



Development of a Digital Child Health Tracking Device for Monitoring Environmental Indicators and Health Status

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ABSTRACT

World Health Organization in 2016 estimated that 25% -33% of global burden of disease can be attributed to environmental risk factors which has to be monitored. When children are exposed to higher degrees, percentages or concentrations of these environmental indicators, it results in health challenges like cold, cough, catarrh, childhood asthma, heat stroke and cardiopulmonary respiratory diseases (COPD).

The study involved the development of a digital child health tracking device for monitoring dust, carbon monoxide, temperature, humidity and number of steps taken by children. These environmental indicators and health status of children in Nursery and Primary Schools in Ibadan Metropolis. 14 different public and private nursery schools was in this study. The developed prototype of digital child health tracker was used for monitoring by attachment to a total of 20 children, public (10) and private (10) respectively from December 2021 to February 2022. Data were entered using IBM Statistical Package for Social Sciences (SPSS) version 25. The environmental indicators were compared across the children’s gender and school type using independent t-test at a significant level of 5%. The comparison was done to know if there was a difference between environmental scores detected from children’s gender and school type.

RESULTS

The digital device result was analyzed and compressed which showed no significant difference in temperature, dust, carbon monoxide, humidity and step count with gender but there was a significant difference in temperature, carbon monoxide which showed higher temperature in public ($M = 37.34^{\circ}\text{C} + 0.95$) than in private ($M = 36.25^{\circ}\text{C} + 0.64$) and also a higher concentration of CO in public ($M = 7.10\text{ppm} + 3.05$) than in private ($M = 5.27\text{ppm} + 1.24$).

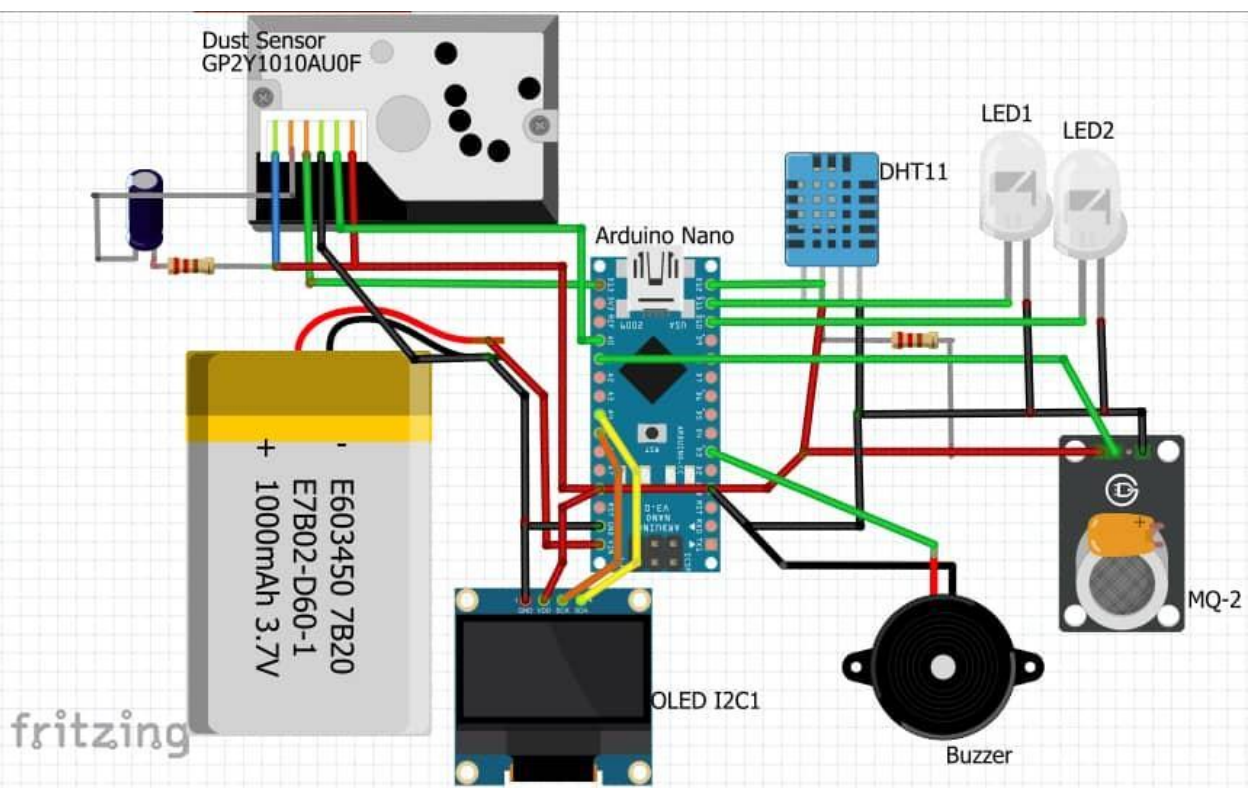


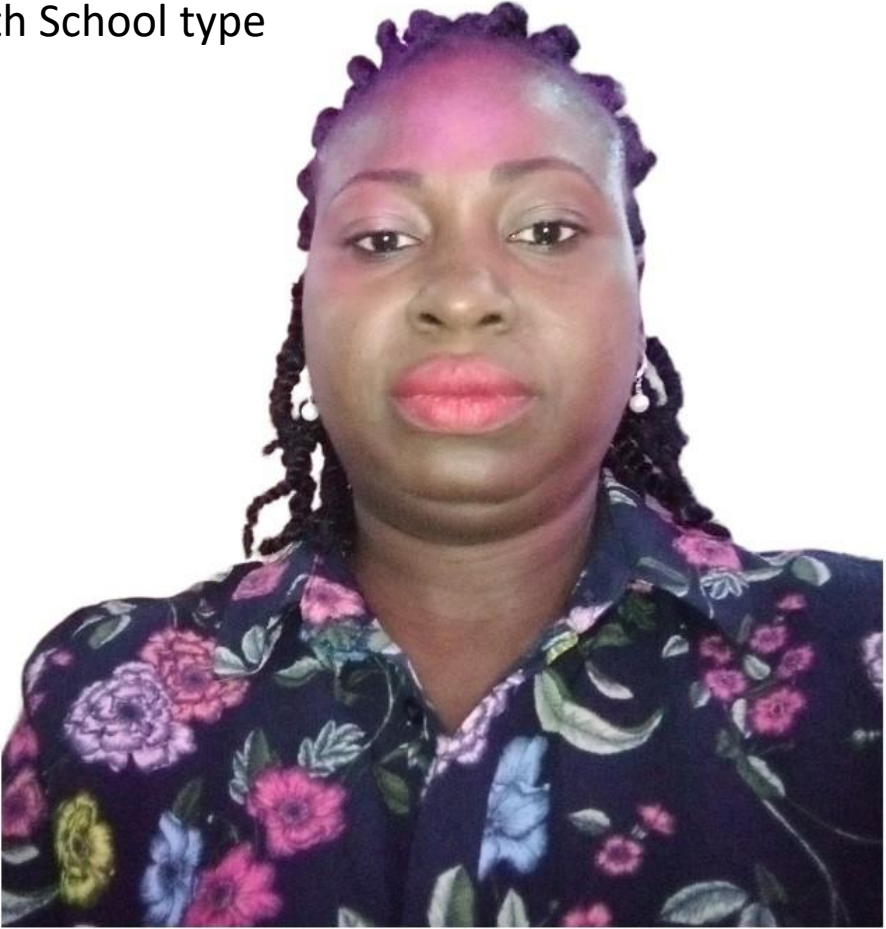
Fig 1 : Design layout of the digital tracker.

Variable	Sex	N	Meant±SD	t	P-value
Temperature (°C)	Male	11	36.25±0.64	-0.11	0.911
	Female	9	36.30±0.99		
Humidity (%)	Male	11	62.95±2.88	1.42	0.174
	Female	9	60.64±4.38		
Dust (ug/m ³)	Male	11	0.01±0.13	1.59	0.13
	Female	9	0.01±0.00		
CO (ppm)	Male	11	5.66±2.47	-1.07	0.299
	Female	9	6.83±2.41		
Step count	Male	11	16.43±4.91	-0.26	0.795
	Female	9	16.94±3.47		

Table 1: Comparison of environmental indicator with children gender.

Variable	School	N	Mean±SD	t	P-value
Temperature (°C)	Private	10	36.25±0.64	-1.38	0.045
	Public	10	37.34±0.95		
Humidity (%)	Private	10	62.98±2.77	1.3	0.209
	Public	10	60.85±4.37		
Dust (ug/m ³)	Private	10	0.01±0.13	-0.68	0.506
	Public	10	0.06±0.01		
CO (ppm)	Private	10	5.27±1.24	-1.75	0.047
	Public	10	7.10±3.05		
Step count	Private	10	16.80±4.82	0.14	0.889
	Public	10	16.52±3.78		

Table 2: Comparison of environmental indicator with School type



CONCLUSION

The use of digital child health trackers should be encouraged among caregivers in schools for monitoring these environmental indicators by alerting the caregivers when these parameters are higher than expected which has been shown to be effective. Practices such as open waste burning, the use of generator as alternative power supply should be discouraged by adequate training of school personnel. The use of blackboard and chalk which deteriorate air quality should be replaced with other teaching methods like slides, videos, digital whiteboards, and electronic tools. These are better alternatives in the classroom.

BIOGRAPHY

Anuoluwapo Olawole-Gbadamosi (MPH) is a passionate and dedicated public health professional. Her research interests are in children environmental exposure, climate change and health research, qualitative and quantitative research methods. She loves reading, traveling and exploring.

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