Bicycle Use		Total
			No	Yes	
Gender	Female	Count	64	24	88



		% of Total	20.1%	7.5%	27.6%
	Male	Count	101	130	231
		% of Total	31.7%	40.8%	72.4%
Total		Count	165	154	319
		% of Total	51.7%	48.3%	100.0%

Sources: Online Survey, 2020

To further explain the observed result from table 4, relationship between gender and preference for bicycle use among the students was analysed. A Chi-Square independent test was run on the hypothesis that student's gender is independent of preference for bicycle use. The result presented on table 5 revealed that at 0.05 level of significant and 1 degree of freedom, the calculated value is 21.469 and the critical value is .000. With the critical value less than the calculated value, the alternate hypothesis is valid that gender is not independent of preference for bicycle use. Hence, it means that gender is a factor in determining bicycle usage and that low response from female for the use of bicycle could be as a result of phobia.

Table 5: Chi-Square Independent Test

	Value	df	Asymptotic Significance (2- sided)	Exact Sig. (2-sided)	Exact Sig. (1 -sided)
Pearson Chi-Square	21.469 ^a	1	.000		

4 Policy outlines

- Bicycle intervention programme should give priority to female student to ensure inclusion of all students
- Development of bike facilities at different activity area that will facilitate access to bicycle by all students
- Collaborate with cycling organization and other stakeholders local or international organization on the sustainable bicycle intervention programme
- Promote the use of bicycle among staff through incentives
- Appropriation of funds for bicycle maintenance and development of pull of fund from both internal and external donor
- Reduce investment in big buses by limiting the services to major road corridors within the campus and only for peak period.
- The green campus initiatives should promote bicycle use in the community

5. Conclusion and recommendation

Public transport is one of the sectors seriously affected by Covid 19 pandemic, the imposition of social distancing has created a new normal in the bus capacity and the operational arrangement is forcing many bus riders to taking alternative transport that ensures social distancing like bicycle. Student population is made up of youths which are within active age of full strength and vitality that should have no problem bicycle riding, though this could depend on the proportion of the population in physical disability.

It is however realized that intra campus journey are short trips that needs to be made with mode that allow for flexibility of movement and with higher efficiency to meet scheduled time for academic activities i.e. lectures and practical classes. This study has revealed higher mobility within campus with few modal alternatives. Hence, bicycle riding is an acceptable option to the students because of it recreational value and health benefit.

Largely, the journey within campus are obligatory, and the demand is not elastic because it is a daily



compulsory journey that all students must make. It is significant to note that over 50% made the obligatory campus journey through commonly non-motorised mode i.e. walking, therefore the introduction of bicycle we be an improvement in the system.

Bicycle use in Nigeria is not a new thing rather for over several years there was a shift from it's used to motorcycle because of the comparative advantage over bicycles. Human energy is replacing by fossil fuel and speed and convenience were gained in terms of operation.

The study therefore recommends that bicycle intervention programme be introduced among the youth, government and management of tertiary institutions should provide opportunity for youth to access bicycle and develop necessary bicycle infrastructure on campus.

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