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Assessing the Effectiveness of Learning Environments Within the Context of Inclusive Education Practices in Higher Education Teacher Training Colleges in Cameroon

Isabela Nchou Kum (PhD Scholar) , Lilian Fai Wiysahnyuy (Associate Professor), Nubonyin Hilda Fokong (Lecturer)

Department of Teacher Education, Faculty of Education, The University of Bamenda, Cameroon

Corresponding Author:** ***Isabela Nchou Kum (PhD Scholar), *Department of Teacher Education, Faculty of Education, The University of Bamenda, Cameroon.*

Abstract: *This study examined the state of learning environments within the context of inclusive education practices in Cameroon's Higher Teacher Training Colleges (HTTCs), to identify professional development needs and address implementation gaps. Guided by Bronfenbrenner's Ecological Systems Theory, it focused on related components like infrastructure, classroom atmosphere, teacher's attitude and behavior, and collaborative networks. The nested mixed-methods research design was used. Data were collected from 254 student-teachers and 20 lecturers in four HTTCs at the Universities of Yaoundé I, Buea, and Bamenda, selected through purposive and convenience random sampling. Structured questionnaires and semi-structured interviews provided quantitative and qualitative data, analyzed using descriptive and inferential statistics alongside thematic content analysis. Findings reveal that the learning environments in Cameroon's HTTCs is generally inadequate for the effective training of student teachers to implement inclusive practices. The overall mean of 1.93 (derived from a total mean of 19.33 across items) suggests that while there are occasional signs of inclusivity, the learning environment falls short of creating a fully supportive, equitable and accessible learning environment for the implementation of inclusive practices in HTTCs. The study recommends coordinated reforms in policy to upgrade the physical learning environment, a positive change in teacher's attitude towards inclusivity and constant adaptability in infrastructure, a review of resource allocation, adoption of alternative energy sources, strategic partnerships, and periodic facility audits to enhance accessibility and effectiveness.*

Keywords: *Inclusive Education practices, Inclusive Learning Environments, Higher Education, Student-Teachers, and Teacher Training Colleges.*

1. INTRODUCTION

The learning environment plays a central role in shaping the outcomes of inclusive education. It is not limited to physical classroom but also encompasses pedagogical practices, social interactions, institutional culture , and resources availability that collectively determine learner's experiences (Florian, 2015; Loreman 2017)Research underscores that effective inclusive learning environment are those that reduce barriers to participation and achievement by adopting principles of universal design for learning, differentiation, and culturally responsive pedagogy (Ainscow & Miles,2011; Florian & Black – Hawkins,2011) when these elements are embedded into teacher education, future teachers are better equipped to create classrooms that welcome and support all learners.

In higher education, particularly in HTTCs, the learning environment is decisive because it prepares educators who will shape the classroom practices at all school levels. (Florin, 2010; Sharma & Sokol, 2016). A supportive learning environment within HTTCs should therefore model inclusive pedagogy, provide exposure to diverse learners, integrate assistive technologies, and therefore foster attitudes of acceptance and collaboration (Loreman, 2017). However, studies show that many teacher education institutions in Africa continue to rely on traditional methods that are less adaptive to diverse learner needs (Chireshe 2011)

In Cameroon, the implementation of inclusive education has been hindered by systematic challenges including large classroom sizes, limited resources, and insufficient adaptation to curricula to diverse learner's needs (Tchombe, 2010: Ngwa,2014) These shortcomings directly affect the learning

environment in HTTCs, where teacher trainers may not experience practical models of inclusion during training. Consequently, graduates often lack confidence and strategies to implement inclusive practices in their future classrooms (Nwosu, 2017). Strengthening the learning environment in HTTCs is essential as it directly influences teacher trainees' capacity to replicate inclusive approaches in the schools where they will serve.

2. Background And Literature

Inclusive learning environments are essential to meaningful inclusion, offering warm, welcoming spaces that honor diversity and promote both academic success and social interaction (Blanton, 2011). According to Hattie (2009), an inclusive learning environment is defined as an accessible, welcoming, and supportive space that caters to all students, regardless of their abilities, backgrounds, or identities. To create such an environment, it is essential to foster a sense of belonging among all learners, ensuring they feel valued, respected, and fully included in classroom activities. When students with disabilities feel genuinely supported and included, their sense of belonging grows, enhancing their overall classroom experience (Golder, Norwich & Bayliss, 2005). Open dialogue about differences in background, ability, and culture further strengthens student confidence and community. Integrating students with special education needs into mainstream classrooms fosters diversity and boosts social acceptance for all (Griffin, 2007). Teachers play a critical role by acknowledging that diversity includes all learners and adapting instruction to varied backgrounds, values, and learning styles (Guldberg, 2010). Another important aspect of an inclusive learning environment is the physical environment. According to Dell et al. (2017), accessible classroom design including ramps, adjustable desks, and assistive technologies is essential to accommodate students with physical and sensory disabilities. Teacher training programs should equip future educators with the skills to create such barrier-free spaces. Equally important is fostering a classroom culture of respect, empathy, and collaboration. Strategies like cooperative learning, peer tutoring, and social-emotional learning (Johnson & Johnson, 2009) can enhance students' sense of belonging. Integrating these elements into teacher education ensures that future teachers are prepared to build inclusive, supportive classrooms for all learners.

More so, the classroom environment plays a crucial role in shaping learning outcomes, making both academic and emotional support essential (Bucholz & Sheffler, 2009). However, providing this support can be challenging in diverse classrooms, where students vary in language, culture, and socio-economic background (Harvey et. al. 2010). Accurate assessment tools are therefore vital for identifying individual needs and ensuring appropriate support and placement (Lambe & Bones, 2006). An inclusive classroom is intentionally designed to meet the diverse needs of all students, ensuring each learner feels valued, respected, and supported. Key components include physical accessibility, a positive social climate, diverse representation, culturally responsive teaching, regular assessment and feedback, ongoing professional development, family and varied learning styles (UNESCO, 1994). By fostering such environments, teacher training colleges can model inclusive practices and prepare future educators to promote equity and inclusion in their own classrooms.

Nformi (2016), examined how learning environments affect the academic engagement of physically disabled students in Buea. Guided by the social model of disability, the study employed a mixed-method, descriptive case study design involving 32 secondary school students. Data were collected via questionnaires, interviews, observations, and focus groups. Findings showed that while inclusion efforts existed, challenges remained such as limited engagement due to lecture-based teaching, and insufficient time for practicals and exams.

The study recommends sensitization workshops, inclusive sports, and forums to promote awareness and participation of students with disabilities. On their own part, Bechem and Wemba (2019), assessed challenges in implementing inclusive education, focusing on teacher preparedness. Using a descriptive survey design, data were gathered through questionnaires, interviews, and observation checklists from 20 purposively selected teachers in two inclusive schools. Results revealed that 75% lacked classroom management strategies for inclusion, 70% felt unprepared by their training, and most relied on abstract teaching materials. The authors recommend integrating inclusive education into teacher training curricula to equip educators with the skills and attitudes needed to support diverse learners effectively.

Tchiaze et al. (2023),, assessed the availability and effectiveness of human resources teachers, stakeholders, and training programs in supporting inclusive education. Using a mixed-method design (surveys and key informant interviews) grounded in a human rights perspective, the study found diverse actors involved but highlighted weak collaboration and insufficient data on capacities. It recommends institutional frameworks and coordinated stakeholder engagement critical for sustaining inclusive learning environments. Tah (2025),, explored how teachers perceive inclusion and the challenges they face. Through semi-structured Zoom interviews with eight trained teachers, thematic analysis revealed limited understanding (focused on disability and cultural barriers) and key obstacles: policy gaps, weak school structures, inadequate teacher skills, and societal resistance. The study calls for systemic reforms, teacher capacity-building, and policy alignment which all essential for creating truly inclusive classrooms environment.

Fonyuy (2018) examined how students with disabilities perceive inclusive practices in higher education. Grounded in international inclusion frameworks, the study aimed to assess the current state of inclusive education, identify challenges, and propose solutions. Using a case study design and semi-structured interviews with four Special Education undergraduates, thematic analysis revealed that inclusive education fosters social acceptance and reduces stigma. However, major barriers included lack of policy, inadequate resources, and limited teacher training. Suggested improvements include enacting inclusive education policies, training more special needs teachers, raising community awareness, and increasing funding. The study underscores the need for systemic reforms to create truly inclusive learning environments in Cameroonian universities.

Urie Bronfenbrenner's Ecological Systems Theory (1979; 2005) offers a comprehensive framework for understanding how interconnected environmental systems influence human development. The theory outlines five systems that interact to shape learning and behavior: the microsystem, which includes immediate settings like home, classroom, and peer groups; the mesosystem, which represents the connections between different microsystems, such as home–school interactions; the exosystem, comprising external environments that indirectly affect the individual, like school policies or a parent's workplace; the macrosystem, encompassing broader cultural, social, and political influences; and the chronosystem, which highlights the role of time, life transitions, and historical context in development. In education, this model supports the creation of inclusive learning environments by addressing the diverse social, cultural, and economic needs of students across these interconnected systems.

The microsystem, comprising immediate settings like family, classroom, and peers, fosters belonging and engagement when teachers actively include all learners (Bronfenbrenner, 2005). The mesosystem, which links settings such as home and school, supports students through strong parent-teacher collaboration (Deslandes & Bertrand, 2005). The exosystem includes external structures like school policies and community services whose role indirectly influences learners with disabilities (Slee, 2018). The macrosystem encompasses societal values and ideologies that shape inclusive policies, exemplified by global frameworks (UNESCO, 2017). Finally, the chronosystem highlights how individual and systemic changes over time affect development, underscoring the importance of early intervention and sustained support (Rouse & Florian, 2012). The influence of the ecological systems theory on inclusive learning environments is established on Table 1.

Table1. *The Influence of the Ecological Systems Theory on Inclusive Learning Environments*

SN	Tenets of Bronfenbrenner's Ecological Systems Theory	Inclusive Learning Environment
1	**Microsystem** It refers to the immediate environment in which individuals interact, such as homes, classrooms, and peer groups.	In educational settings, the classroom is a microsystem that plays a critical role in shaping students' learning experiences. As such, the classroom as an inclusive learning environment requires educators to make it welcoming, supportive, and free from barriers.
2	**Mesosystem** It represents the interactions between two or more microsystems	In education, the importance of an inclusive collaboration between families, schools, and communities is a Mesosystem which is very essential for creating a cohesive and supportive learning environment for learners (Mapp, 2002).
3	**Exosystem**	The social environmental resources, such as parental

	It refers to external environments that indirectly affect individuals.	workplaces, community resources, and social services are Exosystem that can influence or affect learners' learning. This highlights the need for educators to address systemic barriers that may hinder students' access to learning resources.
4	**Macrosystem** It represents the broader cultural, social, and political context in which individuals live.	Societal attitudes, laws, and policies that shape educational practices are a Macrosystem that affect and influence learning activities in educational institutions. This highlights the need for educators to challenge systemic inequities and advocate for policies that promote diversity and inclusion.
5	**Chronosystem** It refers to the temporal dimension of development, including changes over time and the impact of historical and cultural trends.	Societal trends such as advancements in technology or shifting demographic changes are Chronosystem that may influence learning environments. In inclusive education, the highlights the need for educators to be aware of eventual changes and new development that can be exploited to improve upon the quality of learning.

Source: *Researcher (2025) adapted from Bronfenbrenner's (1979) Ecological Systems Theory*

In conclusion, Bronfenbrenner's (1979) Ecological Systems Theory provides a holistic framework for understanding how multiple, interconnected environmental layers influence human development. By examining the microsystem through the chronosystem, educators and policymakers can better support diverse learners and foster inclusive educational environments. This analysis has shown how each system contributes to inclusivity, using evidence from research and real-world examples. However, the theory does not fully address the intersectionality of race, gender, and disability critical factors in inclusive education. Additionally, while conceptually hearty, the theory's practical application in classrooms remains limited.

3. STATEMENT OF THE PROBLEM

In Cameroon, the higher teacher training colleges (HTTCs) serve as pivotal institutions responsible for preparing teachers who will shape the future of secondary and technical education across the country. However, there is growing concern that these institutions may not be fully equipped to foster genuinely inclusive learning environments that accommodate and support the diverse needs of all trainee teachers.

While Cameroon's national policies underscore the importance of inclusion and equity, there remains a gap between policy intentions and actual practices within the HTTCs .many HTTC campuses face infrastructural limitations such as lack of accessible facilities and inadequate learning resources tailored for students with disabilities (Njoku, 2018). Additionally, teacher educators themselves often lack specialized training in inclusive pedagogical methods, which limits their capacity to model and impact effective inclusive teaching strategies (Tanyi & Kihwele,2021)these challenges are compounded by prevailing socio cultural attitudes towards disability, which sometimes perpetuate stigma and exclusion within educational settings (Fokam,2019).

Furthermore, curricular in HTTCs frequently do not emphasize inclusive education principles in sufficient depth. There is little emphasis on differentiated instruction, universal design for learning, or formative assessment strategies that cater to diverse learner profiles (Mbondo & Dzekem, 2022), and this curricular gap undermines efforts to prepare future teachers capable of meeting the varied needs of learners in Cameroon increasingly diverse classrooms. Despite the critical role HTTCs pay in the national education system, empirical research assessing the inclusiveness of learning environment is sparse. Existing studies tend to focus on general challenges in teacher education without specifically addressing how HTTCs implement or fail to implement inclusive education (Ngele, 2020) this lack of comprehensive assessment obscures the understanding of specific barriers faced by trainee teachers within HTTCs and inhibits targeted interventions.

Assessing the learning environment of HTTCs through the lens of inclusivity is therefore essential. Such an assessment will help identify existing gaps in infrastructure, pedagogy, and policy implementation and provide evidence-based recommendations to enhance teacher education practices. By fostering inclusive learning environments, HTTCs can better prepare teachers who are competent, confident, and committed to creating equitable classrooms that uphold the rights and potentials of all learners.

Objectives of the Study

To find out the extent to which the learning environment is significantly suitable for the training of teachers for inclusive education practices in selected higher teacher training colleges in Cameroon.

Research Question

To what extent is the learning environment in Cameroon's higher teacher training colleges significantly suitable to train student teachers to implement inclusive practices?

Research hypothesis

Ha: The learning environment in Cameroon's higher teacher training colleges is significantly suitable to train student teachers to implement inclusive practices

Ho: The learning environment in Cameroon higher teacher training colleges is not significantly suitable to train student teachers to implement inclusive practices

4. RESEARCH METHODOLOGY

The study employed a nested mixed methods design and integrated quantitative and qualitative data from a sample of 254 student teachers and 20 lecturers drawn from four HTTCs across the Universities of Yaoundé I, Buea, and Bamenda. The student teachers and their trainees were both male and female and of different age groups. (ages ranged between 25 and 65). The trainers were also of varied grades.

Sampling techniques combined purposive and convenience sampling methods to select the state universities and student teachers. The researcher could easily have access to students in The University of Bamenda. While the University of Yaoundé 1 was considered because it is the oldest teacher training college and has both French speaking and English speaking student teachers and trainers. The University of Buea was chosen because of its Anglo-Saxon nature and because of the technical training aspect of students. The researcher wanted to gauge the aspect of inclusive practices not only in general education training but equally in the training of teachers for technical education. Data were collected through structured questionnaires and semi-structured interviews between the 15th and 22nd of December 2024 and analyzed using both descriptive and inferential statistics, as well as thematic content analysis.

Quantitative data was collected first to estimate key relationships between constructs such as physical learning environment, classroom atmosphere, teacher's attitude and behavior, culturally responsive communication and infrastructure, These results were then explained and conxtualized through qualitative interviews. The questionnaire comprised two sections. Section A was demographic information while section B comprised 10 items structured on a four point Likert scale, requiring the respondents to choose either of the following options: Strongly agree (SA), Agree (A), Disagree (D) of Strongly Disagree (SD).The questionnaires were then translated into French to mitigate any issue of language barrier. In addition, interviews were collected with the aid of an interview guide made up of 5 semi structured questions pertaining to the variables. Quantitative data was analyzed with descriptive statistics and inferential tests (t- test, ANOVAs, correlation and regression where appropriate). Qualitative data were thematically analyzed, categorized by domain, central themes, code descriptions, frequency (grounding), and illustrative quotes. Integration occurred at the interpretation stage, where qualitative insights clarified quantitative patterns and supported triangulation. Ethical safeguards included informed consent, confidentiality and institutional approval.to evaluate the internal consistency and reliability of the instruments, the interpretation scale for Cronbachs Alpha values as outlined by George & Mallery (2003) was used, The scale is as follows: $\alpha \geq 0.90$ indicates excellent reliability; $0.80 \leq \alpha < 0.90$ is considered good; $0.70 \leq \alpha < 0.80$ is acceptable; $0.60 \leq \alpha < 0.70$ is questionable; $0.50 \leq \alpha < 0.60$ is poor; and $\alpha < 0.50$ is regarded as unacceptable. The reliability Cronbach,s Alpha coefficient wasn0.71 which indicates the reliability level as good and reliable, thus the learning environment is a trustworthy indicator of inclusive practices in HTTCs in Cameroon.

Presentation of Findings

Findings are presented by the research question, integrating quantitative and qualitative results.

Quantitative Findings

Research Question: To what extent is the Learning Environment in Cameroon's Higher Teacher Training Colleges significantly suitable for the training of student teachers for inclusive education practices?

Table2. *Inclusive Learning Environment and the Training of Student Teachers in Higher Teacher Training Colleges*

S/N	Statement	SA	A	D	SD	SA/A	SD/D	Mean	Std Dev
1	I feel safe in my learning environment	23	37	109	85	60	194	1.99	.920
2	The classrooms are physically accessible to all students	21	38	116	79	59	195	2.00	.891
3	My lecturers always address any instance of discrimination or bias in the classroom	29	60	100	65	89	165	2.21	.953
4	My classroom setting fosters collaboration among students of various backgrounds	11	28	125	90	39	215	1.84	.784
5	My contributions in class are always valued and acknowledged	13	23	140	78	36	218	1.89	.769
6	Our classroom discussions encourage diverse view points	6	17	120	111	23	231	1.68	.704
7	Every student has equal opportunities to participate during lessons	9	14	95	136	23	231	1.59	.753
8	Our school facilities such as toilets, sports complexes, libraries etc, are accessible to every student	22	31	114	87	53	201	1.95	.901
9	The pathways on the campus are do not pose any movement challenges	22	43	106	83	65	189	2.02	.920
10	The classroom atmosphere is always relaxed	28	44	123	59	72	182	2.17	.918
Overall Mean of Responses (Out of 40)								19.33	4.624

The analysis on the table 2 shows that the learning environment in Higher Teacher Training Colleges (HTTCs) in Cameroon is generally inadequate for the effective drilling of student teachers in inclusive practices. The overall mean score of 1.93 (derived from the total mean of 19.33 across ten items) suggests that while there are occasional signs of inclusivity, the learning environment falls short of creating a fully supportive, equitable, and accessible space for all student teachers. Most items recorded mean scores below 2.1, reflecting that students perceive a lack of consistent effort in fostering inclusivity within their academic settings. For example, Statements 6 and 7, regarding encouragement of diverse viewpoints and equal participation, recorded some of the lowest mean scores of 1.68 and 1.59, respectively, indicating a significant deficiency in promoting student voice and equitable classroom engagement.

Physical accessibility remains a critical concern, as evidenced by Statements 2 and 8 with means of 2.00 and 1.95 respectively. These scores imply that while some classrooms and school facilities may be accessible, many students likely still face barriers due to physical infrastructure that does not accommodate all learners, especially those with mobility challenges. The pathways on campus (Statement 9) scored slightly higher at 2.02, but this still reflects only moderate satisfaction with accessibility. A truly inclusive environment should guarantee ease of movement and use of facilities for every student, regardless of physical ability. The affective and psychological components of the learning environment also reflect inclusivity gaps. For instance, while the feeling of safety (Statement 1, mean = 1.99) and a relaxed classroom atmosphere (Statement 10, mean = 2.17) received slightly better ratings, these are still not high enough to suggest widespread student comfort. Moreover, the consistently low rating of classroom discussions encouraging diverse viewpoints (Statement 6) and valuing contributions (Statement 5, mean = 1.89) suggest that many student teachers do not feel heard, appreciated, or empowered to express their thoughts freely, elements that are essential to fostering inclusive thinking and behavior.

Another key observation is the weak classroom collaboration across backgrounds (Statement 4, mean = 1.84) and the poor handling of discrimination or bias (Statement 23, mean = 2.21). Although the

latter scored relatively higher, indicating that some lecturers are taking steps to address bias, the variation in standard deviations reflects inconsistency. Not all student teachers experience the same degree of inclusivity, which points to a lack of institutional uniformity in how inclusive values are modeled and maintained across classrooms.

Ho: Inclusive Learning Environments are not significantly suitable in the training of student teachers in higher teacher training colleges in Cameroon.

Ha: Inclusive Learning Environments are significantly suitable in the training of student teachers in higher teacher training colleges in Cameroon.

Table3. *One-Sample Statistics for Hypothesis*

	N	Mean	Std. Deviation	Std. Error Mean
Inclusive learning environment	254	19.33	4.624	.290

According table 3, the mean score for inclusive learning environments as reported by 254 student teachers is 19.33, with a standard deviation of 4.624 and a standard error mean of 0.290. This mean is notably lower than the expected score of 25, suggesting that the perceived suitability of inclusive learning environments falls short of the ideal level. This preliminary insight points to potential inadequacies in how inclusive learning spaces are currently structured and implemented in these institutions.

Table4. *One Sample t-test on Inclusive Learning Environment and the Training of Student Teachers in Higher Teacher Training Colleges*

	Test Value = 25					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Inclusive learning environment	-19.525	253	.000	-5.665	-6.24	-5.09

Table 4 presents the findings of a one-sample t-test, comparing the observed mean of 19.33 to the test value of 25. The test produced a t-value of -19.525 with 253 degrees of freedom and a significance level (p-value) of .000, which is well below the conventional alpha level of 0.05. The mean difference is -5.665, and the 95% confidence interval ranges from -6.24 to -5.09, a range that does not include zero. This confirms a statistically significant difference between the observed and expected values. Given these results, we reject the null hypothesis (Ho) and accept the alternative hypothesis (Ha). This indicates that the extent to which inclusive learning environments are suitable is statistically significant, but the direction of the difference highlights a negative gap from the desired standard.

The Qualitative Findings

Table5. *Thematic Content Analysis Table: Inclusive Learning Environment*

Questions	Categories	Themes	Code Description	Grounding	Sample Responses
How does your work environment (physical and classroom learning environment) support inclusive practices?	Work Environment	Current inclusive practices	Fosters sense of belonging encourages diverse learning styles, and promotes integration of all learners	Majority	"...It work environment to have a sense of belonging to the inclusive learners. It encourages diverse learning skills and integration..."
Any suggestions on how to make your working environment more inclusive?	Work Environment perspectives	Improvement needs	Need for accessible infrastructure Need for updated technology adequate teaching aids, and modernized classrooms	Almost all	"...Improve on technology, accessible walkways for disabled students, provide teaching aids and update the classrooms..."

The findings indicate that the majority of respondents recognize their current work environments as supportive of inclusive practices by fostering a sense of belonging, encouraging diverse learning

styles, and promoting the integration of all learners. This reflects an awareness of the fundamental elements required to nurture inclusivity in educational spaces. However, almost all participants also highlighted critical areas for improvement, notably the need for accessible infrastructure, updated technological tools, adequate teaching aids, and modernized classrooms. These suggestions underscore a collective recognition that while foundational efforts toward inclusivity exist, substantial enhancements are still necessary to fully accommodate diverse learner needs and ensure a truly inclusive and equitable learning environment.

5. Discussion of Findings

The quantitative analysis from student-teachers responses reveal that the learning environments in Cameroon's Higher Teacher Training Colleges (HTTCs) are significantly inadequate for fostering inclusive education. With an overall mean score of 1.93 well below the expected midpoint, the findings indicate that student teachers perceive their academic settings as insufficiently supportive, equitable, or accessible. Low scores in areas such as the encouragement of diverse viewpoints, equal participation, and classroom collaboration across backgrounds highlight a lack of psychological safety and inclusive discourse. Physical accessibility is also a concern, with key indicators like classroom infrastructure and pathways scoring poorly, pointing to structural barriers for students with physical challenges. While marginally higher scores on affective factors such as classroom atmosphere and handling of bias suggest that some inclusivity efforts exist, the wide variation in responses reflects inconsistencies across institutions. The data, therefore, support the rejection of the null hypothesis (Ho) in favor of the alternative (Ha), confirming that although the learning environment's inclusivity is statistically significant, it remains substantially below acceptable standards. These results underscore the urgent need for systemic reforms aimed at creating consistently inclusive, accessible, and empowering environments in teacher training institutions.

The qualitative findings from teachers' responses reveal a general perception that their current work environments demonstrate initial efforts toward inclusivity, particularly through fostering a sense of belonging, accommodating diverse learning styles, and integrating all learners. These reflect a foundational awareness of inclusive principles. However, respondents consistently pointed to key limitations especially inadequate infrastructure, outdated technology, insufficient teaching aids, and poorly equipped classrooms as major obstacles. This highlights a clear gap between inclusive awareness and actual implementation capacity. While the intent to support inclusive education is evident, the current environments lack the material and structural support necessary to fully meet diverse learner needs, underscoring the urgency for systemic improvements.

The quantitative and qualitative findings collectively reveal a pronounced gap between the recognition of inclusive education principles and their practical implementation within Cameroon's HTTCs. Quantitative data from student-teachers highlight significant deficiencies in inclusive learning environments, and notably low scores in areas critical to psychological safety and participation. These findings point to widespread structural and pedagogical barriers, particularly for marginalized learners. Complementing this, qualitative responses from teachers acknowledge emerging inclusive practices such as fostering belonging and accommodating diverse learning styles. However, they also expose persistent material and infrastructural shortcomings such as outdated facilities and insufficient teaching aids that hinder effective implementation. The comparison reveals that while inclusive intent exists at both trainee and practitioner levels, actualization is severely limited by systemic and resource-based constraints, reinforcing the need for coordinated reforms in policy, infrastructure, and teacher preparation.

The current findings align with some existing literature on inclusive education in Cameroon's teacher training institutions. Nformi (2016) similarly identifies the persistent mismatch between inclusive policy frameworks and the lived realities in Cameroon schools, highlighting inadequate infrastructure and limited accessibility as critical impediments to effective practice. Tchiaze et al. (2023) reinforce this by demonstrating that despite growing awareness of inclusive pedagogical principles among pre-service and in-service teachers, structural constraints such as poorly equipped classrooms and insufficient assistive technologies continue to marginalize learners with diverse needs. Tah (2025) further emphasizes that inclusive education in Cameroon remains largely aspirational, constrained by a lack of systemic coordination, insufficient teacher training in inclusive strategies, and weak

institutional accountability. Fonyuy (2018) adds that while some efforts have been made to promote inclusive classroom climates, these are undermined by resource scarcity, limited stakeholder collaboration, and inconsistent implementation across regions. Collectively, these studies confirm that the observed gap between inclusive ideals and their realization in HTTCs is not isolated, but rather a deeply embedded issue requiring comprehensive reforms in infrastructure, policy enforcement, and professional development.

Interpreted through Bronfenbrenner's Ecological Systems Theory (1979), the findings reveal that limited implementation of inclusive learning environment in Cameroon's HTTCs stems from failures across interconnected systems. Low student-teacher ratings reflect microsystem and mesosystem issues like unsupportive classrooms and weak engagement. Teachers highlight exosystem and macrosystem barriers, such as poor infrastructure, inadequate teaching aids, and policy gaps. Despite positive intentions, the absence of systemic coherence hinders progress. The study calls for coordinated reforms across all ecological layers resources, policies, and training to enable effective inclusive practices in a learning environment.

6. CONCLUSION

The assessment of the effectiveness of learning environments within the context of inclusive education practices in Cameroon's HTTCs highlights the critical role these institutions play in shaping the future of inclusive education. As centers responsible for preparing educators, HTTCs must create learning spaces that foster equity, accessibility and participation for all learners. The findings reveals that the effectiveness of inclusive learning environments depends not only on physical infrastructure but also on pedagogical practices, teacher attitudes and behavior, and institutional policies that support diversity and inclusion. While progress has been made, challenges such as inadequate resources, limited specialized training and societal attitudes toward disability and diversity continue to hinder the full implementation of inclusive education practices in the learning environment. To advance inclusive education in Cameroon, HTTCs must strengthen their commitment to creating enabling environments through targeted reforms ,investment in infrastructure and inclusive teaching materials, continuous professional development, and the promotion of collaborative learning cultures.by prioritizing inclusivity at the level of teacher training , Cameroon can empower educators to become agents of change who ensure that the learning environments reflect the principles of equity and social justice. Ultimately, effective inclusive learning environments in HTTCs will not only improve the quality of teacher preparation but also contribute to building a more inclusive society where every learner has the opportunity to thrive.

Additionally, there is a need for Cameroon's HTTCs to initiate formal strategic partnerships with national and international institutions specializing in the promotion of inclusive education such as schools for the deaf and blind, inclusive education NGOs, rehabilitation centers, and special education departments. This will enable HTTCs equip future teachers with the expertise, resources and field experience needed for inclusive classrooms. These collaborations should be well-structured, and embedded into institutional planning and national education reform. Also, HTTCs should adopt national and international for inclusive facilities, ensuring accessibility for students with physical, visual, auditory and other impairments. This includes ramps, tactile paving, wide doorways, accessible toilets and elevators. Inclusive infrastructure should be a budget priority just like the adoption of alternative energy sources like solar panels and other green energy sources to ensure uninterrupted power supply for lighting, The Ministry of Higher Education should equally mandate periodic audits to assess the physical state and standard accessibility of facilities. Findings should guide a scheduled maintenance and upgrade plan. Institutions should also lobby for government subvention or partnership funding to support the renovation and maintenance of inclusive environments.

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AUTHOR'S BIOGRAPHIES

Isabela Nchou Kum is a PhD Scholar at the Faculty of Education at the University of Bamenda, Cameroon. She is also a High School English Language Teacher and an Assisting Teacher Trainer. She has had a wide range of experience in teaching for over two decades. She is passionate about improving pre-service teachers' professional skills.

Prof. Fai Lilian Wiysahnyuy is a holder of a PhD in Educational Psychology and an Associate Professor (AP) of Educational and Counseling Psychology. She is currently the chair of the Department of Educational Leadership in the Faculty of Education, and a teacher trainer at the Higher Teacher Training College, The University of Bamenda, Cameroon.

Contact-+237674988743

Email:fai_lilian@yahoo.com /faililianwiysahnyuy@yahoo.com

Dr Nubonyin Hilda Fokong is a Lecturer at the Faculty of Education in The University of Bamenda, Cameroon. She is currently Head of Department of Physical Education and Animation. Her research interests focus on Innovations in Education and Professional Development of teachers.

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