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The Relationship Between Physical Learning Environment and Academic Achievement of Learners in Inclusion: Across-Sectional Survey with Secondary School Students in Uganda

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Abstract:
This study examined the student's perception of their school physical learning environment (Specifically, how accessible, Appropriate and Suitable) and how it relates to academic achievement of all learners in an inclusive secondary school setting. Data was collected using self-administered questionnaires from 309 Participants including learners, teachers and head-teachers. We examined the relationship between the elements of physical learning environment (accessibility, suitability and appropriateness) and academic achievement of learners with and without special educational need. Data was analyzed using statistical package for social scientist (SPSS) version 25.0. Results showed that there was a moderate positive statistically significant relationship between physical learning environments and academic achievement of learners in inclusive secondary schools in Uganda (r=, 452, p<0.01). Results also showed that the elements of physical learning environment namely; Accessibility of physical learning environment (r=. 431, p<0.01); Suitability of physical learning environment (r=. 410, p<0.01) and appropriateness (r=. 335.p<0.01) had a positive statistically significant relationship with academic achievement of all learners including those with special educational needs. Results from the multiple regression analysis showed that 27% of academic achievement of learners was determined by the elements of physical learning environment with accessibility and suitability of the physical learning environment were the most significant predictors of academic achievement for all learners. We concluded that physical learning environment is fundamental in determining academic achievement of all learners in inclusive secondary schools in Uganda. Interventions should therefore target accessibility and suitability of the physical learning environment if academic achievement of learners in inclusive secondary schools is to be enhanced.

Keywords: Physical learning environment, accessibility, suitability, appropriateness, academic achievement

INTRODUCTION

It is well recognized that the physical learning environment of the school has a significant impact on how well inclusive secondary schools are able to physically and instructionally engage all students (Ackar-Jnr & Danso, 2019). According to Duruji, Azuh, and Oviasogie (2014), a variety of physical learning environments, including classrooms, restrooms, ample seating, safe play areas, boreholes or water sources, ventilation, desks, lighting, change rooms, walkways, desks, libraries,

and laboratories, are linked to effective teaching and learning as well as academic achievement for all students, regardless of individual differences.

Research has demonstrated that having a well-maintained physical school infrastructure is a prerequisite for all students' academic success, and this is particularly true for inclusion students (Ackah-Jnr & Danso, 2019; Korir & Kemboi, 2014). Nevertheless, the issue of how well inclusive schools' physical learning environments—where students interact, learn, and socialize with one another or with teachers—are frequently disregarded (Ucci et al 2015).

However, inclusion asserts that in a secure physical learning environment, all students may study, participate, and achieve academic success (Ackah-Jnr, 2016, Evanita, 2021). Thus, students—especially those with disabilities—are more likely to succeed academically when they receive the proper attention, resources, and support in an age-appropriate general education classroom (Ramelow et al., 2015; Wang et al., 2021).

Similar to other developing nations, Uganda has acknowledged educational inclusion and committed to implementing it through a number of national legislative frameworks and policies, such as the Education Act of 2008, the Disability Act of 2008, the UPE (1997) and USE (2007), and most recently, the inclusive education policy of 2019.

Uganda has also regionally developed all-inclusive pilot school geographically to complement regular schools to teach children with disabilities in addition to maintaining special schools for learners with severe disabilities (MoES, 2018). The inclusive schools support the operationalization of Uganda Government policy objective to implement inclusive education, which aims to provide accessible and equitable education to all children with mild special educational needs in mainstream schools and full enrolment of hard to reach and out of school children (MoES, 2016).

The goal of the current study was to determine how much the physical learning environment in inclusive secondary education influences students' academic achievement. The majority of studies (Duruji, Azuh, & Oviasogie, 2014) concentrated on the physical infrastructure of the school; however, the present study will utilize Ackah-Jnr and Danso's (2019) operationalization of the physical learning environment in terms of its appropriateness, suitability, and accessibility, as well as how these elements relate to the academic achievement of all learners in inclusion.

LITERATURE REVIEW

The Physical Learning Environment

In terms of physical structures, the idea of a physical learning environment refers to the areas, furnishings, and resources found in educational institutions. The physical aspects of the school and classroom, such as the lighting, ventilation, room size, desks, chairs, white board, computers, restrooms and changing areas, safe play areas, and clean water sources, are the main focus of the physical learning environment. MoES (2011).

Research has shown that, particularly in inclusive education settings, a student's comfort level, capacity to learn, and academic success can all be impacted by their physical learning environment (Achah-Jnr, 2016; Eimuhi & Ogedegbe, 2016). As a result, a well-designed physical learning environment improves students' psychological comfort and social interactions with teachers and their peers (Ackah-Jnr, 2016). An inclusive school's physical learning spaces should

be planned to be easily accessible, encourage student participation, and support academic success for all students (Ackah-Jnr & Danso, 2019).

All students' physical and mental health depend on the school's physical learning environment, which includes the playground for sports, the school compound, and other physical activities (Ackah-Jnr, 2016). Therefore, learners' opportunities to participate in and engage in effective outdoor play, sports, and games, as well as benefit from such physical activities in school, are limited by the physical learning environment of inclusive schools, such as hilly compounds or story buildings (Wang et al, 2021). Dear Ackar Jr. (2016), as a result, an inclusive school climate lowers needless barriers to learning and boosts all students' academic access, engagement, and accomplishment.

This study adds to the discussion on the relationship between academic achievement in inclusive schools and the physical learning environment by examining the suitability, appropriateness, and accessibility of the physical learning environments in Ugandan inclusive schools and how they individually or collectively relate to academic achievement in inclusion.

Academic Achievement

Academic Achievement indicates performance outcomes that demonstrate the amount to which a person has fulfilled specified goals that were the focus of activities in instructional environments, specifically school, college and university (Szumski et al, 2022). Academic accomplishment is mentioned in a number of international frameworks as a factor in guaranteeing high-quality, equitable, and accessible education, including (UNESCO, 2017; World Bank, 2015; Salamanca, 1994; EFA, 2000, SDG 4).

Academic achievement is defined by frameworks like the Salamanca 1994 Framework, which takes both success in the classroom and outside of it into account (Suleymanov, 2014). Research has indicated that while evaluating academic performance in schools may be done with ease using grades and test scores, evaluating success outside of school is more difficult because there are no systems in place for follow-up (Dessesmontet et al, 2012).

Empirical evidence has revealed that most times academic achievement of regular learners is higher than those of learners with special educational needs when placed in inclusive educational setting and this is true at all levels of education (Ekeh & Oladayo, 2013, Farrel et al, 2007, Dyson, 2006). They pointed out that if obstacles to instruction are removed and students with special needs receive the necessary support services and attention, their academic performance may match or exceed that of typical students in the same classroom (Ekeh & Oladayo, 2015).

Additionally, studies reveal that students with special needs who participate in inclusion programs achieve better academic goals than students who do not (Ekeh & Oladayo, 2015; Szumski et al, 2017). According to studies conducted by Ekeh and Oladayo (2015) and Dessemontet et al. (2012), regular students in inclusive schools achieved better academically than regular students in non-inclusive schools. According to this research, students who were raised in inclusive classes performed better academically than students who were reared in non-inclusive classrooms.

All of the mentioned studies, however, used inclusionary primary school students as opposed to those in normal primary schools. There are not enough studies on learners' performance in secondary education. Thus, in light of the physical learning environment, the current study will

examine the academic achievement of students in Northern Ugandan secondary schools who have special educational requirements and those who do not.

The Relationship between Physical Learning Environment and Academic Achievement of Learners in Inclusion

Many research studies have examined the relationship between students' academic performance in regular schools and their physical learning environment (Kagoda, 2011; Duruji et al, 2014; Kigenyi, Kakuru & Ziwa, 2017; Wolf, Barry & Fraiser, 2007). Some of these studies have found a strong positive relationship between academic performance and physical learning environment (Kigenyi et al, 2017), while others have found a moderate but statistically significant relationship between academic achievement and physical learning environment (Kagoda, 2011; Kamarruddin et,al, 2009). Wolf et al. (2007) found that students' academic progress in schools was predicted by their physical learning environment. Whereas these studies produce outstanding findings most of them had incredibly big sample sizes (wolf et al, 2007; Duruji et al, 2014) and all of them were conducted in regular schools with emphasis on physical learning environment and academic achievement.

Similar studies have also been carried out in inclusive schools, focusing on the relationship between the physical learning environment and the academic achievement of all students (Ackah-Jnr, 2016; Ackah-Jnr &Danso, 2019; Gietz &McIntosh, 2014; Hewett et al, 2017; Blecker & Boakes, 2010; Ezike, 2018). The findings of these studies demonstrate a strong statistically significant relationship between academic achievement and the physical learning environment, with classrooms, ventilation, restrooms, play areas, desks, changing rooms, and clean water sources being among the physical infrastructure.

However, most of these studies were conducted using mixed method (Ackah-Jnr, 2016; Ackah-Jnr & Danso, 2019) while some studies relied on teacher's perception of the quality of the physical learning environment (Blecker & Boakes, 2010) and some were qualitative in nature (Hewett et al, 2017). The current study is purely quantitative in nature with a reasonable sample size of 309 respondents consisting of both learners and teachers on their perception of the school physical learning environment and how it related to academic achievement of all learners in inclusion. Based on this approach our study may yield unique findings that will contribute to the conversation.

- H01: There is no relationship between Physical Learning environment (Accessibility, appropriateness and suitability) and academic achievement of learners in inclusion.

METHOD

Participants and Procedures

The study used cross-sectional survey research design to collect data from all-inclusive secondary schools from three Districts of Northern Uganda (Gulu, Lira and Arua). The sample comprised of 309 students (61.8% males; 38.2% females) with 63.8% learners with disabilities and 36.2% without disabilities. Regarding the nature of disabilities, 18.8% of the participants were visually impaired, 17.2% were physically impaired, 13.6% hearing impaired, 4.5% were deaf, 5.7% were blind and 4.0% were mentally retarded. These participants were included in the study based on the following criteria's;(i) all learners with disabilities in the school were included in the study, (2) Regular learners who are close friends with those with disabilities or their attendants and (3) Learners from all- inclusive secondary schools. The all –inclusive schools are those secondary

schools with annexes of special needs and they are regionally established by the ministry of education and sport for instance, Gulu High secondary school in Northern Uganda, Nancy secondary school in Lango sub-region and Nvara secondary school in West Nile region. Data was collected from those who met the above criteria with permission from the district education officer, school administration and active involvement of the department of special needs and inclusive education in the selected school.

Instruments and Measurements

Physical learning environment was measured using the Basic requirement and minimum standard monitoring tool (BRMS) developed by the ministry of education and sports (MOES, 2001). The tool consisted of (18) items measuring Physical learning environment. With (7) items measuring accessibility of the physical learning environment, (6) items measuring the suitability of the physical learning environment of the school and (5) items measuring appropriateness of the physical learning environment in the inclusive schools. The items were scored on a five-point likert scale ranging from 1=strongly disagree to 5=strongly agree. We asked questions such as; an area or space that is appropriate for all learners exist, the school buildings (Dormitories, class, toilet, offices, staffroom) are ramped making it easily accessible for all learners, and the physical environment is suitable for all learners including those with disabilities. The questionnaire was reliable for the current study, with acceptable internal consistency (α =0.89).

Academic achievement was measured using the inclusion index tool (Azorin& Ainscow, 2020). The tool consisted of (61) items; with (16) items measuring academic achievement of learners in inclusion while the remaining items measured other aspects of the inclusion matrix (Access, presence and participation). The items were scored on a five-point likert scale ranging from 1=strongly disagree to 5=strongly agree. We asked questions such as; what grade did you obtain in the recent assessment, what was your position in the class in the most recent assessment. The instrument revealed a strong internal consistency of (α=0.97) for the (16) items measuring academic achievement.

Procedures

After ascertaining the suitability of the tools, we embarked on recruitment of research assistant for the study. Through a rigorous and transparent process, we recruited research assistants who were graduates grounded in English, knowledge of inclusive education and from the indigenous population. We also included all the teachers in the special needs annex of the inclusive school, a department responsible for handling special issues. These research assistants were trained on the basics of the questionnaire administration processes, handling of respondents and interviewing techniques. The research assistants were trained to administer the questionnaire within 45-50 minutes.

Ethical Consideration

As a general requirement for graduate research, our proposal was submitted to Gulu University research and ethics committee (GUREC) an affiliate to Uganda National council of science and technology (UNCST) a body that oversees all scientific investigations in Uganda. After successfully defending the proposal, approval was granted to collect data (Protocol no. GUREC-2023-523). Subsequently written informed consent and assent forms were developed for all the respondents. Refreshments were served to all respondents and a moderate transport refund of 10,000shs was given to respondents. We also employed a counsellor and a nurse who were on

standby just in case a learner broke down during data collection. We catered for confidentiality, access, voluntary participation and protected respondents from bodily harm.

DATA ANALYSIS

The study used Pearson product moment correlation coefficient was used to measure the relationship between physical learning environment and academic achievement of learners in inclusion. Linear and multiple regression analysis were also run to ascertain the degree of predictability of study variables. In this study all our statistical analyses were run using IBM SPSS statistical software, version 25.0. Associations between variable with a $p < 0.05$ were considered statistically significant.

RESULTS

Results of the analysis shows that there is a moderate positive statistically significant relationship between physical learning environment and academic achievement of all learners in inclusion (r=. 452, p<0.01) with all the constructs of physical learning environment showing a positive statistically significant relationship with learners' academic achievement, Accessibility of physical learning environment (r=. 431, p<0.01), Suitability of physical learning environment (r=. 410, p<0.01) and Appropriateness of physical learning environment (r=.335, p<0.01). We therefore reject the Null hypothesis and state that there is a positive statistically significant relationship between physical learning environment and academic achievement of learners in inclusion in secondary education in Uganda. Implying that the physical learning environment is an important determinant of learner's academic achievement in inclusion in secondary education in Uganda.

Results of multiple regression analysis show that 27% of learner's academic achievement is determined by the physical learning environment and the other 73% was determined by other unknown factors. The model also shows that Accessibility of the physical learning environment (p<0.05) and suitability of the physical learning environment (p<0.05) are the only statistically significant predictors of academic achievement of learners in inclusion. Implying therefore that interventions should emphasize the accessibility and suitability of the physical learning environment in order to enhance learner's academic achievement. Results also show normal p-p plots for physical learning environment and a detrended normal p-p plot for learner's academic achievement implying that parametric tests were desirable for the data processing.

Table 1.0

		Achievement for all learners	Physical environment	Accessibility	Suitability	Appropriateness
Achievement for all learners	Pearson Correlation	1	.452**	.431**	.410**	.335**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	309	309	309	309	309
Physical environment	Pearson Correlation	.452**	1	.860**	.881**	.864**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	309	309	309	309	309
Accessibility	Pearson Correlation	.431**	.860**	1	.634**	.595**
	Sig. (2-tailed)	.000	.000		.000	.000

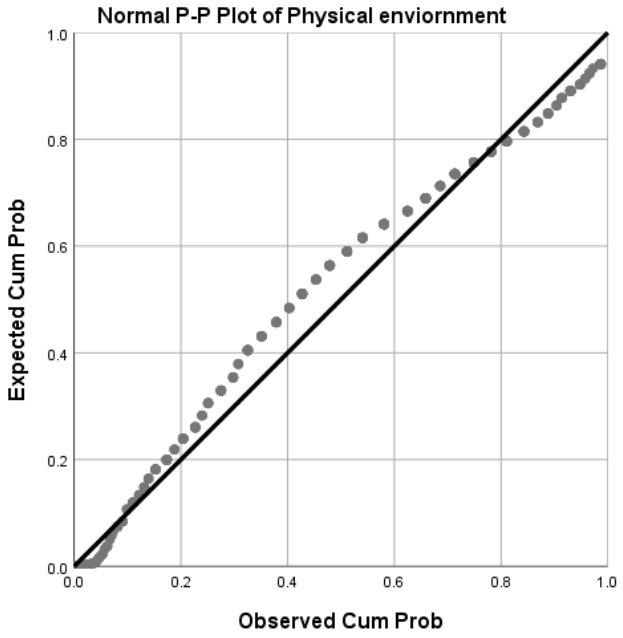
	N	309	309	309	309	309
Suitability	Pearson Correlation	.410**	.881**	.634**	1	.662**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	309	309	309	309	309
Appropriateness	Pearson Correlation	.335**	.864**	.595**	.662**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	309	309	309	309	309
**. Correlation is significant at the 0.01 level (2-tailed).						

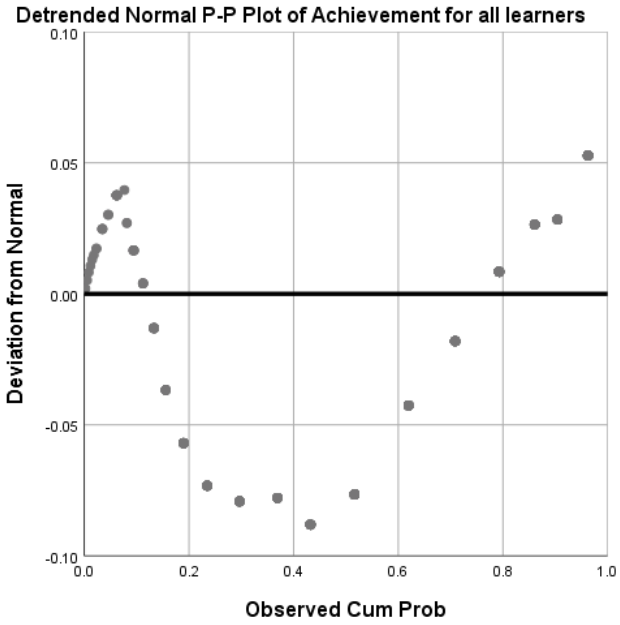
Table 2.0

		Achievement for all learners	Physical environment
Achievement for all learners	Pearson Correlation	1	.452**
	Sig. (2-tailed)		.000
	N	309	309
Physical environment	Pearson Correlation	.452**	1
	Sig. (2-tailed)	.000	
	N	309	309
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 3.0

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	22.242	1.722		12.915	.000
	Accessibility	.256	.063	.277	4.039	.000
	Suitability	.206	.070	.217	2.937	.004
	Appropriateness	.026	.068	.027	.377	.706
a. Dependent Variable : Achievement for all learners						





DISCUSSION

The study assessed the relationship between Physical learning environment and academic achievement of all learners in inclusive secondary education in Uganda. It has been suggested that Physical learning environment is a fundamental determinant of academic achievement of learners in inclusive secondary education (Ezike, 2018; Madudili, 2021). In this study we argue that Physical learning environment is an important determinant of Academic achievement for learners in inclusion. We noted that the accessibility, suitability and appropriateness of the physical learning environment was an antecedent to enhanced academic achievement of all learners in inclusion.

We hypothesized that there was no relationship between the physical learning environment and academic achievement of learners in inclusion. Results however showed that there was appositive statistically significant relationship between physical learning environment and academic achievement of all learners. We therefore rejected our Null hypothesis and accepted the alternative, which states that there is a positive statistically significant relationship between physical learning environment and academic achievement of all learners in inclusion. This finding is in agreement with a study by (Kigenyi et al, 2017, Kagoda 2011, Ucci, et al, 2015) who noted that the success of learners in any academic task depended on the quality of the physical learning environment of the school especially how the classrooms are organized, the availability of teaching learning aid and ventilation.

Results from the multiple regression analysis showed that accessibility of the physical learning environment and suitability of the physical learning environment were the most statistically significant predictors of academic achievement of learners in inclusion. This result is supported by studies by (Ackah-Jnr &Danso, 2019;Kamarrudin et al, 2009) who emphasized that learners academic achievement especially in inclusive setting depended heavily on the accessibility of the physical learning environment in terms of availability of ramps, toilets with enough stances, water source in school and classroom arrangement, similarly s study by (Hewett et, al, 2017;Evanita, 2021) noted that a suitable and appropriate physical learning environment was fundamental to academic achievement of all learners including those with special educational need.

LIMITATION

The study was conducted in inclusive secondary schools in three districts in Uganda (Gulu, Lira, Arua). We suspect that the government had invested heavily on improving the quality of learning environment in these schools given that it accommodates both learners with and without special educational needs. We believe that if the study was conducted in non-inclusive setting may be results would be different, therefore future studies should consider the physical learning environment of non-inclusive schools. Secondly being a cross-sectional study, the associated weaknesses of a cross-sectional study might have affected the findings of this study.

CONCLUSION

Results have shown that all the facets of physical learning environment (Accessibility, suitability and appropriateness) are significantly related to learner's academic achievement and most importantly that the accessibility and suitability of the physical learning environment were the most statistically significant predictors of learner's academic achievement. We concluded that physical learning environment is fundamental determinant of academic achievement of learners in inclusive secondary education in Uganda

RECOMMENDATION

Secondary school systems should consider the accessibility and suitability of their school physical learning environment in their programming if high academic achievement is to be achieved with keen interest on an inclusive architectural design of the school, classrooms, toilets and wash rooms.

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COMPLIANCE WITH ETHICAL STANDARDS

The Uganda national council for science and technology and Gulu University research and ethics committee approved this research no: (GUREC-2023-523)

CONFLICT OF INTEREST

The authors declare no conflict of interest

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