CLASSROOM DESIGN AND LEARNING ENVIRONMENT AS PREDICTORS OF PRE-SERVICE TEACHERS' PERFORMANCE IN FINE AND APPLIED ARTS IN COLLEGES OF EDUCATION IN SOUTHWESTERN NIGERIA

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ABSTRACT

Fine and applied arts provide the aesthetic and non-aesthetic necessities that enrich individuals' quality of life. In recent times, the persistent students' poor performance in the subject has been attributed to inadequate facilities, use of traditional classrooms and inappropriately designed learning environment in schools and institutions where teachers are being prepared. Researchers have focused on improved methodology and classroom practices but not on classroom and learning environment for teaching the subject. There is also a dearth of studies on influence of classroom design and learning environment on students' performance in fine and applied arts. Most of the studies do not provide standardized classroom design and learning environment guidelines that could improve students' performance in fine and applied arts. This study, therefore, determined the extent to which classroom design variables (spatial configuration, visual effects, thermal condition, acoustics factor, facilities and equipment) and learning environment variables (students' perception, seats arrangement and class size) predicted pre-service teachers' performance in fine and applied arts in colleges of education in Southwestern Nigeria.

The study adopted the descriptive survey design. Two hundred and fifty final year fine and applied arts pre-service teachers and 70 lecturers selected through stratified random sampling technique participated in the study. They were drawn from 10 colleges of education purposively selected from Southwestern Nigeria. Instruments used were: Teachers' Classroom Design Checklist, Teachers' Classroom Acoustics Design Questionnaire (r=0.84), Lecturers Inventory for Facilities, Equipment and Materials, Learning Environment Questionnaire (r=0.81) and Teachers' Fine and Applied Arts Performance Test (r=0.84). Nine research questions were answered and eight hypotheses tested at $p<.05$. Data were analysed using Pearson's product moment correlation and multiple regression.

The eight classroom design and learning environment variables taken together, have significant correlation with pre-service teachers' performance in fine and applied arts ($R=.407; F_{(8,249)} =5.99; p<.05$).They explained 13.8% of the variance in the dependent variable. The two factors that predicted pre-service teachers' performance in fine and applied arts are facilities and equipment ($\beta=1.088; t=4.43; p<.05$) and seats arrangement ($\beta =3.76; t=-3.19; p<.05$). The five classroom design variables (spatial configuration, visual effects,

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thermal condition, acoustics factor, facilities and equipment) significantly correlated (R=.335; $F_{(5, 244)}$ = 7.03; p<.05) with pre-service teachers' performance in fine and applied arts and explained 10.8% of the variance in the dependent variable. The three learning environment variables (students' perception, seats arrangement and class size) correlated significantly (R=.23;$F_{(3,249)}$=6.11;p<.05) with performance in fine and applied arts and 5.8% of the variance was due to the three factors. Seats arrangement had the highest relative contribution (β=.21). Out of the eight factors, four had significant relationships with the dependent variable. These are: acoustic factor (r= .154;p<.05), facilities and equipment (r= .284p<.05), students' perception (r=.147;p<.05) and seats arrangement(r=-.222;p<.05).

Facilities and equipment as well as seats arrangement predicted pre-service teachers' performance in fine and applied arts. Hence, the use of adequately designed classroom and appropriate learning environment has become necessary. Therefore, appropriately designed art classrooms and relevant facilities should be provided to enhance performance in fine and applied arts in Nigerian colleges of education.

Key words: Classroom design, Learning environment, Pre-service teachers' performance, Fine and applied arts, Colleges of education

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DEDICATION

This work is dedicated to Taiwo, Aramide, Feyisara

and

Late Madam Regina AmokeOlaleye (Moomi)

who sacrificed so much to educate her children

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Emmanuel Olumuyiwa OLALEYE

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CERTIFICATION

I certify that this work was carried out by Emmanuel Olumuyiwa OLALEYE in the Department of Teacher Education, University of Ibadan, Ibadan.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

From the global perspective, knowledge, skill and creativity, amongst others, are viewed and considered as basic requirements for a workforce that is necessary for the significant development of individuals and nations. Haddad and Draxler (2002) also view these requirements outside the context of a workforce as necessities for sustaining the educational, political, economic, social and cultural systems of nations. In recent times, however, research, assessment and reports (USAID, 2002; NEPAD/CBC/AR, 2003; Garcia, Ruegenson & Zislin, 2006; UNESCO, 2010; Ofoha, 2011) acknowledge that most disciplines and school subjects which should provide the required skilled workforce lack substantial knowledge, relevant skill and ingenious creativity. In various assessments of this situation, Murning (2006), Olaitan (2007), Dike (2009) and UNESCO (2010) submit that the production of the required skilled workforce would demand a multi-disciplinary balance to knowledge acquisition and skill development process that is supported by considerable creativity from various human endeavours and disciplines. This submission attempts to de-emphasize the over-reliance on some subjects in the Pure, Physical and the Social Science that is prevalent in Nigeria's current educational system.

To correct this situation, Matsuura (2008) and Ofoha (2011) advocate that students should learn technical and vocational education subjects like Fine and Applied Arts, Home Economics, Metal Works, Auto-mechanics and so on. This supports the position of Mohammad and Bassam (2009), who are of the opinion that the subjects would not only help the students to develop their creative thinking and mental capabilities, but also assist them to realise their full potential and contribute meaningfully to national development. The purpose of vocational education, as Aina (2009) enunciates, is to provide its recipients with the basic knowledge and practical skills needed for entry into the world of work as employers of labour or as self-employed. In order to realise the objectives of vocational education Dike (2009) emphasizes the need to establish good Vocational Education departments and technical institutions, that will provide the required training and impact the necessary skills leading to the production of artists, craftsmen, technicians, artisans and other skilled personnel who will become enterpreneurs and promote self-reliant personnels. The United Nations Educational Scientific and Cultural

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Organization (UNESCO, 2010) also notes that revitalizing Vocational Education sector and providing adequate training, facilities and learning environment will go a long way to improve the economic opportunites for individuals and nations. It is against this background that Ofoha (2011) prescribes the recognition of Vocational and Technical Education (VTE) at all the levels of education, especially at the Senior Secondary School (SSS) level, as the key to achieving economic empowerment and national development.

From the foregoing and deducing from the report of USAID (2002), Matsuura's (2008) submission and the position of Mohammad and Bassam (2009), Aig-Imokhuede (2009) and Filani (2009) opine that, since the basic requirements for a skilled workforce which include knowledge, skill and creativity, are almost the same rudimentary prerequisites for the study of Fine and Applied Arts, the expectation is that students who study this discipline would be suitably equipped to contribute to the desired workforce. According to Sieber (1982), Fine and Applied Arts apart from providing students with desirable skills and tools required for a veritable workforce, it also provides aesthetic and non–aesthetic necessities that enrichthe quality of life. As an area of human endeavour, Fine and Applied Arts has served humanity from time immemorial, reflecting the ways of life and influencing every sphere of it at different eras andeven more conspicuously, in the contemporary scientific era. Similarly, Oguibe (2004) notes that there exists an inextricable connection between Fine and Applied Arts and society, as it serves as a medium of communication, information, reformation, education and as a means of documenting history and human existence.

In relationship with this observation, Filani (2009) posits that the opportunities Fine and Applied Arts offer in various human endeavours and in the social, material, scientific, technological and creative growth of the individuals and nations are unprecedented. Fine and Applied Arts functions as a creative force in human culture, a catalyst in cultural and industrial development and a means of empowering individuals economically (Adejumo, 2006). Fine and Applied Arts education provides students with valuable opportunities to experience and build knowledge and skills useful for self-expression, imagination, creative and collaborative problem solving, communication, creation of shared meanings, and respect for self and others (Power & Klopper, 2011). With these skills, the importance and the role Fine and Applied Arts play in the production of a self-sustaining, creative and skilled workforce for self and national development is very crucial.

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(a) The Importance of Fine and Applied Arts in Schools

The importance of Fine and Applied Arts as a school subject and a tool for further educational advancement, promotion of social interaction, national cohesion and cultural preservation is succinctly highlighted in section 1; sub-section 6, in the National Policy on Education (FRN, 2004; p 7). Fine and Applied Arts describes the concept and practice of a type of education that conveys its meaning and knowledge through two and three dimensional forms and covering wide areas of artistic endeavours. The specialising areas of Fine and Applied Arts include drawing, painting, sculpture, textile, ceramics, history, architecture, photography and art education (Bloomeyer & Getty, 1995). Fine and Applied Arts is practised, taught and learnt at the different levels of education in the school system as a double-major course in colleges of education and polytechnics with options of specialisation at the universities (National Universities Commission, 2001; National Board for Technical Education, 2002; National Commission for Colleges of Education, 2009). In section 5, sub-section 24 in the National Policy on Education, Fine Arts is one of the core pre-vocational subjects at the Junior Secondary School (JSS) level, and one of the core vocational electives at the Senior Secondary School (SSS) level (FRN, 2004; p 20).

In order to serve the manpower needs of the secondary schools, the National Commission for Colleges of Education (NCCE) designs and regulates teacher education and teacher preparation programmes of the colleges of education in the training of pre-service teachers in different courses and programmes in Nigeria. In Fine and Applied Arts programme, its philosophy is to provide academic and professional training for pre-service art teachers. It also aims at developing their aesthetic perception, artistic talents and expression as well as stimulating interest in the practical and theoretical areas of Fine and Applied Arts (NCCE, 2009). The objectives of Fine and Applied Arts in colleges of education as stipulated by NCCE are:

- Training professional art teachers to fill the manpower needs of the primary and junior secondary school;
- Equipping and providing the teachers with knowledge, understanding and skills in Fine and Applied Arts;
- Equipping students with necessary knowledge and skills for the promotion of Nigerian and world artistic and cultural heritage;
- Developing in the would-be teachers the ability to communicate effectively through the arts; and

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- Preparing teachers to qualify for and benefit from teacher education at the University level
- Equipping NCE graduates with manipulative skills which will make them self-reliant job creators (p 252).

(b) The Challenges of Teaching Fine and Applied Arts in Colleges and Schools

Despite these objectives of Fine and Applied Arts, its importance and numerous contributions to the development of humanity; and its potential for creative, technological and national development, it is not given a prominent place among other school subjects and courses in the secondary schools and colleges of education. Indoshi, Wagah and Agak (2010) observe this neglect as an emerging phenomenom consequent upon the decline in enrolment, as the subject is being dropped in the curriculum in preference for other school subjects in secondary schools and colleges of education as found in Nigeria, Kenya, Australia, and in some other developing countries of the world.

Klopper and Power (2011) note that, apart from the decline in enrolment and the neglect of the subject, various research and investigations (Adeyanju, Egbedokun & Idowu, 2006; Herbst, 2007 Wiggins & Wiggins, 2008; Alter, Hays & O'Hara, 2009; Ewing, 2010; President's Committee on the Arts & Humanities, 2011) report performance in Fine and Applied Arts as falling short of expectations, not only in Nigerian schools and colleges of education, but also internationally. It isfound that in many instances, pre-service teacher education do not provide adequate preparation to meet the expectations of the Fine and Applied Arts curriculum owing to some factors. The factors include lack of art facilities, lack of equipment, lack of art materials, curriculum deficiencies, poor teacher preparation, government and parents' attitude and wrong methodologies at the different levels of the school system, especially at the college of education.These factors considerably affect the teaching and learning of the subject and are also observed to be responsible for the not too encouraging performance in the subject (Kparevzua, 2002; Anderson, 2003; Eddine, 2005; Akande, 2006; Fadare, 2006; Nkom, 2006;Leung, 2007; Mamza, 2007; Indoshi, Wagah & Agak, 2010; Ofoha, 2011; Rohrer, 2012; Soremi & Sofowora, 2012).

In attempts to solve the students' low level performance in Fine and Applied Arts in schools, Lauglo and Maclean (2005), Tarja (2005) and Bamford (2006) investigated the poor quality of Fine and Applied Arts learning environments of teacher training institutions. Emi (2006), Mamza (2007) and Davis (2008), investigated the quality and availability of facilities and equipment in colleges of education in Nigeria. Sinclair, Jeanneret and O'Toole (2009),

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Wagah (2009)and Ewing (2010) examined the quality of teachers and the impact of teaching styles on the performance of students in Fine Arts in secondary schools in developing countries. McDonald (2010) and Klopper and Power (2011) examined the effects of classroom environment and classroom practices on students' performance in schools. Soremi and Sofowora (2012) investigated the level of utilizing instructional approaches and aids in the teaching of Creative Arts. All of these studies have been categorised by Russell-Bowie (2006), Herbst (2007) and Israel (2008) into two broad areas — teaching strategies and methodologies with a view to improving the performance of students in Fine and Applied Arts.The studies observe that where there are qualified art teachers, facilities, furniture, equipment and materials, the context, that is the classrooms and environment where Fine and Applied Arts is taught and learnt, is grossly neglected. Akinbogun and Kayode (2006), Akande (2006), Akinsanmi (2007), Bartel (2007), Cornett (2007), Vassiliki (2007), Garvis (2010), Soremi and Sofowora (2012) hint on the attention and priority given to the sciences in schools and the provision of science and introductory technology laboratories for the teaching of the sciences and technology-related courses, whereas there is no provision of the least required and relevant facilities for the teaching of Fine and Applied Arts. This development, as Kithyo and Petrina (2008) affirm, is borne out of the negative attitude of the schools administration to Fine and Applied Arts subjects.

(c) Negative Attitudes to Fine and Applied Arts

According to Indoshi, Wagah and Agak (2010) some environmental, curriculum, administrative-related factors, what happens in schools, homes, cultural norms and labour market culminate in government, institutions, administrators and parents' negative attitudes towards Fine and Applied Arts.The general aparthy arising from the attitude of governments, institutions and school administrators affects in no small, measurethe lowlevel of physical and moral commitment towards the teaching and learning of the course. Indoshi, Wagah and Agak (2010) observe that the lopsided appropriation of financial, material and physical resources which is, often tilted favourably towards the sciences in institutions is as a result of the negative attitude of school administrators and their preference for the sciences over the arts. Furthermore, in recent times institutions are always relentlessly justifying the huge spending on the provision of facilities and resources for the sciences through their admission policies which are claimed to be geared towards producing graduates for rapid industrialization (Dike,2009).Thisdevelopment is prompting art educators tofocus moreon providing sustainable alternatives like request for financial aids, facilities and equipment from groups, non-governmental agencies (NGOs),

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international agencies (INSEA, UNESCO), Art patrons and museums to ameliorating the lapses created by the non-provision of facilities for the study of Fine and Applied Arts. Fine Arts teachers have also been encouraged to be in-ward looking and ingenious by converting abandoned classrooms into art classrooms in their schools at various train-the-trainers' workshops, training and conferences.

In view of this, investigations on how to evolve classroom practices using minimal and improvised facilities in effectively teaching the pedagogical content of Fine and Applied Artswere conducted as reported in Pascoe, Leong, MacCallum, Mackinlay Marsh and Smith (2005) and Wiggins and Wiggins (2008). From the researchers' investigations, there are consistent and convincing evidences that, even when some subjects can be taught through verbal instructions; it is not possible to teach Fine and Applied Arts verbally. The practical aspects of its curriculum require a controlled setting, special furniture, equipment and materials at every level of education where it is being taught (Ewing, 2010). According to UNESCO (2008), Art education programme will record considerable performance and high academic achievement, if the arts classrooms meet a higher design and construction standard fitted with adequate and relevant facilities than a typical, tradititional/conventional classroom. While schools and colleges of education fall short of these standards because traditional/conventional classrooms lack all the prerequisites and conditions for learning as studios, poor training and not too encouraging performance of pre-service teachers has been the result. This observation is reported in Kparevzua (2004), Adeyanju (2006), Foster and Gibbons, (2007), Mongtomery (2008), CHPS (2010), McGraw-Hill Construction (2010), Whiteside and Fitzerad (2012). As Oguibe (2004), Taylor (2008) and Chan (2009) note, the quality and conditions of classrooms impact significantly on learning, withgreat implications for pre-service teachers' training andtheir performance.

(d) Inadequate Design Elements in Classrooms used for the Teaching of Fine and Applied Arts

Power and Klopper (2011) suggest that, relationships exist between the quality of teacher training and performance as also reported by Majoribanks (2004), Petegem and Donche (2006), Sanders and Fisher (2006) and Herbst (2007). In orderto enhance performance, in Fine and Applied Artsit would benecessary to improve the training standards of pre-service teachers as the reports from the accreditation exercises of Fine and AppliedArts programmes in colleges of education in Nigeria have suggested (Hudson & Hudson, 2007; Davis, 2008; Alter, Hays & O'Hara; 2009). This corroborates Emi's (2007) suggestion that,arising from thereports of the

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accreditation exercise,the need fora facility inventoryand survey process as the first steps toward meaningful facility development and procurement exercises in institutions is urgently desirable. In some of such surveys, Mamza (2007), Puyate (2008) and Dike (2009) discovered that almost all the colleges have no purpose-built studios but rather traditional/conventional classrooms that lack the required design standard for the teaching of Fine and Applied Arts.

The surveys also indicate in details that the design of space, visual (light), thermal, acoustics, facilities and equipment are below standard in the classrooms as they are currently being used. Items like drawing and printing tables, drawing boards and easels; equipment like screen printing machines, drilling machines, spraying guns, photographic equipment ,kilns ,potters-wheel, looms, ack saws; and materials like printing ink, embossed papers, poster and oil colours, chemicals, resin acids oxides and dyes and a host of others, which should support the teaching and learning process, are generally lacking. Furthermore, learning environment conditions that could facilitate and enhance the effective teaching of Fine and Applied Arts are also grossly inappropriate (2005; Akinsanmi, 2007; Aina, 2009; Dike, 2009; UNESCO, 2010). Similarly, learning environment variables like students' perception, (assessment of the environment) seat arrangement (seat organisation and formation) and class size (student population) significantly influence students' learning, performance and achievement. These variables and more contribute to the overall performance of students in any learning process (ASA, 2009; ASHRAE, 2010; Hille, 2011; NCEF, 2012; Whiteside& Fitzgerald, 2012). These major areas of deficiencies and inadequacies in art classroomsdesignand learning environments of Colleges of education contribute to the not too encouraging performance of pre-service teachers (Kparevzua, 2006; Mamza, 2007; Bartel, 2009).

As a rule, the teaching and learning of the different areas of Fine and Applied Arts, like life drawing, sculpture, painting, ceramics, textiles, graphics, art history and art education, require designated spaces (Brown & long, 2006; Chism,2006; Lomas & Oblinger 2006; Taylor, 2008; Marks, 2009; McGraw-Hill Construction, 2010). This demands that each area must have a space for the various activities and skills intended to be learnt. Kparevzua (2006) and Mamza (2007) observe space, asone of the keyvariables in classroom design, to be very defective in most colleges. Spaces are unorganised and not categorised in terms of their functions (that is learning, teaching and social activities) utilisation (display area, exhibition areas and creativity zones) and designs (Informal and formal). Flexible learning spaces that could create positive learning environment are non-existing (Adeyanju, Egbedokun & Idowu 2006; Puyate; 2008). Montgomery (2008), CHPS (2010), Parsad and Coopersmith (2012) submit thatthe use of variety

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of teaching styles become impossible under learning conditions owing to cramped and too small spaces.

An equally important variable of classroom design is lighting (visuals). This deals with the various conditions of illumination within a classroom setting. The operations of a Fine and Applied classroom is determined and influenced by lighting conditions from different sources of illumination which are, natural lighting (day lighting and, lately, solar), electric lighting (compact fluorescents, T-8 or T-5 linear lamps and high intensity discharge HID lamps).Dunn, Dunn and Price (2007),Heschong and Lee (2009), Figuero and Rea (2010), ODOE (2012) and Lippman (2012) report a positive correlation between lighting, learning style and performancein a study that investigated the effects of lighting level preferences of students on performance. Equally Adeyanju, Egbedokun and Idowu (2006), Kparevzua (2006), Mamza (2007), Bartel (2009) and Dike (2009) observe lighting conditions of colleges of education to be generally poor, very flat and not effectively functional, thus affecting performance.

Indoor-air quality, temperature, humidity, moisture, atmospheric conditions constitute the thermal condition of a classroom. The thermal condition of a classroom is considered a design variable that significantly affects performance and academic achievement (Green, 1979; Abimbade, 1995; California Energy Commission, 1995; Milton & Glencross, 2000; Myatt, 2002; Skopek, 2005; Langdon,2007; EWG, 2009: ASHRAE, 2010; Daisey, Angell & Apte, 2003; WGS, 2010; Brown, 2012). Similarly, Murakami (2006) establishes a significant relationship between thermal conditions, some psychological effects (irritation, off-task behaviours, stress, and so on) and performance. Kperevzua (2006) discoveredpoor thermal conditions and ventilation problems in colleges of education classroms owing to deficient designs and lack of ventilation system in classrooms where metal works are performed. Mamza (2007) observes that poor thermal conditions in art classrooms are caused by atmospheric pollution because of irritable odour, which isemitted from the use of chemicals in textile classes. Students' performance, to a considerable level is affected and students leave classes earlier than scheduled when such situation exists.

Another variable which is considered very important in the discourse of classroom design is acoustics. As a design variable, acoustics essentially deals with the control, management and treatment of noise and sound to an acceptable level within a given space.Within the teaching and learning context, classroom acoustics is a physical phenomenon which could also be culturally determined. The principles of acoustics identify noise as an unwanted sound, which has a psychological process of understanding and interpretation (Kryter, 1994; Olla, 2006). The

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importance of acoustical factor in classroom design is supported by research evidence and studies establishing relationship between acoustics and learning (Sutherland & Lubman, 2001; Acoustical Society of America (ASA, 1998; 2009).In Fine and Applied Arts, most of the activities are practical thus generating some measure of sound, which, when not controlled, may eventually become noise at an intolerable and unbearable level. Gofar (2000), Fadare (2006), Mumovic, Palmer, Davies, Orme, Ridley and Oreszczy (2009), and Klopper and Power (2010) identify noise to be a barrier to learning certain concepts in graphics and other areas of Fine and Applied Arts that require high level of concentration. Owing to interferences from the noise produced by the reverberation of some equipment, it is always observed that occasional breaks in the level of concentration of students occur, and thereby significantly affecting performance.

One of the design variables of a Fine and Applied Arts classroom is facilities and equipment. As required by the minimum standard of NCCE (2009), facilities and equipment constitute the core requirements for the teaching and learning of the different areas of Fine and Applied Arts. Steveson (2002), Lackney (2003) and Lee (2004) observe that, apart from serving as resources and tools, facilities and equipment contribute significantly to the design and ambience of the physical layout of an art classroom. Facilities can be classified into two: (i) specialised and ancillary/auxiliary spaces include, for example, classroom and studio, photographic dark room, computer graphics room, art gallery, offices, stores and toilets, and (ii) furniture and furnishings include, for example, specially designed tables, seats, workstations and boards in conformity with the various areas and tasks that require special positioning, viewing and posture.

The need for specially designed furniture in Fine and Applied Arts to reduce physical ailments and increase productivity has been reported in some researches. Knight and Noyes (1999) performed a study on classroom furniture in relation to students' behaviour and sitting positions between traditional classroom furniture and specially designed furniture. The researchers found that the students showed a 'significant improvement in on-task behaviour and a marked change in sitting position following the introduction of the newly designed furniture' (Higgins, Hall, Wall, Woolner & McCaughey, 2005). Specially designed sets of furniture required for the teaching of Fine and Applied Arts include easels, donkey chairs, and model's throne, printing table, light board, drawing boards and work benches, which are purposely designed for life drawing, painting, sculpture, graphics, and textiles, while furnishings include curtains, window blinds and backdrops for the control of light and privacy during life drawing classes. Equipment is classified into two: (i) machine/tools (ii) instructional media and materials.

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As a category of equipment, machine and tools are used for the production of different works in the various areas of Fine and Applied Arts. They include light and heavy machines and tools such as spraying machines, atomizer spraying gun, arch welding machine, pillar and radial drilling machines, electric potter's wheel and printing/etching machine.

As another category of equipment, instructional media contribute significantly to the teaching and learning of Fine and Applied Arts. Instructional media are a broad range of resources employed to enhance effective and efficient communication and demonstration in the teaching-learning process (Abimbade, 1997; Hudson & Hudson; 2007; Garvis; 2010). They can also be used to support and stimulate classroom teaching, cognitive and socio-moral development. Inspite of the importance of facilities and equipment in the teaching and learning of Fine and Applied Arts, Idiagbe (2004), Adeyanju (2005) and Uwhereka (2005) identified the non-availability of some essential equipment in some Fine and Applied Arts classrooms as a challenge, while the few available were grossly inadequate .Emi (2007) and Mamza (2007) added thatsome equipmentare available but not installed owing to the constraints of space as a result of which they are not being used. This significantly affects the teaching and performance of students in Fine and Applied Arts (UNESCO, 2010; Rohrer, 2012).

(e) Inappropriate Learning Environment in the Teaching of Fine and Applied Arts.

Learning environment is a combination of the physical, psychological or emotional conditions and social or cultural influences affecting the growth and development of a learner that is engaged in an educational enterprise. Based on extensive research, some variables of learning environment which include students' perception, seat arrangement, class size, attitudes and many others, have been considered very significant and accepted as crucial in improving or influencing students' performance (Wubbels, 2006; Bronzaft, 2007; AIA, 2010; Gordon, 2010; Baker, 2012). In the last four decades, reports of research indicate that students' perception is an important variable that could assist learners determine the worth of their classroom learning environment. Claiborne and Ellet (2005) assert that there issignificant correlation between the students' perception of learning environment and performance owing to the difference in their ability to assess their learning environments. In general, students who perceived their learning environment positively outperformed those who perceived their classroom environment less positively (Fraser & Deer, 1983; Fraser & Fisher, 1986; Burden& Fraser, 1993; Killeen, Evans & Danko, 2003; Lippman, 2008). However, it is observed that students' perception of their learning environment is underestimated, neglected and it is not considered as an important

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mediator between learning and academic achievement in most institutions (Bartel, 2009; Indoshi, Wagah & Agak, 2010; NCES, 2012).

Over the years, classroom seat arrangement in a learning environment which is not usually seen as a significant psychological variable that could influence students' performance is now considered as one of the basic variables that can be altered to improve performance in Fine and Applied Arts.According to Yeats (1997), the examination of seating and positioning has been well researched in the workplacebut it has tended to be ignored in classrooms. However, in contemporary education practices and learning environment research, considerable evidence shows that relationships exist between seat arrangement, space and behaviour which could affect performance significantly.While probably there is an infinite number of ways of arranging a classroom seats, McCroskey and McVetta (2004) identify traditional, horseshoe and modular as the three most commonly used. It is also suggested that classroom seats could be arranged informally and in a manner that could accommodate a variety of instructional activities. However, in Fine and Applied Arts, the effects of classroom seat arrangements have not been investigated. Consideration has not also been given to the effects seat arrangement could have on sightline, visibility, accessibility, flexibility, comfort and performance in general drawing and life drawing classes (Milanese & Grimmer, 2004; Murphy, Buckle & Stubbs, 2004; Rohrer, 2012).

Importantly too, class size as one of the organisational variables of learning environment is considered to be crucial in providing an atmosphere that could promote and enhance students' interaction and performance. Studies on class size have established relationships between class size and academic performance; class size and quality of teaching; class size, density and space; and class size and learning (Ahrentzen & Loo 1976; Kaine & Ward, 2000; Krueger, 2000; Akinbode, 2001; Iroegbu, 2002; Archilles, 2003; McCauthern, 2004; Gordon 2010; Parsad & Coopersmith, 2012). Although the results from class size research are mixed, class size is still considered a variable that is capable of improving students' behaviour and enhancing academic performance. Investigations on the effects of class size on performance in the learning environment of Fine and Applied Arts have not been conducted (Higgins, Hall, Wall, Woolner & McCaughey, 2005). According to Nkom (2006), this has been responsible for the inability to suggest a considerable classroom design which could enhance performance owing to class size.

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(f) An Overview of Pre-Service Teachers' Performance in Fine and Applied Arts in Colleges of Education (2005-2010)

From the foregoing discussion on classroom design and learning environment variables, various studies by Emi (2006), Kparevzua (2006), Mamza (2007), Israel (2008), Bartel (2009), Gordon (2010) Parsad and Coopersmith(2012) identify deficiencies in Fine and Applied Arts classroom learning environment as factors responsible for the not too encouraging performance of pre-service teachers in Fine and Applied Arts, as reflected in Table1.1

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Table1.1: PERFORMANCE DATA OF FINE AND APPLIED ARTS GRADUANDS OF COLLEGES OF EDUCATION IN SOUTH-WEST, NIGERIA (2005-2010)

S/N	NAME OF COLLEGE	GRADUATION YEAR	2005	2006	2007	2008	2009	2010
1.	Federal College of Education (Special) Oyo	TOTAL GRADUANDS	53	78	78	72	59	92
		DISTINCTION	00	01	01	00	02	03
		CREDIT	03	02	05	18	06	14
		UPPER MERIT	18	22	20	29	13	16
		LOWER MERIT	31	53	49	31	36	52
		PASS	01	00	03	04	02	07
		FAIL	00	00	00	00	00	00
2.	Ondo State College of Education Ikere-Ekiti	TOTAL GIRADUANDS	58	52	41	33	24	47
		DISTINCTION	00	02	01	03	00	03
		CREDIT	04	06	05	09	08	09
		UPPER MERIT	24	19	22	12	12	12
		LOWER MERIT	30	25	13	10	04	21
		PASS	00	00	00	00	00	02
		FAIL	00	00	00	00	00	00
3.	Adeyemi College of Education Ondo	TOTAL GRADUANDS	62	74	70	50	50	76
		DISTINCTION	02	01	03	02	00	02
		CREDIT	10	09	09	13	11	12
		UPPER MERIT	14	12	18	15	17	26
		LOWER MERIT	33	46	39	26	31	41
		PASS	03	05	01	04	01	03
		FAIL	00	00	00	00	00	00
4.	Federal College of Education (Technical) Akoka, Lagos	TOTAL GRADUANDS	43	125	100	10	62	64
		DISTINCTION	01	05	02	00	00	02
		CREDIT	02	07	07	01	03	09
		UPPER MERIT	03	15	13	02	10	17
		LOWER MERIT	37	93	78	07	49	36
		PASS	00	00	00	00	00	00
		FAIL	00	00	00	00	00	00
5	Adeniran Ogunsanya College of Education, Oto-ijanikin, Lagos	TOTAL GRADUANDS	52	20	10	20	25	40
		DISTINCTION	00	00	00	00	01	00
		CREDIT	02	00	00	01	02	03
		UPPER MERIT	10	08	01	06	11	08
		LOWER MERIT	38	12	08	13	11	29
		PASS	02	00	01	00	00	00
		FAIL	00	00	00	00	00	00

SOURCE: NCCE STATISTICAL DATA 2010

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Table1.1: PERFORMANCE DATA OF FINE AND APPLIED ARTS GRADUANDS OF COLLEGES OF EDUCATION IN SOUTH-WEST, NIGERIA (2005-2010) (Contd.)

S/N	NAME OF COLLEGE	GRADUATION YEAR	2005	2006	2007	2008	2009	2010
6.	Tai Solarin College of Education, Ijebu-Ode	TOTAL GRADUANDS	47	42	00	02	17	42
		DISTINCTION	00	00	00	00	00	00
		CREDIT	04	01	00	00	01	04
		UPPER MERIT	21	05	00	00	03	08
		LOWER MERIT	29	31	00	02	11	28
		PASS	03	05	00	00	02	02
		FAIL	00	00	00	00	00	00
7.	Federal College of Education, Abeokuta	TOTAL GRADUANDS	61	57	16	53	15	61
		DISTINCTION	00	01	00	02	00	00
		CREDIT	03	07	00	04	01	03
		UPPER MERIT	08	15	07	09	05	11
		LOWER MERIT	48	32	09	36	09	42
		PASS	02	01	00	02	00	05
		FAIL	00	01	00	00	00	00
8.	Emmanuel Alayande College of Education, Oyo	TOTAL GRADUANDS	49	290	276	138	199	109
		DISTINCTION	00	09	07	04	08	03
		CREDIT	08	32	28	11	26	09
		UPPER MERIT	14	43	41	20	31	13
		LOWER MERIT	23	187	163	98	121	76
		PASS	04	29	37	05	13	08
		FAIL	00	00	00	00	00	00
9.	Osun State College of Education, Ilesa	TOTAL GRADUANDS	73	05	21	64	00	00
		DISTINCTION	00	00	00	01	00	00
		CREDIT	04	00	02	01	00	00
		UPPER MERIT	13	01	06	12	00	00
		LOWER MERIT	56	04	13	48	00	00
		PASS	00	00	00	02	00	00
		FAIL	00	00	00	00	00	00
10.	Osun State College of Education, Ila-Orangun	TOTAL GRADUANDS	58	16	00	00	107	68
		DISTINCTION	01	00	00	00	01	00
		CREDIT	06	01	00	00	06	07
		UPPER MERIT	12	05	00	00	16	15
		LOWER MERIT	36	09	00	00	79	43
		PASS	03	01	00	00	05	03
		FAIL	00	00	00	00	00	00

SOURCE: NCCE STATISTICAL DATA 2010

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From Table 1.1, it could be seen that, between 2005 – 2010 sessions, a total of 3,546 students graduated with various grades in Fine and Applied Arts from the ten Colleges of Education in South-west,Nigeria as follows:

1. Ondo State College of Education, Ikere-Ekiti, Ekiti State;
2. Adeyemi College of Education, Ondo, Ondo State;

3. Federal College of Education (Technical), Akoka, Lagos State;
4. Adeniran Ogunsanya College of Education, Otto-Ijanikin, Lagos State;
5. Federal College of Education, Osiele, Abeokuta, Ogun State;
6. Tai Solarin College of Education, Ijebu-Ode, Ogun State;
7. Osun State College of Education, Ilesa, Osun State;
8. Osun State College of Education, Ila-Orangun, Osun State;
9. Federal College of Education (Special), Oyo, Oyo State;
10. Emmanuel Alayande College of Education, Oyo, Oyo State.

Analysis of the results from the colleges shows that, for the period of six years as the Table1.1 has shown, out of 3,546 pre-service teachers that graduated, only 71 students, which is 2.00 %, had distinction, 349 graduated with credit, which is 9.84 %; 759, which is 21.40 %, passed out with upper merit grade; 2,205, which is 62.18 %, graduated with lower merit grade; 171, which is 4.82 %, had pass grade; and 01, which is 0.03%, failed. From investigations, the only failure (01) i.e 0.03% recorded in FCE, Abeokuta was due to the candidate's inability to complete assignments given as the continuous assessment. This consequently gave the candidate cumulatively low marks leading to failure. A total of 2,205 passed out with lower merit grade, which may be considered to be just an average performance.

Table1. 2: SUMMARY OF PERFORMANCE IN FINE AND APPLIED ARTS OF PRE-SERVICE TEACHERS IN TEN COLLEGES OF EDUCATION IN SOUTH–WEST, NIGERIA (2005 – 2010)

GRADES	2005	2006	2007	2008	2009	2010	TOTAL
DISTINCTION	03 (0.53)	17 (2.23)	14 (2.33)	12 (2.65)	12 (2.11)	13 (2.14)	71 (2.00)
CREDIT	46 (8.14)	65 (8.54)	56 (9.30)	48 (10.6)	64 (11.3)	70 (11.53)	349 (9.81)
UPPER MERIT	137 (24.25)	145 (19.05)	128 (21.3)	105 (23.2)	118 (20.8)	126 (20.75)	759 (21.34)
LOWER MERIT	361 (63.89)	492 (64.65)	362 (60.13)	271 (60.00)	351 (61.8)	368 (60.62)	2,205(62.01)
PASS	18 (3.19)	41 (5.39)	42 (6.98)	17 (3.75)	23 (4.04)	30 (4.94)	171 (4.81)
FAIL	00 (0.00)	01 (0.13)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	01 (0.03)
TOTAL	565	761	602	453	568	607	3,556

Sources: 1. NCCE Statistical Digest 2. The colleges *Percentages in parenthesis

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Similarly from the summary of performance in Table1.2, it could be noted that no remarkable improvement has been recorded at the lower merit grade, which has constantly remained at 60 % and above mark in the past six years (2005-2010) under consideration suggesting that the performance may not improve because of some prevailing factors which still persist. This is notencouraging when one considers the fact that over 60 percent and above of the total number of graduates had a performance that could not reflect the high standard required in the school system.

By all indications, all is not well in the colleges of education as this situation falls short of the minimum standard and requirements for Fine and Applied Arts as stipulated by the National Commission for Colleges of Education. Therefore, if the trend is going to be reversed at the College of Education level and Fine and Applied Arts is to be given proper positioning, the need to investigate the configuration and use of traditional/conventional classrooms asstudios is necessary. Various studies (Kparevzua, 2006; Sims, 2007; Bartel; Gordon, 2010; ODOE, 2010; NCES, 2012) observe that the use of traditional/conventional classrooms as studios without the right configurations and positive learning environment conditions and factors significantly contribute to the less qualitative training of pre-service teachers. As further observed, this also leads to the weak teaching and learning of Fine and Applied Arts at the various levels of the school system. Herein lies the need for the study.

1.2 Statement of the Problem

Pre-service teachers' not too encouraging performance and the quality of training in the colleges of education continue to be of concern to policy makers, Art educators and researchers. The persistent andprevailing average performance of pre-service teachers in Fine and Applied Arts and the near extinction of the course in some colleges of education have been linked with many factors. The classrooms and learning environments which lack the prerequisite conditions for the teaching of Fine and Applied Arts has been found to be one of the contributory factors to the less qualitative,unprofessional training and the not too encouraging performance of pre-service teachers in colleges of education. The classroom design requirements in terms of spatial configuration, lighting (visual) effects, thermal condition, acoustic factor, facilities and equipment are not of the required standard, while students' perception, classroom seat arrangement and class size are not within the acceptable range of learning environment conditions for the training of pre-service teachers of Fine and Applied Arts. This study, therefore, investigated classroom design (spatial configuration, lighting effects, thermal

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condition, acoustic factor, facilities and equipment factor) and learning environment (students' perception, classroom seat arrangement and class size) of colleges of education as predictors of pre-service teachers' performance in Fine and Applied Arts.

1.3 Research Questions

The study tried to provide answers to the following questions:

1. What is the composite effect of the selected classroom design variables: spatial configuration, lighting (visual) effects, thermal condition, acoustic factor, facilities and equipment, on pre-service teachers' performance in Fine and Applied Arts?
2. What are the relative effects of the selected classroom design variables on pre-service teachers' performance in Fine and Applied Arts?
3. To what extent would these classroom design variables: spatial configuration, lighting (visual) effects, thermal condition, acoustics factor, facilities and equipment factor, predict pre-service teachers' performance in Fine and Applied Arts?
4. What is the composite effect of the selected learning environment variables viz: pre-service teachers' perception of learning environment, seat arrangement and class size on pre-service teachers' performance in Fine and Applied Arts?
5. What are the relative effects of the selected learning environment variables on pre-service teachers' performance in Fine and Applied Arts?
6. To what extent would these three learning environment variables: pre-service teachers' perception, seat arrangement and class size,predict pre-service teachers' performance in Fine and Applied Arts?
7. What is the composite effect of the selected classroom design and learning environment variables on pre-service teachers' performance in Fine and Applied Arts?
8. What are the relative effects of the eight selected classroom design and learning environment variables on pre-service teachers' performance in Fine and Applied Arts?
9. To what extent would the classroom design and learning environment variables predict pre-service teachers' performance in Fine and Applied Arts?

1.4 Research Hypotheses

Eight null hypotheses were tested at $p<.05$ level of significance

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Ho1 There is no significant relationship between spatial configuration and pre-service teachers'performance in Fine and Applied Arts.

Ho2 There is no significant relationship between lighting (visual) effects and pre-service teachers'performance in Fine and Applied Arts.

Ho3 There is no significant relationship between thermal condition and pre-service teachers'performance in Fine and Applied Arts.

Ho4 There is no significant relationship between acoustic factor and pre-service teachers'performance in Fine and Applied Arts.

Ho5 There is no significant relationship between facilities and equipment factor and pre-service teachers'performance in Fine and Applied Arts.

Ho6 There is no significant relationship between pre-service teachers' perception and pre-service teachers'performance in Fine and Applied Arts.

Ho7 There is no significant relationship between seat arrangement and pre-service teachers' performance in Fine and Applied Arts.

Ho8 There is no significant relationship between class size and pre-service teachers'performance in Fine and Applied Arts.

1.5 Significance of the Study

This study is considered significant because based on the empirical evidence and the data generated, the importance of the contributions of the classroom and learning environment variables, viz: spatial configuration, lighting (visual) effects, thermal condition, acoustics, and facilities and equipment factors to the variance of pre-service teachers' performance would be highlighted. The study emphasized the need for pre-service teachers to understand and situate themselves contextually within their learning environment for them to be able to perform well. A positively perceived environment will psychologically encourage a better performance and freedom of expression.

From the study, pre-service teacher trainers will have insight into the rationale for using variables (for example, class size, seat arrangement and acoustics) that hitherto had been seen as less important as part of teaching strategy to improve students' performance. Pre-service teachers' trainers would avail themselves of the opportunity of understanding that most physical learning environment variables have some psychological attributes that complement one another to significantly predict and enhance students' performance in Fine and Applied Arts. For

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example, space configuration could affect mood, while pollutants and thermal condition could cause irritation and off-task behaviour.

The study also highlights the importance of some physical elements in the classroom in improving comfort, well-being and probably attitude that can improve academic achievement and become a basis for the provision of improved training facilities, conditions and environment that would be attractive, leading to higher students' enrolment, which hitherto has been one of the problems of Fine and Applied Arts. The study has suggested the inclusion of a creative and skill- development course as an offshoot of Fine and Applied Arts in the curriculum of colleges of education to complement entrepreneurial education courses. The training facilities provided for Fine and Applied Arts will assist tremendously in this direction.

The fact that useful feedback from this study will complement the parameters, guidelines and standard provided by the National Commission for Colleges of Education and initiate further guidelines in future classroom and studio design efforts towards the improvement of Fine and Applied Arts Education, makes the study very significant.

Finally, the study will serve as a reference point for further research in the area of Fine and Applied Arts resources, facilities and environment and indicate gaps which the study could not fill.

1.6 Scope of the Study

This study covered ten colleges of education in Ekiti, Lagos, Ogun, Ondo, Osun and Oyo States in South-west, Nigeria where Fine and Applied Arts is offered at the Nigeria Certificate in Education (NCE) level. The study examinedfive (5) years pre-service teachers' results between 2005-2010 academic sessions. It investigated spatial configuration, lighting (visual) effects, thermal condition, acoustic factor, facilities and equipment factor as classroom design variables, and learning environment variables; students' perception, classroom seat arrangement and class size as they affect pre-service teachers' performance in Fine and Applied Arts.

1.7 Operational Definition of Terms

For the purpose of this study, the following terms are operationally defined:

Acoustics factor: This refers to the influence and effects of sound and noise that are made by some activities within the Fine and Applied Arts classroom.

Classroom Design: This is defined as the consideration and examination of the appropriateness of all the necessary spatial configuration, visual effects, thermal condition, acoustics factors,

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equipment and facilitiesfactors that constitute the conditions and convenience for the efficient and effective teaching of Fine and Applied Arts in a classroom

Class Size: It means the average number of pre-service teachers engaged in learning some theoretical and practical concepts of Fine and Applied Arts in a designated space/class at a specific time.The number is usually not less than nine and not more than thirty-five by UNESCO standard

Facilities and equipment: These, collectively, are the specialised and ancillary/auxiliary spaces, like the studio, darkroom, exhibition halls and display spaces; furniture/furnishings like work-benches, easels, donkey chairs and curtains; machines/tools, like spraying machines, potters' wheel, developers and enlargers; instructional media and materials, like computer sets, printers and multi-media projectors used for the teaching and learning of Fine and Applied Arts.

Learning Environment: This refers to the ambience and atmospheric and climatic conditions that pervade all of the physical surroundings and psychological conditions affecting the growth and training of the student- teacher in a Fine and Applied Arts setting.

Pre-service Teachers' Performance in Fine and Arts: This is the level of what has been achieved by the pre-service teachers, through their abilities in the use of mental, physical and manipulative skills for the effective accomplishment of the practical and theory tests in Fine and Applied Arts.

Seat Arrangement: It means the placement and organisation of seats for various instructional activities in the Fine and Applied Arts classroom.

Spatial Configuration: This means the categorization, allocation and utilization of the different spaces and areas for the teaching and learning of Fine and Applied Arts.

Students' Perception of Fine and Applied Arts' Learning Environment: This refers to the student's individual judgement and value of all what could be perceived as the progress made in terms of skill, knowledge and experience acquired owing to the quality of the Fine and Applied Arts classroom environment.

Thermal Condition: This is the condition and thermal ambience of the Fine and Applied Arts classroom derived from air in terms of the composite atmospheric temperature, air quality, humidity, climatic conditions, ventilation system and control.

Lighting (Visual) effects: These are effects and visual ambience created by different light and illumination sources and levels in a Fine and Applied Arts classroom and their influence on activities like drawing, painting and designing. The levels could be bright or dim from natural (day light) and electrical (full spectrum) sources.

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CHAPTER TWO

REVIEW OF RELATED LITERATURE

Related literature was reviewed under the following subheadings:

2.1.0 Theoretical Framework

2.1.1 Social Cognitive Learning Theory

2.1.2 Field Theory

2.2. Conceptual Framework

2.2,1 The Concept, Meaning and Scope of Fine and Applied Arts

2.2.2 The Importance of Fine and Applied Arts in National Development

2.2.3 Fine and Applied Arts Education and its objectives in Colleges ofEducation

2.2.4 The Training of Fine and Applied Arts Pre-service Teachers in Colleges of Education

2.2.5 Conceptualisation of Classrooms

2.2.6 Types of Classrooms and their Features

2.2.7 Principles of Classroom Design

2.2.8 The Design of Fine and Applied Arts Education Classroom

2.3. Empirical Studies

2.3.1 Spatial Configuration and its Effects on Performance in Fine and Applied Arts

2.3.2 Effectsof Lighting (Visual) in Fine and Applied Arts Classroom

2.3.3 Effects of Thermal Condition on Performance in Fine and Applied Arts

2.3.4 Effects of Acoustics on Performance in Fine and Applied Arts

2.3.5 Facilities and Equipment and its Effects in Fineand Applied Arts

2.3.6 Learning Environment: Its Physical and Psychological Attributes

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2.1.1 Social Cognitive Learning Theory

Social cognitive learning theory, as propounded by Bandurain 1977, explains human behaviour in terms of continuous reciprocal interaction between cognitive, behavioural and environmental influences. Bandura's use of 'social' implies that behavioural, cognitive, personal factors and environmental influences all operate interactively as determinants of each other. This theory centres on how people gain understanding of themselves and their environments and how they act in relation to such understanding (Bigge and Shermis, 1998).Social cognitive learning theory suggests that there is a purposive relationship between a person perceived environment and the quality of environmental influences (Bigge and Shermis, 1998). This theory employs both humanistic and behaviouristic terminologies to explain human psychological functions in terms of a continuous reciprocal interaction between personal and environmental determinants.

Bandura (1977) in support of Pervin's (1968) research reports that the environment influences cognitive development. This view explains that, within the context of learning and knowledge acquisition, a transactional perspective must incorporate the notion that people and psychological processes are imbedded in and inseparable from their physical and social contexts and that time, continuity, and change are intrinsic aspects of psychological phenomena (Altman, 1992). This perspective also emphasizes that human beings acquire knowledge through their transactions with their social and physical environments (Lippmann, 2008). Furthermore, human beings cannot be understood as apart from their social and physical settings but rather as embedded within them. As individuals develop understanding about their environment, they also influence their evolution. As individuals influence their settings, so also the environment influences the knowledge that people acquire (Lippmann, 2008).

In educational context and from the study of human learning, the psychological significance of an environment is investigated through the study of an individual perception of the existing situation - the meaning that the individual assigns to it. Adherents of social cognitive

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theory stress that perception plays a key role as an intervening variable between stimuli and responses, through which situational conditions influence both conscious life and actual behaviour (Bigges and Shermis 1998). According to Wilch (1973), the situational conditions of the physical environment influence significantly human behaviour. Factors like the quality of environment, degree of fit, equipment and facilities constitute the moment-to-moment inputs, whether other environmental stimuli are present or not. Coyne and Lamb (1978) provide a basis for the study of human behaviour within the context of educational environment by accepting Skinner's commonly accepted assumption that a person does not (primarily) act upon the world, the world acts upon him or her. This implies that as our environment shapes us, we also shape, alter and design our environment to suit our learning and educational aspiration.

The discussion on classroom design in this study is reinforced by Bandura's cognitive theory and position that a person's learning environment can be purposively altered, shaped and designed to provide comfort and conditions that can promote effective learning. This is based on the assumption and understanding that cognitive development, personal and environmental factors interactively determine the design of an environment. This theory also provides the basis for the analysis of individual's performance of tasks using some environmental factors and variables like students' perception, thermal condition, lighting(visual) effects, spatial configuration, seat arrangement and class size.

2.1.2 Field Theory

Kurt Lewin's (1936) Field Theory and works provide the general framework for the study of learning environments. Kurt Lewin first produced the root idea of cognitive field psychology in 1936 and shared the view, that the social environment is a dynamic field which impacts in an interactive way with human consciousness. In the author's work in 1936, Lewin asserted that behaviour is the function of person and the environment, noting that these three (behaviour, person and environment) are constant variables in any learning environment. According to Neill (2004), Kurt Lewin's Field Theory proposes that human behaviour is the function of both the person and the environment expressed in symbolic terms B = f (P, E). Berkowits (1980) claims that Kurt Lewin's formula shows that behaviour B is a function (f) of the interaction between characteristics of the person (P) and features of the environment, which could have physical and psychological attributes. The theory suggests that adjustment could ensue where the person's psychological state influences the social field of milieu (Neil, 2004). In

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this theory, the meaning of learning is upon the aspects and situation within which persons and their psychological environment come together in psychological field in life space.

Field Theory was propounded in an attempt to construct scientific principles that are highly applicable to situations and environment. Generally, classroom psychosocial learning environment research is founded upon Lewin works, which recognise that both the environment and its interaction with personal characteristics of the individual are potent determinants of human behaviour (Kerr, Fisher, Yaxley and Fraser, 2006). In recent times, many educators have acknowledged the influence of environment on behaviour. Since learning takes place in an environment, the nature of the environment could influence learning. An environment which is permissive could enhance effective learning, whereas an environment which is characterised by disturbances or discomfort could inhibit effective learning. Advocates of cognitive field psychology are convinced that, in the light of the present stage of scientific development, this theory is more likely than any other to lead to the most productive results in classroom procedures and research (Bigge & Shermis, 1999).

Therefore insights are drawn and applied from field theory and Lewin's works to the composite study of all the psychosocial variables of Fine and Applied Arts classroom learning environment.

2.2.1 The Concept, Meaning and Scope of Fine and Applied Arts

Unlike many other disciplines that could be easily defined by absolute principles, rules and theories, Fine Arts is a highly complex entity that cannot be similarly defined. This is due to its multiplicity of forms, types, historical and cultural roots (*Encyclopaedia of Irish and World Arts*, 2007). The definition of FineArts is generally derived from its philosophy, movement, periods (eras) and cultures from which it spawned. Example of some definitions considered from these perspectives are:

1. Fine Arts subject is mainly concerned with the study of human culture.
2. Fine Arts is the expression or application of creative skill and imagination through a visual medium or three dimensional media.
3. Fine Artsis a type of creative activity like drawing, music, literature, dance and so on.
4. Fine Arts is defined as a product of creative human activity in which materials are shaped or selected to convey an idea, emotions or visually interesting form (Encarta, 2004).
5. Fine Arts is a global activity, which encompasses a host of disciplines as evidenced by the range of words and phrases which have been invented to describe its various forms.

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Examples of such phraseology include 'Fine Arts', 'Liberal Arts', 'Visual Arts', ' Decorative Arts' and 'Applied Arts'

In conceptualising Fine Arts and Applied Arts, there is the need for clarification of the words 'Fine' and 'Applied. Uzoagba (2000), cited in Mamza (2007) defines the word 'Fine' as the appreciation of the beautiful and is used to describe the branch of art which has no other function than the appeal it makes to man's sense of beauty. Fine Arts include painting, sculpture, drawing, art appreciation or art history, arts education, performing arts, dance and drama. The concept 'Applied' is the creating of utalitarian items using aesthetic principles. The items could be used for commercial, domestic and industrial purposes. Therefore, Fine and Applied Arts could be seen as a single entity encompassing a broad field of different areas of arts.The overlapping nature of the categories of arts makes the scope of Fine and Applied Arts very wide and dynamic. New areas, concepts, ideas and styles spring up daily as a consequence and development of creative skills, technology and higher degree of intellectual involvement. From the primitive forms of cave painting, figurine sculptures and other types of ancient art to the new media and cotemporary forms of expression such as assemblage, collage, installation art and environmental art, the scope is ever expanding.

2.2.2 The Importance of Fine and Applied Arts in National Development

Fine and Applied Artsis very crucial, to national development as it impacts on all spheres of human endeavours, disciplines and professions. Similarly, a nation is what it is by what it has been able to make of her artistic potentials. Such artistic potentials traverse diverse areas of human endeavour- education, science and technology, socio-economic aspects, culture, industry, commerce,communication and entertainment (Idiong, 2006; Ozovehe, 2006; Adejumo, 2006; Oni, 2007; UNESCO, 2008; Ewing, 2010;Indoshi, Wagah & Agak, 2010; Ofoha, 2011;President's Committee on the Arts and Humanities, 2011).

The place of education in national development is very significant, hence its adoption by nations as a tool for social, economic, political, cultural and technological advancement (FRN, 2004). As education provides the opportunities for the acquisition of skills, knowledge, and understanding for an individual to live successfully and be productive, so does Fine and Applied Arts. The National Policy on Education (NPE, 2004) recognises Fine and Applied Arts as one of the disciplines in Nigeria's educational programme that avail trainees the opportunity to acquire appropriate skills, abilities and competences, -both mentally and physically. According to Obayan (2007), Fine and Applied Arts education is part of integral development of the 'three

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Hs'-the head, the heart and the hands -which must not be neglected, as their neglect will amount to denying an individual's integrated personality development. Fine and Applied Arts is equally emphasized in the nation's educational system as the medium for unity and instruction for all subjects. It provides a medium through which all other disciplines of life are seen clearly (Eisner, 1992; NCES, 2012). Its importance as a means of promoting social interaction, national cohesion, and cultural preservation is also noteworthy. Education and Fine and Applied Arts are both characterised by inventiveness, adaptability, discovery, modification, novelty, originality, distinctiveness and consistency.

The interrelationship of Fine and Applied Arts with education is significant in many ways, as they share some conceptual and thematic affinities. In education, key concepts in the teaching-learning process across all levels are made more meaningful and concrete from the perspective of Fine and Applied Arts. Concepts like aesthetic, creativity, culture, perception, intelligence, psychomotor skill, cognition, expression and performance are vividly understood when they are practically demonstrated, explained and applied through Fine and Applied Arts (Egbedokun and Idowu, 2006). Fine and Applied Arts play a key role in educational reform as evidence indicates that education has continued to be a powerful instrument for shaping a nation and; Fine and Applied Arts makes the shape look better (Fadare, 2006; Power & Klopper, 2011).

In science and technology, Fine and Applied Arts, from history, has been a precursor to technological growth.It serves as a means through which basic utilities for human existence are envisioned and created(Okwuoliseh, 1998). The vital link between Fine and Applied Arts and technology is also succinctly highlighted by the International Society for Education through Art (INSEA, 1998& 2012): without art and creativity, there is no technology; technology is a bye-product of creativity. Morris (1975) notes that the importance of creativity as a process takes precedence over any technological development. Therefore, it could be inferred that it is the instinctive visual ideas of the artist that are ultimately translated into possibilities of technology (Edinne, 2005; Ozovehe, 2006).

On socio-economic development, Adamu (1999) identifies the development of human resources to improve the social and economic systems as the main function of Fine and Applied Arts. The function of Fine and Applied Arts can be divided into two basic types: aesthetic and non aesthetic. Fine and Applied Arts generally produces the basic necessities of life, such as domestic equipment and materials, utensils and clothing. They make them pleasant in appearance, thus enriching the quality of living and thereby fulfilling the aesthetic function. The non-aesthetic function of Fine and Applied Arts deals with communication, information,

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education and reformation. On economic development, Fine and Applied Arts assists humans to acquire skills in various occupations or professions. As Ihekwoaba (2003) observes, a skilled population is an asset to the nation because they produce scarce goods and services. Fine and Applied Arts is an instrument par excellence that a nation can rely upon to bring about self-reliance (Mamza, 2007). In the 21st Century, Fine and Applied Arts has primarily been concerned with training students to survive in an emerging industrialized world, providing skills which produce goodsand ensure economic prosperity (Oni, 2007; Aina, 2009; Dike, 2009; Okafor, 2011; Ofoha, 2011).

The contribution of Fine and Applied arts to cultural rejuvenation, growth and development within the society is recognised, as it serves as a catalyst for technological, social and economic development. Babangida (1988) submits that much of the technological development in Nigeria in the early civilization were related to artistic creation and socio-cultural needs of the country, reiterating that, in African culture, arts have played both social and economic roles. Fine and Applied Arts promote culture in many areas of its activities through themes, materials, techniques and history. In national development, cultural promotion is not antithetical to economic developmentas many people may wrongly conceive it (Aig-Imuokhuede, 2003; Wagah, 2009).

On industrial development, Kparevzua (2002) and Nguku (2000) observe that technology has depended on Fine and Applied Arts to solve certain problems in the field of engineering, architecture, medicine and industrial arts through the concept of design. Akinbogun (2003) and Adhiambo (2004) aver that the influence of Fine and Applied Arts in mass production has been remarkable in pottery, textiles, furniture and architecture. In the area of communication, Fine and Applied Arts provide in its simplest form, individuals with means to express their imagination through illustrations that are not tied to the formality of spoken or written language. It provides humans with a way to express himself/ herself in relation to the universe (Adeyinka, 2006). Unlike words, which come in sequence and each of which have a definite meaning, Fine and Applied Arts provide a range of forms of symbols and ideas with meanings. The need for creative expression has made man to invent some communication equipment and communication systems like computer graphics, electronic printing machines and electronic billboards, which have helped tremendously in advertising and commerce (Akinbogun, 2003; NSEAD, 2010). The contributions of Fine and Applied Arts in the areas of graphics, advertising and entertainment in monetary values to the nation's economic development are significant.

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2.2.3 Fine and Applied Arts Education and its Objectives in Colleges of Education

Fine and Applied Arts Education as a subject describes the concept and practice of a type of education that conveys its meaning and knowledge through two and three dimensional forms. The forms include drawing, painting, sculpture, textile, architecture, photography, printmaking, graphics, industrial design and decorative arts (Genty, 1985 and Blomeyer, 1993). Fine and Applied Arts Education provides students with valuable opportunities to experience and build knowledge and skills in self-expression, imagination, creative and collaborative problem solving, communication, creation of shared meanings, and respect for self and others (Power & Klopper, 2011). The National Policy on Education has provisions for the teaching of art at all levels of education. It recognises the role of Fine and Applied Arts as one of the powerful instruments in a self-reliant economy. The policy stresses two important areas of Nigeria's educational system where Fine and Applied Arts is relevant in:

1. The production of self-reliant, resourceful and creative people in the community,
2. The development of aesthetic awareness in the general public with regards to the products of industry and environment.

Fine and Applied Arts Education is also a means to acquire language for expressing ideas, feelings, emotion and need, the readiness to gain understanding of the media of expression, the ability to learn the proper use of tools, equipment and materials in order to develop creative innovative skills and develop interest for a future vocation. This is expected to be achieved within a formal system of education which states unambiguously objectives that are realisable under a research-teach-learn-apply paradigm. Fine and Applied Arts is institutionalised to holistically provide academic, intellectual and professional training for NCE teachers. As stated in the philosophy of Fine and Applied Arts (NCCE, 2009), the development of students' aesthetic perception, artistic talents and expression, the stimulation of interest and enquiry in the practical and theoretical areas, particularly as they affect the teaching of art of the primary and junior secondary school levels, constitute the rationale for Fine and Applied Arts Education. The objectives of Fine and Applied Arts programme in a college of education are:

i. training professional art teachers to fill the manpower needs of the primary and junior secondary schools,
ii. equipping and providing the teachers with knowledge, understanding and skill in Fine and Applied Arts.
iii. equipping students with the necessary knowledge and skill for the promotion of Nigerian and world's artistic and cultural heritage,

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iv. developing in the would-be teachers the ability to communicate effectively through the arts,

v. preparing teachers to qualify for and benefit from teacher education at the university level, and

vi. equipping NCE graduates with manipulative skills which will make them self-reliant job creators (NCCE, 2009: 41).

2.2.4 The Training of Fine and Applied Arts Teachers in Colleges of Education

The means to attaining the objectives of Fine and Applied Arts programme in acollege of education are clearly spelt out by the National Commission for Colleges of Education minimum standards (NCCE, 2009: 41). The quality of training and preparation of pre-service teachers in accordance with the NCCE requirements are determined by a number of factors, which include pre-service teachers' entry qualification, curriculum, facilities, resources and staffing. These factors have been found to be deficient, inappropriate, and inadequate in relation to required standard in the colleges of education. The colleges are confronted with diverse and inevitable challenges (Emi, 2007; Mamza, 2007; McDonald, 2010). The literature suggests that currently, pre-service teacher education does not adequately prepare teachers for the expectations and execution of the Fine and Applied Arts curriculum (Herbst, 2007; Davis, 2008; Alter, Hays & O'Hara, 2009; Power & Klopper, 2011). Potential educators, in many cases, enter pre-service teacher education with an initial lack of background experiences and content knowledge in one or more areas of Fine and Applied Arts education (Dunkin, 2004; Russell-Bowie & Dowson, 2005; Hudson & Hudson, 2007; Wiggins & Wiggins, 2008; Power & Klopper, 2011).

Apparent shortfalls in the curriculum contents, lopsidedness, inadequate learning experiences and the absence of classroom practices that could be supported with current and innovative practices are noticed in the teacher education programmes globally (Israel, 2008; Catterall, 2009; Ewing, 2010,Power & Klopper, 2011; Rohrer, 2012) as most facilities (specialised classrooms, studios and galleries)and specialised tools (equipment and machines) are not up to the required standards in accordance with most regulatory institutions requirements (UNESCO, 2010; Parsad & Cooper, 2012). Further examination of most colleges and institutions reveals environments that are not conducive to teaching and learning, as they lack appropriate facilities, classrooms, studios and art materials (Gofar, 2000; Ubangida, 2004; Barnabas, 2005;Emi, 2007; Mamza, 2007;President's Committee on the Arts and Humanities, 2011; Baker, 2012).There is also the non-availability of various new technologies, devices, art equipment and

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materials that could help both the teachers and students to develop lifelong skills now and for the future (Shallah, 2003;Kats, 2006; AIA, 2010; Gordon, 2010; Rohrer, 2012).

In terms of facilities, traditional/ conventional classrooms used as studios have inadequate numbers of required items and facilities for the teaching of all the courses from the introductory stage to the advanced stage. Specialised rooms like computer graphics room, darkroom and galleries, are lacking. Similarly, equipment for practical, like computer and printers, cameras, slide projectors, opaque projectors, printmaking machines for practical are not available.While it has also been noticed that institutions in some developed and few developing countries use cognition enhancement graphics programmes, such as Fractal Design painter, interactive multimedia environment, CD-ROM on great artists, likeRenoir, Cezanne, Mattisse and Bannesand virtual trips to art museums in the training of art students, institutions in Nigeria lack such essential items (Dede, 1987;Herbst, 2007; Davis, 2008; Alter, Hays & O'Hara, 2009; Power & Klopper, 2011).

For the effective teaching of Fine and Applied Arts, the minimally required personnel in the colleges, that is academic and non-academic staffs (lecturers and support staff, models, traditional artists and local craftsmen, art technical officer) are not being met. Shortage of qualified personnel contributes to the lopsided teaching being currently witnessed, as specialists in some areas are not available. Owing to the practical and theoretical nature of Fine and Applied Arts, various teaching strategies that are prescribed for its effective teaching, like lecture, demonstration, tutorial and other creative methods, are not being used. The Lecture method is the only visible method being used. Since most facilities, equipment and materials required for teaching are not available, demonstration method of teaching becomes difficult to use. Rather, take-home assignments are given, and this constitute a larger percentage of teaching strategies adopted. As observed, the requirements of Fine and Applied Arts as a double major course in terms of contact hours, facilities, personnel and equipment are more than other courses. Its teaching therefore deserves more attention in a college of education.

2.2.5 Conceptualisation of Classrooms

Butin (2000) conceptualises a classroom as a living room, interactive museum or library where knowledge is discussed and discovered. Black (2001) also conceptualises a classroom as a learning facility created and designed for the discovery of knowledge and discussion rather than a room where information is transferred from teachers to students. The classroom serves as a communication channel for learning essential academic, social and cultural skills for all students (Sutherland & Lubman, 2001). The classroom accommodates a wide range of activities: individual

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study, one- on- one discussion (with a teacher or another student) small group work, large group work, and teacher- directed instruction or lecture. A classroom may be used by a single teacher, by several teachers throughout the day, or may be reconfigured through moving walls to allow for team teaching or multi-class projects. Learning can happen anywhere, but the magnitude of learning and academic accomplishment is tangibly greater in the classroom (Wedge and Kearness, 2005).

According to Miller (2005), classrooms are a core element of the campus, yet their potential is often overlooked.Oblinger (2006) opines that learning as a central activity of colleges and universities, most times, occurs in classrooms (formal learning). At other times, it results from serendipitous interactions among individuals. The classroom is seen as the most visible symbol of an educational philosophy. This starts with the assumption that a predetermined number of students will all learn the same time, from the same person, in the same way, and in the same place for several hours each day (Nair & Field, 2008). In realisation of the indispensability of classroom in the teaching-learning process, several studies have made the classroom the central focus of facilities and educational reforms in contemporary times (Baraldi, 2010; Makitalo-siegl, Zottmann, Kaplan & Fischer, 2010).

2.2.6 Typesof Classrooms and Their Features

Two major types of classrooms have always been identified by their design, structure and features. These are (i) Traditional/conventional (open-plan) and (ii) specialised (closed) classrooms. Classrooms, whether traditional/conventional or specialised, they can have impact on learning (Nair; 2008).

i. Features of Traditional/Conventional Classrooms:

Various studies (Weisser, 2006; Lippman, 2007) observe that traditional/conventional classrooms designs are motivated by educational theories of educators like Maria Montessori and John Dewey which are based on child-centred principles. By description, the shape of this classroom is generally in form of a square box where the teacher assumes the frontal position while teaching. The classroom spaces are blocked off into different areas by strategically placing book-shelves and cupboards around the space. The seat arrangement in this type of a classroom is always the traditional form which does not focus on the need for people to connect and intereact, rather they are separated. Lighting and illumination in the classroom is from natural source which comes in through the windows that are not extended to the ceiling area thereby producing uneven distribution of light in the classroom. As in Fine and Applied Arts which require outdoor learning

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and activity, the traditionalclassroom, is seen as a space that is only supportive of some teaching-learning activities and not all activities can be done indoors. Other studies (Washor, 2003; Tanner & lackney, 2005 Hille, 2011) report that generally traditional classrooms are usually poor in ventilation as the atmospheric condition is not given due consideration either by providing appropriate ventilation syste. It is difficult to control unwanted noise as provisions are not made to use sound absorbent materials.

ii Features of Specialised Classrooms:

The specialised classroom is designed along pedagogical issues that are supported by an archictectural philosophy of 'form follows function' that is woven around activity-centred principles. Specialised classroom shape is determined by curriculum contents and how to teach them. Various activities determine to a great extent how the spaces are configured and used. The spaces are usually divided into creativity zones where ideas are generated and articulated while wet zone house resources that are tried-out for achieving the curriculum intents. Specially designed furniture sets that are easily adjustable and moveable are arranged in a manner that aids interaction and engagement among individuals and groups. People are easily connected in these classrooms. The specialised classroom relies on artificial lighting more than the natural lighting to ensure quality visual environment. In life drawing classes, curtains are used to provide shade and privacy for the model. Needs and technical requirements determine the typeand level of lighting. For example, full spectrum lighting is needed for painting while relying heavily on fluorescent. The Internal Environment Quality (IEQ) is supported by mechanical system while large doors and large-expanse windows are constructed to boost the quality of ventilation and thermal condition. Acoustically treated materials are used for noise and sound control. Generally,the specialised classroom is proactive to technology integration such that, the condition within the classroom could be controlled and regulated.

Although, in a comparativeanalysis of the two types of classroomsand their suitability for the teaching of Fine and Applied Arts, Oblinger (2006), Ewing (2010) and Hille (2011) found that, by its design features and conditions, the traditional/conventional classroom may not be too appropriate for the teaching of Fine and Applied Arts in terms of spatial configuration, lighting (visual) quality, thermal condition, acoustics control and equipment factor, yet the relevance and suitability of the traditional classroom as an aged-long facility cannot still be overlooked. This is because as it predates some contemporary facilities currently being used, it has its own appeal and some peculiarity attached to it. However, the learning environment considered most appropriate for the teaching of Fine and Applied Arts could only be created and achieved if a specialized

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classroom which has all the required settings and conditions necessary for the teaching of the subject is used. Therefore, as most studies tend to suggest and conclude, the use of traditional/conventional classroom would continue to stifle creativity, destroy the love for learning and discourage self-expression while, the quality of trainining pre-service teachers will still remain very low without any considerable improvement in the not too encouraging performance being recorded in Fine and Applied Arts presently (McGraw-Hill Construction, 2010; AIA, 2010; UNESCO, 2010; Rohrer, 2012).

2.2.7 Principles of Classroom Design

Although some educational reformers still disagree once in a while that it cannot be ascertained whether any improvement in student performance is as a result of the design of the classroom or the teaching style (Classroom Design Manual, University of Maryland, 2000), Tanner and Lackney (2005) however, argue that a well-designed classroom is a critical factor in creating the appropriate environment for effective classroom instruction. This is because the goal of effective classroom design is to deliver information in the most effective manner to students. Sturt (2008), citing Burnett, Wagner, Cryorkos and Horn (2003) claims that students have a fundamental right to classroom learning environment that allows them to see anything presented, to hear any audible presentation free from noises and distortions, and to be physically comfortable (in terms of airflow, appropriate temperature, good furniture and so forth) regardless of the method of instruction used. According to Baraldi (2010) educational reformers in recent times, have debated and discussed the relevance of classroom in its present rectangular design. In most cases the debates have led to contentions and controversies. While Labare (2005) argues that classrooms should no longer exist, Burke (2005) and Reese (2007) advocate that a restructuring of classroom design is desirous, and other educational theorists advocate different approaches. However, some of the researches done on theinfluenceclassroom design and learning environment on learning are conclusive enough that classroom learning environments variables are now known to lead to significant and substantial differences in learning achievement (Washor, 2003; Nair; 2008; Makitalo-siegl, Zottmann, Kaplan & Fischer, 2010).

The developments arising from paradigm shifts and technology integration have provided a basis for conceptualising a classroom design that can give form to emerging educational concepts (Fischer, Kollar, Mandl & Haake, 2007; Gordon, 2010; Sims, 2011). Moore and Lackney (1993) cited in Washor (2003), propose that two means by which classroom design can give form to emerging educational concepts is to:

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1. Translate the empirical research literature on the effects of classroom design on educational performance into research-based design guidelines and principles,

2. Transformthe educational ideas or the experience of reflective educators into architectural forms.

Nair (2000) avers that reform as an element and process of effecting paradigm shift in teaching and learning should start with the physical learning environment which has been unappreciated for its supportive role in student's learning and performance. According to Washor (2003), the relationships amongst the physical environment, and pedagogical, psychological and social variables, which are yet to be explored to any great extent by educational researchers or environment behaviuor research could be facilitated by an examination of how classroom design affects performance.

2.2.8 The Design of Fine and Applied Arts Education Classroom

Fine and Applied Arts is a vocational discipline that requires specific resources for the teaching and learning of its concepts within and outside the classroom. According to McGregor (2004) within the classroom, the resources which include facilities, equipment, different teaching strategies and methods constitute the major determinants of how the art classroom is designed. Lippman (2008) and American Institute of Architects (2010) also acknowledge that apart from the resources, one other determinant of the design of art classrooms and studios is thinking about accommodating future needs and changes. This is necessary because, in an era of rapid technological advancement and curriculum change, a well-thought-out sustainable design that could stand the test of time for a dynamic subject like Fine and Applied Arts is required. AsMcGraw-Hill (2010) argues, a short term design that lacks fundamental elements, principles and procedures would result into obsolete facilities within a short period of time. Therefore, there is the need to produce sustainable design guidelines based on sound philosophy. Braybrooke (1986), quoted in Polette (1991) identifies flexibility, safety and quality of environment as the three key factors to be considered in Fine and Applied Arts classroom design along such guidelines.

Flexibility is defined as the ease with which a classroom environment, studio environment, available equipment and other resources can be adapted or used to teach various areas of the subject. Safety relates to the personal safety of students, faculty and support staff, the environmental health factors and structural integrity that affect the completion of studio instruction. Quality of environment relates to the conditions of space, lighting, temperature,

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ventilation, humidity, classroom arrangements, access, location and appropriate furniture within the classroom learning environment. As the major focus of this study is to investigate the variables and elements of design as the determinants of the quality of classroom and studio environment, some considerations are given to Braybrooke's design principles which emphasize flexibility in the use of available space, quality of classroom atmospheric conditions and safety in terms of comfortability and personal safety.

In terms of broad expectation, the standard of the Fine and Applied Arts classroom by its design should:

- serve as a model for Fine and Applied Arts teacher-graduates when they plan their own classroom,
- be safe and stimulating,
- create learning experiences needed to meet the objectives of a particular Fine and Applied Arts cluster,
- be accessible to special needs students and students of various abilities by the elimination of equipment and learning environment barriers, and
- make the existing classroom space flexible (Polette, 1991; Butin,2000).

And in specific terms, needs assessment should precede classroom design to address the following questions:

- What clusters will be taught in the classroom?
- How much space is required for each student?
- How much storage space is required?
- What utilities are required?
- What are the safety considerations?
- Will specialization rooms be required?

Within the Nigerian context, the design of Fine and Applied Arts classrooms and studios has not been given specific mention in which design guidelines and criteria are provided except the dimensions of classrooms provided by the National Commissions for Colleges of Education (NCCE, 2009:41). The classroom generally used as studios for Fine and Applied Arts are not purpose – built; rather they are designed in line with the long-held assumption of the traditional classroom (Mamza, 2007; Gordon, 2010; Baker, 2012). In such situations, consideration is not given toappropriate or proportionate design elements, like thermal condition, light (visual) effects, acoustic factors, spatial configuration, work spaces and storage facilities. It could, therefore, be reasonably assumed that effective teaching and learning will not take place. This is

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reflected in the position of Graetz (2003), Oblinger (2006) and Montgomery (2008), that effective teaching and learning can only take place in a physical environment with quantifiable and perceptible physical characteristics that determine the design of a classroom, studio, and auditorium, amongst others.

Gordon (2010) also observes that the design and the physical setting of a classroom often depend on the nature of the tasks, the learners, the pedagogical and curricular objectives. In support of this observation, Baker (2012) opines that a classroom design should be concerned with how socio-behavioural dimensions and pedagogical objectives can be addressed in a collaborative process of design that would enhance teaching and learning. Rohrer (2012) therefore, suggests that the design of classroom and learning environment should be the first priority that should be considered in the teaching and learning of Fine and Applied Arts because of its peculiar nature.

The spatial requirements and specifications of a Fine and Applied Arts classroom in a college of education have always been taken for granted (Strange & Banning, 2002). Lackney and Tanner (2005), aver that we fail to notice the ways in which space constraints or enhances what we intend to accomplish owing to our traditional assumptions about classroom space. Space can have a powerful impact on learning; therefore we cannot overlook space in our attempts to accomplish our goals. Oblinger (2006) asserts that a space is considered effective and relevant in the spatial design of a classroom when it is conceived as a:

- usable and adaptable teaching space which is at the same time special
- set of spaces that are sustainable in use over a long period of time and can accommodate the changing nature of Arts.
- set of interlocking spaces that vary in scale and optimize the use of externally covered space.
- Space which nurtures new relationships in learning and teaching.

Dittoe and Porter (2007) assert that spaces that are most effective for active and collaborative activities are those that create a flexible and fluid environment. A studio model which resembles an open work space for architects or artists enables more interaction, student engagement and movement than the typical classroom. In addition to flexibility, function is another classroom design essential that should enhance students' participation.

For most classroom activities vision is the primary sensory channel for receiving information. Therefore, illumination or light should be a critical part of the design of any classroom. Illumination is defined as a measure of the amount of light falling on, or incident to a

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work surface or task from ambient and local light sources. Natural and artificial light must be mutually supporting. Artificial lighting should be such that full light is provided for use all the time in the classroom. In classrooms that have lighting that is too general and uniform, shading and shadows will not be visible enough for drawing. Similarly observation will be poor for modelling in sculpture. A Fine and Applied Arts Classroom needs direct lighting options that can be used when needed from different levels (Bartel, 2007). Three levels of lighting are required in a Fine and Applied Arts classroom: full lighting, note taking lighting and presentation area lighting. Lighting must be free of both direct and indirect glare, shadow less, diffused and at a level that conforms to the types of activities performed.

In Fine and Applied Arts classroom design, consideration for the thermal condition of a classroom is essential. The thermal condition of a classroom is influenced and determined by the nature of work being performed. A temperature range of 68 – 70 degrees Fahrenheit and relative humidity of 20% to 85% is usually desirable. One of the most considered components of thermal condition of the classroom is indoor-air. Indoor-air contains a variety of particles and gaseous contaminants. These contaminants, also known as Volatile Organic Chemicals (VOCs), are commonly referred to as indoor pollutants when they affect human health and performance (EPA, 2003). Indoor temperature and relative humidity can also affect health and human performance directly and indirectly. Most often, poor indoor air quality results from the failure to consider the ventilation system as very crucial to classroom design. Common examples include the failure to control:

- pollution sources, such as art supplies and laboratory activities,
- temperature and humidity,
- moisture and clean up spills and
- ventilate each classroom adequately (Mills, 2000).

According to Burr (2000), Fine and Applied Arts classroom should be designed and maintained in ways to minimize and control sources of pollution by providing adequate exhaust and outdoor air ventilation through natural and mechanical means. Classrooms that maintain proper temperature, humidity conditions and responsive to students and staff with particular sensitivities will naturally provide comfort and enhance performance (Institute of Medicine, Committee on the Assessment of Asthma and Indoor Air, 2000). In a study by ASHRAE (2010), the effects of ventilation rates that were below the recommended levels were identified to have health implications and reduced human performance. The prevalence of low ventilation rates suggests a clear opportunity for improving indoor air quality design.

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Also, a noticeable feature of Fine and Applied Arts classroom is noise from the various activities performed, especially in sculpture, metal work and ceramics. Acoustical treatment of ceilings and walls is necessary to lessen internal noise as well as those that may come from nearby laboratories. ASA (2009), observes that, while the overall noise level in Fine and Applied Arts education environments will not be, in any way, near that of industrial arts environments, there is little excuse for acoustical noise (defined as unwanted sound) interrupting the learning process. A design standard or guideline for the overall acoustical design of classroom spaces, and its integration with other classroom systems, such as lighting, heating, ventilation and air-conditioning systems is necessary in enhancing task performance and concentration (Acoustical Society of America, 2009). It is generally known that there are three ways to control unwanted sound: (i) at the source, (ii) along the path between sound source and receiver, and (iii) at the receiving end. Therefore, reverberation and background noise should be limited to ensure that acoustical barriers are limited from classrooms. Improving classroom acoustic design will benefit teachers and other students by making the classroom a more effective and positive learning environment. A Fine and Applied Arts classroom design that makes the control of background noise and reverberation level a focus point will improve learning, productivity, concentration and teacher-student communication (American National Standard Acoustical Performance Criteria, 2002).

Equipment, machines, tools and furniture form the core of the teaching-learning resources required for the teaching of Fine and Applied Arts. Their use, storage, display, maintenance and fitting require special spaces and designs within the classroom learning environment. The design of the classroom space to accommodate equipment, machines, tools and instructional resources should be woven around three related concepts: mobility, flexibility and transformability (McGraw-Hill, 2010). Mobility permits movement of equipment and furniture within the classroom. Flexibility relates to the movement of hardware within a space, where benches and tables are designed to serve a variety of purposes. Flexible facilities play a supportive role in students problem-solving activities, support the multiple use of instructional spaces, permit storage when not in use and provide for more instructional activities without increasing the size of the available space (Gordon, 2010, Parsad & Coopersmith, 2012). Transformation refers to the changes that take place in the space in terms of the movement of the equipment in an easier manner within the classroom learning environment.

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2.3.1 Spatial Configuration and its Effects on Performance in Fine and Applied Arts

There is now considerable empirical support for the argument that a variety of sustainable design in terms of space can have a significant influence on student behaviour, performance and academic achievement (Lackney, 1999; Buckley, Schneider, & Shang, 2002; Oblinger, 2006; AIA, 2010; CHPS, 2010; Parsad & Coopersmith, 2012). Several studies in higher education, secondary and primary school settings have established a relationship between space and learning, stating that the physical arrangement of most college classrooms reveals much about the learning process (Marks, 2009). Similarly, advances in learning theory and a study by Bransford, Brown, Coclaing and Oblinger (2006) indicate clear implications for the design of spaces in which learning most likely takes place. Their study demonstrates that spaces that provide experience stimulate and create opportunties for rehearsal, feedback application and transfer, support learning and aid high performance. These spaces, when in harmony with learning theory and the needs of current students, reflect several elements: flexibility, comfort, sensory stimulation and technology support.

According to Lackney (2003), learning takes place in many different kinds and qualities of space. Providing the raw space for learning activities to take place is the first step in providing a successful place for learning. Spaces in classroom design are classified into teaching spaces and learning spaces. Today, learning spaces are much more relevant than teaching spaces. Different studies (Gardener, 1995; Project Kaleidoscope, 1998; Oblinger, 2003; Webber, 2004; Oblinger, 2006) have claimedthat students learn differently from how many of the teachers in the faculty now teaching them did. The design of spaces can favour or disadvantage various ways of learning, thereby affecting performance and learning outcomes. Some research (Chism &Manahan, 2002; Bickford, 2003; Strange & Banning 2003; Chism, Coles & Associates, 2005; Oblinger, 2006; AIA, 2010; CHPS, 2010) also confirmed that spaces that are created along some learning paradigms have impactand can effectively enhance performance.

The influence of physical space on human activity has been studied from both psychological and physical perspectives. This include the field of environmental psychology which explores such topics as place attachment, psychological comfort with space, and the motivational and inspirational effects of space on performance and academic outcomes (Strange & Banning, 2002; Chison, 2003). Webber (2004) notes that space could have a psychological effect on an individual when it is able to provide comfort. Space can make students feel relaxed and perform optimally when it comes to knowledge creation and communication. Therefore, space configurations exert powerful influence on activities. Similar research findings (Scott-Webber,

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2004; Acher & Miller 2005; Brown, 2005) submit that space design is a prerequisite for achieving higher educational outcomes with some physical effects on learners. They argue that physical spaces that are most effective for active and collaborative learning are those that are designed to create a flexible and fluid environment.

Good and innovative design is that which causes minimal human discomfort and maximum human functioning in learning spaces (Snow, 2002; Oblinger, 2006; Lippiat, 2007; Montgomery, 2008). As an innovation in space design, it is suggested that an architecturally well-defined 'activity pocket' which comprises large group, small group and individual learning spaces is important to the development of learners (Moore, 1986; Moore & Lackeney, 1994;Meek, 1995;Chism, 2006; Chan, 2009). These spaces tend to encourage more learner engagement in a learning task, more teacher involvement with individual learners, less teacher interruptions and more exploratory behaviour, social interactions and cooperative behaviours among learners (Public School Construction Programme of Maryland, 2010). Smaller and secluded study space within an instructional area is also important for student's development and has been found empirically to relate to performance (Lackney, 2003; American Institute of Architects, 2010). The extent to which human beings function is determined in large part by the limitations and prescriptions of the designed environment. Space is needed for technology integration, projects and group work based on the unique needs of different content areas and age levels. McFeely (2010) avers that a link exists between physical space, motivation and task performance of those in that space.

National Survey of Student Engagement Clusters of Effective Educational Practice (2004), and Dittoe and Porter (2007) claim that colleges and universities whose students performed well adhered to principles such as active and collaborative learning, student interaction with teachers and a supportive learning environment. In a study of institutions that did exceptionally well in engaging their students, Baker (2010) discovered that the institutions aligned the physical environment with the potential of physical space to advance learning, thus making space a critical factor when learning outcome and academic achievement are measured and discussed. Also, in a study conducted by McGraw-Hill (2010) to find out the best practice in school design, principals, teachers and students agreed that space as a variable of classroom design contributed significantly to learning outcomes, as it greatly enhanced teachers' and students' performance. The study emphasized that the creation of separate specialist areas within the bigger space was important for group work, study bays and tables with special resources as required in Fine and Applied Artsho Bartel (2007), however, observes that in an art classroom where every inch of

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wall space is educationally valuable, and as spatial needs mean more than just the classroom's physical dimensions, many college classrooms have failed psychologically to arouse learners.Bartel's observation corroborates the findings of other researchers who have evaluated classroom learning environments that many educational facilities, such as classroom failed as spaces for learning due to poor quality (Chism & Bickford, 2002; Fisher, 2002; Scott-webber, 2004; Brown & Long; 2006; Foster & Gibbons, 2007). Apparently, the self-contained classroom can no longer provide the variety of learning settings necessary to successfully facilitate twenty-first century learning. A studio model, which resembles an open workspace for architects or artists and which should enable more interaction than the typical classroom and supports students' engagement, movement and high academic achievement are generally lacking.

The issue of whether school facilities and space affect academic outcome still continues to be debated extensively in various studies (Watson &Probe, 2001; Scheinider, 2002; Prince, 2003; CABE, 2005; Bartilett & Chase, 2005; Oblinger, 2006; USGBC, 2009; Parsad & Coopersmith, 2012).As part of the debate, Dittoe and Porter (2007) acknowledge that the use of mathematical formulae to determine an appropriate amount of classroom square footage per students is outdated and ineffective. Institutions now recognize that space should be developed and designed for reasons beyond utilization numbers and acknowledge the importance of creating spaces that appeal to students, enhance performance and foster learning. Work spaces should be provided for specialized activities like Fine and Applied arts. The summary of the findings of all the studies cited confirm the importance of space in a range of teaching and learning environments and that these spaces should be viewed by academics and professionals as tools suited to a particular mode of required learning. Although Baker (2012) notes that research to guide the customization of classroom is scarce, some studies confirmed the educational benefits of space design based on applied learning principles can be used as guide. Education institutions should now have compelling reasons to move in new directions and design physical space that support students' performance and success (Dittoe, 2005; Oblinger, 2006; Akinsanmi, 2007;WGS, 2010).Baker (2012) suggests that designers and architects of physical learning environments will have to provide engineers and facility planners some spatial specifications according to educational requirements when creating a physical context for learning how student's productivity can be affected by spaces and the learning environment (Taylor, 2008; AIA, 2010; Parsad & Coopersmith, 2012). Therefore, research on learning environments and classroom design should focus on this question of how students' productivity can be affected by spaces and the learning environment (Taylor, 2008; AIA, 2010; Parsad & Coopersmith, 2012).

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2.3.2 Effects of Lighting (Visual) in Fine and Applied Arts Classroom

Although illumination standards for classrooms have largely levelled off in recent years, there is still some disagreement about the most basic question of how much illumination is necessary in the classroom (Baker, 2012). The major barrier also remains that while lighting experts have a sense of what a good visual environment should look like, how to measure lighting and daylighting within specific performance standard is yet to be developed. Baker (2010), notes that there has not been a great deal of research onthe effects of light on students, adding that a review of some of the more basic (and often animal-based) research that have been conducted provided a perspective for considering the human element in school facility design, construction and performance. Since it has also been established that environmental lighting exerts profound biological effects on humans, in addition to providing visual stimulus, the planned use of light should be an important consideration forclassroom design because of its health implication which could affect the performance of tasks (Figuero & Rea, 2010).

Lighting (visual) effect as a variable in classroom design has been classified into naturally-generated lighting (daylight) and electrically-generated full spectrum light (electriclight) as means of illuminating classroom (Benya, 2001). Different studies of classrooms (CIE 2001; Boyce, Veitch, Newsham, Myer & Hunter 2003; Veitch, 2004; Bartel, 2007) have discussed the effects of lighting on performance. Most of these studies demonstrated clear relationships between the presence of light and human performance in building, especially classrooms which were intentionally designed to provide sufficient interior daylight for normal daytime visual tasks (Heschony, Wright & Okura, 2002). In a study by Fielding (2000), the effects of daylight on performance in Art classroom was observed to give off a continuous spectrum of all light wavelengths, including blue, red and green, appearing as a bright white and providing a high quality of light for most visual tasks whichwas more accurate for viewing colours.

A research in the USA by Branz (2007) also linked day lighting in classrooms to a 20% improvement in students' performance. Similarly in some research carried out in New Zealand by Nielson in 2006, and 2007, it was reported that good natural light helped to create a sense of physical and mental comfort, and its benefits was far-reaching more than merely being a source of light. Other studies (Hatthaway, 1992; Kuller & Lindsten, 1992; Nicklas & Bailey, 1997; Heschong & McHugh, 2000) also observed that the presence of daylight had positive impact on student performance and even health. Studies by The Heschong Mahone Group (1999) and Kuller and Lindsten (1992) have earlier demonstrated a positive correlation between day,

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lighting and academic performance.Some studies on other sources of light (Heschong, 1999; IESNA, 2000; Benya, 2001 andBartel, 2007; Figuero & Rea, 2010) demonstrated statistically significant association between electrically-generated full spectrum lighting and students' performance. In a study to compare the effects of electric illumination and daylight illumination, Heschong, Wright and Okura (2000) found a significant correlation between the presence of light, performance and human behaviour. They identified statistically significant effects of light on human behaviours as evidenced in the standardised test scores for elementary school students.

In another experiment to find out the effect of different sources of light on performance, Zamkova and Krivistskaya (2004) reported that students who received exposure to ultraviolet light had resistance to fatigue and improved in academic performance better thanthose who were exposed to regular fluorescent light. This supports the findingof Hehrabian and Russell (1974), as reported by Griffin (1990), that extremely low levels of light are not pleasurable or productive in task settings, and that increased levels of white lightwould increaseactivity. Wohfarth and Hargreaves (1986) andThompson (1989) conducted studies on the non-visual effects of different types of lighting in classrooms and tested for physiological development and school performance effects of four common classroom lighting types of elementary students. A correlation between light, attendance rate, achievement, health and general development was observed. Thefindings in all these studies demonstrate that there is a strong correlation between the presence of light from different sources and performance.

Other studies (Veitch, 1992; EPA, 1999; McDaniel, 1999; McHugh & Heschong, 2000) conducted to determine the effects of mixed light sources (that is naturally-generated day lighting and electrically-generated lighting) on classroom design and students' performance reported significant contributions of different sources of light beyond task performnace to moods. It was observed that changes in mood could occurby a slight increase of Illumination. In a pair of experiments to determine the effects of lighting design on performance, mood and satisfaction in the classroom, Boyce, Veitch, Newssham, Myer and Hunter (2003) tested a model of relationships between lighting appraisal, room appraisal mood and satisfaction. They claim that lighting which people rate as being better from different lighting conditions has a connection to health (physical and visual comfort) and well-being (satisfaction). From other studies (CIE, 2001;Boyce, Veitch, Newsham, Myer & Hunter, 2003;Veitch, 2004; Bartel, 2007), there is evidence that poorly designed day lighting, as with poorly designed electric lighting, can create visual discomfort, disabling glare and decrease performance. Incorrectly placed window for day lighting can introduce undersiable solar heat gain, causing discomfort and increasing ventilation

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problems (IESNA, 2000). Good day- lighting design requires understanding a building's local climate that should be balanced, diffused, and glare-free from two or more directions. It is suggested, therefore, that there should be:

- Sufficient light levels for the tasks in the space,
- Operation of shading devices to reduce light intensity for audio-visual programmmes and computer work,
- Creation of windows for interest, relaxation and communications with the outdoors, and
- Exterior shading devices to minimize solar heat gains during cooling season (IESNA, 2000; Benya, 2001).

From the foregoing, three potential pathways are suggested for daylight and electrical light mechanisms that can improve human performance; increase visibility, enhanced mood and improved health in Fine and Applied Arts. Such light effects might be a function of any or any combination of the following:

- Higher illumination levels under daylight
- Better colour rendition under daylight
- Improved spectral content of daylight (Scotopic enhancement)
- Improved three-dimensional modelling with high lights and shadows,
- Reduction of flicker effects from electric light.

The expectation is that these should improve student and /or teacher morale or perfomrnace owing to:

- Mental simulation from varying lighting conditions
- Calming effects of a connection with the natural world (weather, time of the day)
- Greater mental alertness because of circadian biochemical responses to daylight neurotransmiting levels
- Better memory retention owing to one or more of the above processes to improve longer-term health because of circadian biochemical responses to daylight.

Good lighting is contextually determined. Research on the effectsof lighting on performance within the context of Fine and Applied Arts has been dominated by two relatively circumscribed themes: visibility which focussed on the threshold viewing conditions; and visual comfort, which focussed on the threshold between comfort and discomfort (Veitch, 2004). In Fine and Applied Arts, lighting does more than reveal fine details (visibility) and control glare (visualcomfort). It serves a broad range of needs for people in spaces. For example in Fine and Applied Arts classrooms, the quality and sourceof lighting determine the study of concepts like

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shading and shadows. Lighting and illumination conditions that are not visible enough may affect observation and contribute to the production of poor quality works in drawing, graphics, painting and modelling in sculpture. Therefore, a visual art learning studio needs direct and zoned lighting options that can be alternated for different tasks when the need arises. As a rule, Fine and Applied Artsclassrooms need good directional day lighting and a high level of electric light luminance. From the summary and recommendations of some studies conducted (Veitch, 2001; Houser, Tiller, Berserker & Mustrick, 2002; Newsham, Veitch, Arsenault and Duval, 2004; Bartel, 2007; Bartel, 2007; Branz, 2007; Figuero & Rea, 2010) lighting the art rooms should be to provide good lighting with:

- Good controls to window so that variation can be achieved with colour rending lamp
- Different levels of lighting that will vary with different types of work
- Good colour matching light and device that are needed for most art works

It is equally necessary to provide task lighting for demanding work and to provide some feature lighting for displays. Some of the higher levels of lighting can be provided locally to increase interest and variety.

2.3.3 Effects of Thermal Condition on Performance in Fine and Applied Arts

The thermal quality of a classroom is described as the overall composition, state and level of indoor air, humidity and temperature, which is largely determined and controlled by different ventilation systems and designs of classroom (EPA, 2003; ASHRAE, 2010, Hille, 2011). From several studies in the 1950s and 1960s (McCumington, 1952; McDonald, 1960; Nolan, 1960; Pecollo, 1962; Stuart & Curtis, 1964; Manning & Olsen, 1965; Heardle, 1966) to the present (Marks, 2009; ASHRAE, 2010, Hille, 2011; Baker, 2012; Parsad & Coopersmith, 2012) much insight has been gained through scientific studies about the thermal environment of classrooms and its relation to learning. There is now a growing body of work linking educational achievement and students' performance to thermal quality (Jago & Tanner, 1999; Indoor Air Quality Scientific Findings Resource Bank, 2009).

In various studies, thermal comforts have been reported to influence task performance, attention spans and levels of discomfort. Similarly, thermal conditions that are below optimal level are observed to affect dexterity, while higher-than-optimal temperatures decrease general alertness and increase physiological stress (Lackney, 1999). Murakani (2006) notes that ideal thermal classroom environment had an effect on the mental efficiency of students especially in situation where they were performing tasks that are related to quick recognition and response. He

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supports maintenance of an ideal temperature range for higher achievement in relation to mental efficiency and thermal conditions. Ito (2006) avers that human beings work most efficiently at psychomotor task like construction, carving drawing and painting in Fine and Applied Arts when the environment is at a comfortable temperature.

As a component of the thermal quality of classrooms, indoor air quality (IAQ) continues to dominate research activities linking performance to indoor air quality and academic achievement. There is evidence from research (Barr, 2000; Platts-Mill, 2000; Wargock & Wyon, 2000; Leyten & Boerstra 2002) that poor indoor air uality (IAQ) can cause illness requiring absence from school and can cause acute health symptoms that decrease performance while at school.The studies cited above argue that poorer perceived air qualities caused reduction in work performance because the same indoor environmental condition affected both performance and perceived air quality. Better perceived indoor air quality correlated with improvements in various tasks, with approximately a 1% increase in task performance per each ten percent decrease in the percentage of occupants dissatisfied with indoor air quality. It can be concluded that as temperature and humidity increased, achievement and task performance deteriorated, attention spans decreased and students reported greater discomfort. Cooler classrooms increased feelings of comfort, activity and productivity. In addition, recent data suggest that poor IAQ may directly reduce a person's ability to perform specific mental tasks requiring concentration, calculation or memory (EPA, 2003; Indoor Air Quality Scientific Findings Resources Bank, 2009; ASHRAE, 2010).

Evidence that various environmental conditions are closely linked with the incidence of objectively measurable adverse health effect is rapidly emerging from schools. From the analysis of the indoor air quality (IAQ) of some learning environments, a variety of particles and gaseous contaminants were found tohave health implications that related directly to performance (EPA, 2003). These contaminants commonly referred to as indoor pollutants, affected students' health and performance adversely. For example, a European study of 800 students from 8 colleges provided data on indoor air quality, health symptoms and students ability to concentrate. In the study, carbon dioxide measurements were taken in the classroom and students were given a health symptom questionnaire. Responses and findings which were statistically significant suggest that reduced ventilation rates and higher indoor pollution is associated with a decreased ability to concentrate along with increased adverse health symptom. Snedje and Norback (2000) also reported similar results when using subjective reports of performance, which confirmed the

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claim of laboratory studies that the effects of a mixture of volatile organic compounds (VOCs) can decrease performance of sensitive students.

Also in some studies of some laboratories, studios and classroooms (Bako-Biro, 2000; Norback & Wallinderner 2000; Kajtar, Herezek & Lang, 2003;Kajtar 2006; Seppanen, Fisk & Lei, 2006; Bartel, 2007) evidence emerged on how the performance of students in creative thinking and studio work in Fine and Applied Arts was affected by indoor air pollutants. In some of the studies, it was discovered that activities and many materials that were previously thought to be harmless were found to be harmful. Activities like spraying, clay mixing, glaze mixing, soldering and many art materials and chemicals for photography printmaking chemicals, paint thinners, fixtures, glazes and dust contain chemicals and toxins called volatile organic compounds (VOCs). To find out the effects of indoor pollutantson work performance and control it sources, Myatt (2002) measured approximately 4% to 16% increase in the performance (speed or accuracy) of selected task, for example when indoor pollutant sources were removed while performance of other tasks (creative thinking) was not significantly affected by source removal. The study concluded that the magnitude of performance improvement from pollutant source removal or exclusion is likely to depend highly on the source characteristic and building ventilation rate. As a means of ventilation,appropriate exhaust booths with a dedicated exhaust fan that keep all fumes away from the user can be used to control toxins if they cannot be totally removed at the source.

The findings of a survey by Nielsen (2003) have been supported byMendell and Heath, (2005): a well-ventilated classroom and the elimination of odours were essential elements of good design for learning.Awell-ventilated learning environment as Kjtar (2006) opines, supports task performance and concentration. In some related scientific studies (Braganza 2000;Myatt, 2002; Daisey & Angell, 2005; Fancy &Wargocki, 2007), it was observed that performance can be improved from a few percent to possibly as much as 10% by providing superior environmental quality. In an experimental study to determine the effects of temperature on school work performance, Daisey and Angell(2005) discovered that the average speed of completing academic work based on monitoring of performance of eight simulated school work tasks decreased by approximately 1.1% per each 1^0F as temperature increased from 68^0F to 77^0F The number of error in school work was not significantly affected by temperature change in the experiment. The study concluded that increase of 5% to 10% in aspects of student performance may be associated with doubling the ventilation rate when rates are at or below minimum

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ventilation standards (15 cfm per student). However, data relating ventilation rate with school performance are not extensive.

Nielsen (2003) reported that, in a study involving teachers, students, architects and designers, all participants regarded ventilation and temperature control as critical to a good teaching-learning environment. They agreed that when stuffiness and carbon dioxide build-up are minimized, students can stay awake and would be attentive during class. They alsoopined that the quality of the thermal environment in the classroom would affect the way in which the students would grasp instruction. According to McGuffy (1982), empirical historical studies dating back to 50 years have indicated that temperature above the range of 72-80^{0}Ftends to produce harmful physiological effects that decrease work efficiency and output. Shaughnessy (2006) also found that temperatures above 80^{0}F tend to produce harmful physiological effects resulting from poor ventilation which interferes with heat loss from body surfaces produced from the effect of temperature, humidity and air movement.

As a means of controlling the temperature, humidity, and air movement in classroom, Wargorcky and Wyon (2007) discovered that air condition was considered to be the most critical factor in providing an optimum thermal environment for learning. They concluded that classroom conditions were improved by air conditioning, thus creating comfortable conditions which reduced annoyance and improved visual display. Likewise students performance, attitude and behaviour improved in proper air-conditioned climates, making it easier to concentrate and making them feel less drowsy and fatigued. Mendell and Heath (2005) assert that higher temperature has a negative relationship with academic learning. In relation to this finding, Seppanen and Fisk (2006) note that students in an ideal thermal environment make significantly fewer errors on tasks than students in regularly controlled thermal environment. Wargocki and Wyon (2007) observe a greater gains in academic achievement of students in climate controlled classrooms as opposed to those students in non-climate controlled classroom.

2.3.4 Effects of Acoustics on Performance in Fine and Applied Arts

As a design variable, acoustics essentially deal with the control, management and treatment of noise and sound to a bearable level within a given space. Like lighting, ventilation, air temperature and other environmental factors that affect learning, acoustics also play an important role in determining the outcome of the teaching-learning process. Considerable research efforts have confirmed the effects of acoustics on classroom design and teaching andthat good acoustics contribute to good learning and performance within an environment (Lucas, DuPress & Swing, 1981; Mackenzie &Airey; 1999; Lackney, 1999; Nelson & Soli,

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2000; Acoustical Society of America, 2009). The summary of the findings of these researches reveal that:

- 71% of the teacher felt that internal classroom noise was a problem.
- More than one-third of the teachers indicated that they had to speak at a level that strained their voices.
- About half of the teachers said they had to considerably raise their voices during group work.

Schneider (2002) suggests that the research on acoustics within the context of learning should be consistent and continuous in order to support improvement in classroom design.The critical relationship between good acoustics and a good learning outcome is further demonstrated in some other studies. In a survey on best practices in school design (Nielson, 2003), teachers and students found that concerns about acoustic, rate slightly higher than other environmental areas. Poor acoustics received a higher mention for the worst classrooms the teacher had taught in. Teachers attached importance to noise level in classrooms and schools. Lackney (1999) found that the teachers believed that noise impairs academic performance. Indeed, it appears that external noise cause more discomfort and lower efficiency for teachers than for students (Lucas, 1981). This factor could lower the quality of teaching and, ultimately, learning and performance. Research has shown that bad acoustics alone can have the greatest influence on learning (New Zealand Ministry of Education, 2003).

Olla (2006) posits that noise is an unwanted sound that is physically and culturally determined while its understanding, interpretation and influence are psychological.According to Crandel, Smalding and Hexer (2004), a common expectation is that noisewill have a negative psychological effect on task performance. However, laboratory results are mixed on this submission. This is due to the number of variables involved, for instance the properties of the noise, the type of task being performed, the stress tolerance and other personality characteristics of the individual. Since it is very hard to control all these variables, inconclusive findings normally occur. This places some doubt about the validity of laboratory experimental research methods to investigate this phenomenon. Bell, Fisher, Baun and Greene (1997) identify noise and too many distractions, which include reverberation, as the major causes of acoustical problems. In a synthesis of existing works, Earthman and Lemastered (1998) present three key findings: (i) higher student achievement is associated with schools having less external noise; (ii)outside noise causes increased student dissatisfaction within their classroom; and (iii) excessive noise causes stress in students.

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Fisher (2000) affirms that high noise level, apart from causing stress, also affects verbal interaction, reading comprehension, and cognitive task; induces feelings of helplessness; affects the ability to concentrate, and thus affect performance. Research further indicates that high level of background noise, which comes from heating and cooling system, equipment and activities adversely affect learning environment, especially for students who require optimal conditions for hearing. Gordon, (2010) and Baker (2012) recognise four basic requirements for good and satisfactory hearing conditions in any classroom:

i. Sufficiently low level background noise
ii. Adequate separation of successive sounds(reverberation control)
iii. Proper distribution of sound within the space
iv. Sufficient sound control

Cohen, Glass and Singer (1973) compared the level of noise from two different classes -a quiet classroom and a noisy classroom. Students in the noisy classroom had more difficulty in solving complex tasks and puzzles, implying that loud noise impair intellectual performance and complex tasks. Where the students worked cooperatively in small groups the noise level rose.

In some studies of the impact of acoustics on performance indesign, art and technology rooms, Whitelaw (1999), Australian/New Zealand Education Board (2000),Nelson and Soli (2000) and Nielsen (2003) identify two general acoustic categories that are associated with activities in Fine and Applied Arts: (i)high noise levels where materials such as wood, metal and plastic are designed, cut and shaped; and (ii) moderate/low noise level where textile , drawing, sculpturing, painting and graphics are done. Nielsen (2003) found that the use of noisy equipment caused reverberation and, at a high level, the noise became hazardous and persistently broke student concentration. Nelson and Soli (2000) reported that high level of noise generated within the Fine and Applied Arts classroom caused stress, induced feelings of helplessness, engendered inability to concentrate and there was lack of extended application to learning tasks.

However, asfurther attempts to examine the effects of noise on performance in Fine and Applied Arts continued, interesting and contrasting results came up. From an experiment to determine the therapeutic effect of noise and sound on health, mood and performance, McLaren (2005) claims that, when noiseproduced some rhythmic sound at a regular interval, it was observed to produce a unique form of arousal. Noise is a constant phenomenon in Art classrooms.In Fine Art and Applied Arts classes, the regular noise which occurs from some activities and the use of background music as a form of arousal has been found to be significantly correlated to an increase on task performance, as demonstrated by McLaren and

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Dickson (2005). In the study, it was observed that in general environments, non-musical noise was found to increase arousal as pitch (frequency) and loudness (amplitude) were increased. The same study also found that when music was used, loudness and tempo had a direct positive relationship on both performance and physical activity. It could, thus be concluded that having some types of background music for some courses may bebeneficial to learning. However, as noted from the studies reviewed, background music should not be so intrusive that it becomes perceived as noise and thus detrimentally affecting performance.

From the foregoing, it is clear that acoustical performance is an important consideration in the design of classrooms. Poor or good acoustics can have a major impact on student abilities to hear, focus, concentrate and learn. As emphasized by different studies (Schmid & Thibault, 2001; Acoustical Society of America, 2002; Nielsen, 2003), it is imperative that teachers and educators understand that:

- Good acoustical control in teaching spaces are important for general well-being
- A quiet teaching environment creates calm atmosphere.
- An acoustically well-designed classroom is desirable at all times.

It is however suggested that all knowledge-based societies should do what is necessary to eliminate acoustic barriers to learning in classroomssince the classroom serves as a communication channel for learning essential academic, social, arts and cultural skills for students (Sutherland & Lubman, 2001).Therefore controlling noise to advantage should preoccupy new and recent areas of interest with regard to creating better environmental conditions for learning (ASA, 2009).

2.3.5. Facilities and Equipment and its Effects in Fine and Applied Arts

Facilities and equipment areconsidered a combinedvariable of classroom design which constitutes a significant and major part of the requirements for the teaching and learning of Fine and Applied Arts. Apart from their functions as teaching and learning places and aids, they also serve as tools and resources of production for the various art works. Facilities and equipment are viewed as strong determinants of students' performance and they influence the design of the physical layout of the classroom. Facilities and equipment are categorised into (i) Specialised, ancillary and auxiliary spaces; (ii) furniture and furnishings; (iii) machine and tools; (iv) instructional media and materials (ERIC, 1995; Abimbade, 1997; Butin, 2000; Polette, 2002; Lackney, 2003; Bartel, 2007). The relationships between facilities and equipment and students' academic performance have been highlighted in some studies (Nwagwu, 1997; Idiagbe, 2004;

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Aihievbolona, 2005; Uwhreka, 2005; Emi, 2007; Mamza, 2007) conducted to determine how the availability of facilities and equipment affects pre-service teachers' training in colleges of education. Some of these studies showedthat students' achievement and performance have positive and significant relationship with the quality and availability of facilities and equipment (Oghuvbu, 2009).

In an assessment to ascertain the quality of the Fine and Applied Arts' training environment of pre-service teachers, Aihievbolona (2005)found that the college of education environment on its own is an essential system whose integral components of facilities and equipment, personnel and training schedule collectively determine both the teacher's and student's performance. Like a characteristic of a system, in which a part is as important as a whole within its operation, facility and equipment indices similarly contribute significantly to creating a positive learning attitude in the pre-service teachers. Nwagwu (1997) opines that relevant teaching facilities, equipment and materials can positively determine the learning of rudimentary and basic skills in the diverse areas of Fine and Applied Arts ifthey are made available when needed because they are interrelatedly functional with other requirements in determining the performance and academic achievement of the students.

Studieshave also revealed certain barriers whichcould prevent the qualitative and meaningful training of pre-service teachers' leading to higher performance. In a study of the quality of pre-service teachers' Fine and Applied Arts learning environment in colleges of education, Mamza (2007) identifies the dearth of basic tools, equipment and a purpose-built studio as some of the problems affecting the quality of training, thus resultingto the not too encouraging performance of the pre-service teachers.Emi (2007) notes that most of the reports of accreditation exercises conducted by the NUC, NCCE and NBTE on the Art programmes of Nigerian tertiary institutions showed that much was not done to provide adequate infrastructural facilities for the teaching of art.Most of the highlights of the reports identified infrastructures to be generally not in consonance with the trends and development in teacher training, as most facilities were out-modelled, obsolete and inadequate. This, comfirms Uwheraka's (2005) observation that the quality of training obtained from facilities below the approved standard, leads to reduction in the quality of teaching and learning, thus resulting to poor students' academic performance. Also, in a comparative study of two classes in Fine and Applied Arts, Oghuvbu (2009) found that the availability of facilities and basic equipment promoted effective teaching and contributed to the academic performance of students who were taught with relevant instructional resources, while students who were not taught nor had no exposure to instructional

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resources performed below the other group. The study concluded that those whowere not taught with instructional resources mastered no skill.

As a category of instructional resources, multimedia have always had influence on what happens in the classroom. The use of multimedia and simple graphics to teach complex tasks provide stimulating effects. Most of the software and packages include music, animated three-dimensional graphics and video, while some of these packages give spoken instructions.In a study on the effect of multimedia and computers on the cognitive development of students in art education courses, Milton and Spradley (1996) found that the cognitive ability of the students was enhanced with the use of 'cognitive enhancers'. The concept of cognitive enhancer is based on the assumption that the cognitive strengths of a person and a computer technology can be used to complement each other. Also from the group of multimedia, the computer is regarded to be the most influential and versatile form of technology equipment in the teaching and learning process. Various studies on the use of computer in education (Coley, Cradler&Becker, 1992; Chaves, 1993; Clark, 1994; Engel, 1997; Fuchs & Woessmann, 2004; Lee, 2004) identified engagement, motivation and concentration as some prerequisites for learning which the computer can provide when used for the teaching of the arts.

For example, the computer has much more short-term memory, in the form of Random Access Memory (RAM) than do humans. Conversely humans store information over the long term in rich network of associated textual, temporal, visual imagery, which gives them an advantage over any other package applied to solve problems (Gardner, 1982; Beicher, 1994; Jonanssen, 1996; Jonansen & Reeves, 1996). Computer-Aided Design (CAD) software has revolutionised professional practices and dramatically increased productivity in engineering, architecture and Fine and Applied Arts. In a 'tutee' approach, Papert (1980) argues that students develop higher order thinking skills and creativity by using the computers to perform some tasks such as drawing a figure using friendly "programming languages," such as logo and micro words, such as Karel the Robot (Popyak, 1989). From the foregoing, Donovan and Bransford (2005) opinethat new tools and technologies (interactive video) are allowing students and teachers to find new ways to communicate, collaborate and interact, noting that ubiquitous access to information has helped to shift the emphasis of education away from the simple transmission of information to an active acquisition of skills and knowledge.

2.3.6 Learning Environment: Its Physical and Psychological Attributes

The concept of environment as applied to educational settings refers to the atmosphere, ambience, tone or climates that pervade the particular setting (Dorman, Fisher & Waldrip, 2006).

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Hiemstra (1991) views the learning environment as all of the physical surrounding, psychological or emotional conditions and social or cultural influences affecting the growth and development of a learner in an educational enterprise. A learning environment can also be conceptualized as a system of interconnected components that mutually support one another (Akinsanmi, 2009). A learning environment can be considered as the socio-psychological context in which learning takes place. Therefore, according to Fraser and Walberg (1991), producing favourable and conducive environment that can maximise learning outcomes and increase task performance is a neccessary prerequisite within an educational setting.

Learning environment as a significant and integral part of the learning process has received considerable attention from educational researchers in the past decades. In recent years, the learning environment has been considered, as one of the crucial factors associated with students' cognitive learning outcomes and task performance (Margiante, 2007).The influence of the learning environment on the process of education has received a great deal of attention from educational researchers during the last three decades (Fraser, 1998). As a field of educational research, the study of learning environment has attracted considerable interest at the primary, secondary and post-secondary school levels to determine if the opportunities given to the learners to excel and nurture their potential could be available both in and out of the classroom (Goh, 2007;Taylor, 2008; Gavis,2010).

Some studies have shown the potential benefits of assessing and studying learning environments in different dimensions, that is physical, psychosocial and physiological for the improvement of the teaching and learning process and those involved in the process that is the teacher and the learner. Results of studies conducted in the past thirty years have provided convincing evidence that the quality of the classroom environment in schools is a significant determinant of students'learning (Fraser, 1994; Gordon, 2010).Dorman Fisher and Waldrip (2006) claims that studies conducted generally in diversified areas of learning environment associations are those linked with learning outcomes that cut accross the continents. These include environment-outcome studies that investigated school-level environment and student outcomes in Mathematics (Webster & Fisher, 2004), the relationship between learning environment, family contexts, educational aspirations and attainment (Marjoribanks, 2004), the effect of classroom and home environments on students' academic efficacy (Cliborne & Ellett, 2005), and the effect of technology on learning environments and students' attitudes in secondary science classes (Temons, 2005; WGS, 2010). Other studies conducted across the continents include those in Brunei (Riah & Fraser, 1996), Singapore (Goh & Fraser, 1998; Fraser

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& Chionc, 2000),Indonesia (Margiante, Fraser & Aldridge, 2001), Australia (Alter, Hays, & O'Hara, 2009; Ewing, 2010; Power & Klopper; 2012) and USA (Parsad & Coopersmith, 2012).These studies demonstrated links between classroom environment and students' cognitive and affective outcomes as one of the strongest traditions of classroom environment research.

The arrangement of the physical environment has long been recognised by professionals in a range of fields as significantly influencing those who occupy it (Loughlin and Suina, 1982 Gordon, 2010). According to Loughlin and Suina (1982), the physical design of a learning space can support or contradict a teacher's expectations as well as impact upon the health of its users. The findings of Loughlin and Suina (1982) has led to the development of the science of ergonomics and the study of physical, physiological and psychosocial factors that can influence a worker's or a student's productivity and health (Woodson,Tillman & Tillman, 1992; Higgins, Hall, Wall, Woolner & McCaughey, 2005; Baker, 2012). Kroener and Grandjean (2001), refer to the person-environment-fit concept developed byHunt in 1975 and modified by Fraser and Fisher in 1983 as an area of ergonomics which examines the degree of fit between the characteristics of a person and the environment.Kerr, Fisher, Yaxley and Fraser (2006) assert that this can determine a person's well- being and performance.

Graetz (2006) observes that all learning takes place in a physical environment with quantifiable and perceptible physical characteristics that are acknowledged could affect learners emotionally, with important cognitive and behavioural consequences. Although emotional reaction to environmental stimuli has been shownto vary widely across individuals and activities in studies by Aldrige and Fraser (2000) and Kline and Fisher, (2002), most students found learning difficult in a classroom that was stiflingly warm. Conversely, an environment that elicits positive emotional response may not only enhance learning, but also leads to a powerful emotional attachment to that space. Any learning environment that produces positive emotional state can be expected to facilitate learning and the development of place attachment (Graetz, 2006). However, Weinstein (1979) and Akinsanmi (2007) note that there is little research on the relationship between physical design and most educational programmes. Akinsanmi (2006) observes that researchers often base their theories on physiological, psychological and sociological changes that take place when learning occurs and often exclude the physical/material conditions that surround the learning process. As a result, learning environments are often described in terms of pedagogical philosophy, curriculum design and social climate and there is little research on the role the physical environment plays in the learning process.

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The areas of psychology that relate most directly to classroom design and learning environments are environmental, educational, human factors (engineering) and social psychology. Classroom psychosocial learning environment research is founded upon the work of Lewin (1935, 1936) who claims that both the environment and its interaction with personal characteristics of individuals are potent determinants of human behaviour. The foundation for the contemporary era of social environment studies provided by the works of Moos (1973, 1974, 1976, & 1979) and Walberg (1976, 1986) has been applied to educational settings (Ker, Fisher, Yaxley & Fraser, 2006). Moos (1976) notes that three dimensions exist in psychosocial environments, namely relationship dimension, personal development dimension, and a system maintenance and system change dimension. Kerr, Fisher, Yaxley and Fraser (2006) examined the seminal work of Moos (1976) and suggest that the environment -behaviour link could only be understood if studied through a holistic socio-ecological approach.

Years of research on the impact of environmental variables on human thoughts, feelings, behaviours and task performance indicate that most of these variables often moderate the effects of environmental variables physically and psychologically (Graetz, 2006; Baker, 2012). However, it should be noted that research on the impact of physical and psychological variables on the classroom learning environments of Fine and Applied Arts is not as voluminous as that in the area of sciences.

2.3.7. Effects of Students' Perception in Fine and Applied Arts

Over the last four decades, research in learning environment has indicated that students' and teachers' perception are important elements in the psychological and social dimension of classroom environments (Fraser, 1998). Atimes, if students are asked to appraise or rate the environment in which they learn, their perception assists tremendously in taking decisions on how to improve the environment. The foundation for the study of individual perception of and interaction with the environment is laid in the Person-Environment Interaction theory, which is well-grounded in Pervin's (1967) transactional approach and Holland's (1965) model of environment. The main thrust of Pervin's approach is the way students perceive the environment and themselves. With this approach, several other studies examining students' perceptions of their learning environments have been conducted in different parts of the world in six countries: United Kingdom (UK), Nigeria, Australia, Israel, United States of America (USA) and Canada (Fraser & McRobbie, 1995). In these studies, it was found that students' perception of learning environment accounted for a significant amount of the variance of learning beyond that owing to difference in their abilities.

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Contemporary classroom environment research efforts, whichwere pioneered by Walberg in the late 1960s and Fraser (1983; 1986 and1989) have shown the importance of looking at students' perception of their learning environment. This line of research on environment has generally emphasized a (a) the development, reliability and validity of learning environment measures; (b) the impact of students' perception of such measures on cognitive, behavioural and affective outcomes; (c) the extent to which teacher, school or contextual factors affect learning environment measures; and (d) how these measures can be improved by changing classroom environments in the desired direction (Waxman & Chung, 2006).By using students' perception of their classroom psychosocial environment, it is possible to predict both affective and cognitive outcomes (Rentoul & Fraser, 1980). Furthermore, research has found that these outcomes can be improved by providing teachers with feedback from learning environment data (Fraser & Deer, 1983; Fraser &Fisher, 1986; Fraser, Malore & Neale, 1989; Burden & Fraser, 1993).

These studies have also established that, in general, students who perceived their learning environment positively outperformed those who perceived their classroom environment less positively. From a theoretical perspective, classroom learning environment research emphasizes a student-mediating-cognition paradigm which maintains that how students perceive and react to their learning tasks and classroom instruction may be more important in terms of influencing student outcomes than the observed quality of teaching behaviours (Knight, Winne & Marx, 1982; Wittrock, 1986 and Waxman, 1991). According to Waxman and Chang (2006), this paradigm assumes that (a) the classroom environment experienced by the student may be quite different from the observed or intended instruction; (b) teaching and learning can be improved by examining the ways that classroom instruction and the learning environment are viewed or interpreted by the students themselves since students ultimately respond to what they perceive is important (Schultz, 1979& Chavez, 1984). Students are considered to be experts of their own views and experiences of school (Oldfather, 1995) and their perception of the learning environment are also essential for understanding the opportunities for learning that are provided for each student in class (Fraser, 1990; Waxman & Chang 2006).

Empirical research on students' perception, task and learning outcomes (affective, behavioural and cognitive) have been explained in the works of Gardiner (1989) whose global model has been adopted widely as conceptual framework for most studies. The model explains the links between students' perception, technology and the environment. Inhis model, the*person* at the centre is the *student* and his*satisfaction* and hence his learning outcomes can be considered dependent upon the classroom *sociosphere* (psychosocial) environment, or *ecosphere* (physical)

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environment or*technosphere* (technology and media). The link between the three is explained in Fig. 1

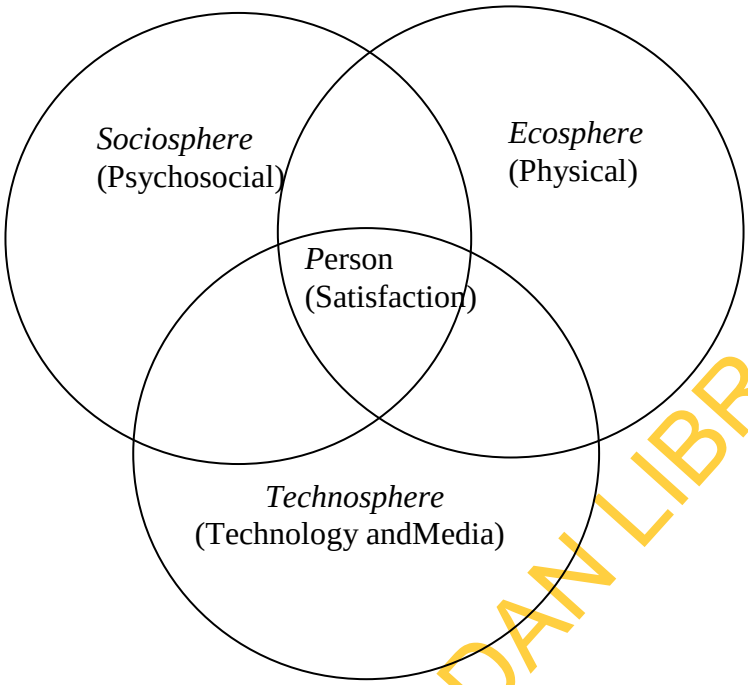

Figure 1: Gardiner's (1989) conceptual model

Students' perception is explained in Gardiner's model as the level of satisfaction desired from the interaction of the psychological (*sociosphere*) the physical (*ecosphere)* and the (*technosphere)* environments, which is determined by the measure of different scales (factors) at different dimensions. Aldridge, Fraser, Fisher and Wood (2002), investigating whether association existed between psychosocial and physical classroom learning environment and student satisfaction and student outcomes, measured student cohesiveness, teacher support, involvement, investigation, task orientation, cooperation, equity, differentiation, independence, and young adult ethics. A number of statistically significant correlations were found between the scales (variables). Positive correlations were found between the psychosocial variables and the scales, while weak associations were found between students' satisfaction and some aspects of the physical environment. It was noted that owing to the association between students physical and psychosocial learning environment, the physical environment can indirectly affect student satisfaction and outcomes (Aldridge, Fraser, Fisher & Wood, 2002).

Some other different environment models have been identified apart from Gardiner's model. Holland (1986) identifies six types of environments models based on peoples' perception, namely: (i) realistic,(ii) investigative,(iii) social, (iv) conventional, (v)enterprise, and(vi)artistic, which isthe classroom environment of the pre-service teachers of Fine and Applied Arts.In the artistic environment, tasks generally require the use of imagination as well as personal

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interpretation of feelings, ideas or facts. Personal interpretations are usually evaluated against sensory or judgemental criteria. Although excellence is valued, the standards of excellence are often defined ambiguously. Work situation usually requires intense involvement for long periods of time and draw upon a person's total resources. Some work situations (such as drama, music and group projects) involve close interpersonal relationships; other work situations (such as painting, graphics, and textiles) are completed in isolation.

This study adopted and used some of the procedures and instruments in investigating students' perception of the artistic environment described by Holland (1986) as a construct to predict pre-service teachers' performance in Fine and Applied Arts. Inferences from theresults were drawn based on the similarity of science laboratory environment and Fine and Applied Arts' classroom environment, as both operate as specialised classrooms.

2.3.8 Classroom Seat Arrangement and its Effects in Fine and Applied Arts

Ever than before, more design attention is now given to the interior and seat arrangement of specialised instructional spaces, laboratories and performance areas which are used for instructional activities in science, art, technology and education. Research on classroom learning environment and classroom design has focused on the question of how students' interaction, performance and productivity can be affected by the seat arrangement in the teaching-learning process (McGroskey & Sheaham, 1976; Becker, 1982 &Pappas, 1990; Yeats, 1997). Findings from different studies (Heston & Garner, 1972; Becker, 1982; Vosko, 1991; Hill & Cohen, 2005; Bartel, 2007) established positive and significant relationships between seat arrangement, space, behaviour, performance and learning outcomes. In some other studies (Feiter, 1971; Bloom, 1976; Bartel, 2007), observations were made that the type of course taken and activity involved, determined the choice of seat arrangement. However, Sommer (1969), Bloom (1976) and McGroskey (1977) note that students have differential preferences for a type of classroom seat arrangement over the other. Thompson (1973) avers that a causal relationship couldensue between participation and interaction owing to seat arrangement .The implication of seat arrangement on health has also been reported by Vosko (1991). Seat arrangement could also have significant influence on student psychology, peer relationships and student performance (Hill & Cohen, 2005).

While there isprobably an infinite number of ways of arranging seats in a classroom, McGroskey and McVetta (2004) identify three asthe most common: traditional, horseshoe and modular. The traditional seat arrangement of classrooms typically consists of about five or six perfect straight rows, each containing five to seven chairs equidistant from each other; it has a

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long historical existence. Sommer (1969) avers that the straight row arrangement evolved in order to make use of the only adequate lighting available then – natural light from side windows. Inspite of developments in lighting, which make the straight row arrangement unnecessary, traditional arrangement still persists and, in fact, dominates seat arrangements in classrooms. In asurvey of seat arrangements of classrooms on a university campus, Bartel (2007) found that over 90 percent of the classrooms had this arrangement.The horseshoe or semi-circular arrangement was noted to be frequently employed in smaller classes, such as seminars. Some rooms were not physically conducive to this arrangement of seatsin classes because of the dead space in the middle. Consequently, a "double horseshoe", two semi-circular rows with one inside the other was frequently used. The modular arrangement is found mostly in specialized classrooms, like Home Economics and Science laboratories and in classrooms at the lower elementary school levels. Koneya (1973), Brophy and Good (1974) have shown that the traditional straight-row arrangement is predominant in most educational settings, particularly in college and upper elementary through high school settings. According to Good, (1974) and from the vantage point of the specialist in instructional technology, the cause of this dominance is elusive and very difficult to explain. The conclusion is that if seat arrangement is discussed at all in a teaching method course, the traditional arrangement is virtually always attacked and always seen as a less desirable alternative than the others because of the implication it has for task performance.

The kind of task as well as the amount and kind of activities that occur in the classroom has long been thought to be partially a function of the seating arrangement of students.Substantial research has been donetoinvestigate the nature of task in traditional seat arrangement in classrooms. The physical layout of a classroom and the performance of task effectively in it have also been established by environmental planning researchers to be essential to the success of both the student and the teacher. These also serve as determinants of their comfortable functioning in the classroom environment (Friedrich, Galvin and Book, 1976; Gorham, 1981; Council of Educational Facility Planners, 1991; Owu, 1992; Tessmer & Harris, 1992). Taking a functional approach to the arrangement of seats for example, Hurt, Scott and McCroskey, (1978) argue that each of the three arrangements has positive elements, depending on the desired type of task in the classroom.

Adams and Biddle (1970) investigated the effect of traditional or straight row seating on students and found that location within the seat arrangement was the main determinant of whether a student was actively involved in the process of performing a task. Identify the centre

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of activity where most interactions take place to be the area extending from the front of the room directly up to the centre light and diminishing in intensity as it moves farther away from the teacher. McCroskey (1977) repeated Adams and Biddle's (1970) study with a discussion group and found a linear relationship between row and interaction. Students occupying the first row contributed six times as many statements per session as the last (fourth) row.

Hurt, Scott and McCroskey (1978) opinethat, if the purpose of the class is primarily one of information dissemination, the traditional arrangement is probably the best because it minimizes student-student interaction and places the primary interaction focus in the classroom on the teacher. Some studies (Baster, 2002; Hill & Cohen, 2005) have also identified similar interaction patterns in small group settings and seat arrangements. They observe that the teacher is the primary focus in the traditional arrangement, as the teacher and the studentswere the focus in the horseshoe arrangement, while the student was the focal point in the modular arrangement. Although previous research suggested that students occupying certain seats in a classroom will participate much more than students occupying other seats if they are seated in their preferred position, Hill and Cohen (2005) found that the students sitting directly across the teacher were the most frequent participants, which might be partly due to their vantage positions.

Few studies of classroom seats arrangements (Hurt, Scott and McCroskey, 1978; Baster, 2002; Hill and Cohen, 2005) have delved extensively into how positioning, locations and conditions affect the instructional process. In a study, students were placed in various seating locations and conditions within a typical general classroom design. They were asked to identify basic shapes on the white board. The result was profound, as a significant number of students could not differentiate a square from a rectangle or an oval from a circle because of where they sat. Several issues came to bear in distorting this fundamental cognitive learning activity. For example, the height of instructional television from students, angle of incidence from students to multimedia, and the impact of screen glare from either windows or overhead lights became issues for consideration. One might contend that it should be simple for students to relocate his/her seat in order to properly orient themselves to the learning activity. During the analysis of one particular popular laboratory arrangement, it appeared that some students had disproportionately lower grades when their seats were located in those portions of the room where the seating view angle to multimedia was extreme, student distances from instructional television were excessive, and the orientation of the student to the teacher was dysfunctional.

Because of the differences in purpose for which each arrangement was best stated and noted from most of the studies cited above, Hurt, Scott and McCroskey (1978) could not suggest

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one system over the others. However, they argue that the traditional system is least conducive to interaction and that if the teacher seeks to increase activities in the classroom, one of the other arrangements should be chosen. They add that it is equally important to consider students' preference for seat within the three types of classroom arrangement.This is in line with the findings of some studies (Baster, 2002; Bartel, 2007) on the seat arrangements of Fine and Applied Arts classroom which draw a general conclusion that students sitting in their preferred position in certain seat arrangements increases a student participation, interaction and task performance. While three quarters of the activities of Fine and Applied Arts are practical with mixed seat arrangements, this cannot be said of other subjects. The seat arrangements of Fine and Applied Arts classes are dieeply rooted in the fundamentals of ergonomics which, in the context of classroom design, means getting the best fit between students and teachers, their school activities, equipment and learning. The objective is to make learning spaces safe, comfortable, efficient and productive. The ergonomic principles of classroom design which also include seat arrangements are determined and influenced severally and collectively by these factors:

- Sightlines: There is the need for semi-circular seat arrangement especially for drawing classes, where students would not have to twist their bodies and heads or move their eyes to the left or right beyond 30^0, otherwise anthropometric discomfort would be created (Vosko, 1984).
- Angle of incidence for the use of projected instructional resources: This deals with the issue of height of the instructional media from the student. It checks the impact of screen glare from either window or overhead lights.
- Distance to view object or model under study: A seat arrangement in Fine and Applied Arts is also determined by the need to observe and represent accurately all the principles and the basic rudiments of drawing like depth, perspective, size, balance and proportion in compositions.
- Distance to view work under production: To view an art work in progress, distance is critical to seat arrangement. For example, in drawing and painting, the students need to relate every touch or stroke made to the overall composition holistically.
- 3-Dimensionality and 2-Dimensionality: Most artworks are appreciated from the round which infers that a flexible seat arrangement is needed to allow the students move round the object of study and view everyangle.

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- The use of machines, tools and equipment determines,to a large extent, different seat arrangements in a case where such tools are permanently fixed; no seat arrangement could be suggested.
- Demonstration: This plays a major role in the seat arrangement of an art class. A seat arrangement that will enablethe teacher to be seen from a vantage position while demonstrating some skills or performing some tasks will be an advantage.
- Territoriality: Human beings, like other creatures, tend to establish territorial space.Care must be taken to honour the territoriality needs of learners. We adjust things within spaces to give meaning to our space and create a sense of comfort and familiarity. In such a situation therefore, a flexible seat arrangement is obvious.

Furthermore, in Fine and Applied Arts classroom environment, the choice of particular seat arrangement is propelled by the need to interact, participate, concentrate and perform. Proximity, distance and spaces are also key issues in determining the type of seat arrangement. In terms of preference, a student is free to seat according to the dictate of the task to be performed and the area of interest to the student. In general and life drawing classes, the choice of sitting is discretional, free from the teacher's interference and control. The seat arrangement of a Fine and Applied Arts classroom is also determined by some activities and anthropometry considerations, as clumsy seat arrangements and poor posture can cause pain and other symptoms in the back, neck, shoulders, hands, wrists and eyes.

There are four elements that can impact on cognitive learning potential in Fine and Applied Arts classroom owing to seat arrangement, use of instructional media, and classroom design. They are:

i. Angle of incidence: It is not uncommon for students seated in the peripheral portion of the laboratory to have less than the 15-degree angle of incidence to either projection, multimedia or white boards (Hills & Cohen, 2005),

ii. Severe angle of incidence: This can seriously cause distortion in which the students may find it difficult to differentiate common information, such as letter "E" from letter "B" and basic shapes. It may also be difficult to interpret accurately information and data presented in graph.

iii. Distance to Instructional Television: The distance to instructional television can often exceed 35ft. Based on physics of acoustics, a student seated 35ft from the television hears1/8thof the volume of what the student sitting from 8ft away hears. Extreme distance

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factor may affect every student as visual information could also become equally obscured (Sims, 2011).

iv. Teaching Style: A surprisingly important, but often neglected aspect of the classroom design that could affectperformance is the teaching style of the instructor. Teachers are often encouraged to move around the room like a public speaker giving a motivational talk (Chan, 2009). However, careful analysis of this issue reveals two important factors:

- Teachers may maintain a left side or right side instructional preference putting them at a greater distance from students on the opposite side;
- As teachers look left and right for emphasis, the volume of their voice can diminish by as much as 50-80% for those students to whom the teachers back is turned.

Although it has been established that different classroom seat arrangements and designs shape and influence how active students are in the learning process, it is not enough to design pleasing classroom environments that are nice to be in without considering for the future (Long & Olson, 2004). The implication of the result of all these studies for instructional communication specialists, facilities designers and classroom teachers are significant. Firstly, decisions on classroom arrangement should take into account the contents, concepts and tasks to be performed. Using traditional arrangement in a course dominated with practicals or the horseshoe arrangement in a theory class may not be a good practice, as students may prefer the opposite. Secondly, students should be given as much choice as feasible in selecting their own seats no matter what arrangement is employed. Regardless of the type of activity, students differ markedly in their desire to perform specific tasks. More design attention must be given to the arrangements of specialised instructional spaces, such as science, art and technology education laboratories, which accommodate multiple instructional activities (Hill & Cohen 2005). A teaching environment that is flexible, well designed, arranged and tended breeds more active participation in the learning process and experience thus aiding performance (Paradise & Cooney, 1980; Burgess, 1981; Huchingson, 1981; Chan, 2009; Sims, 2011; Baker, 2012).

2.3.9 Class Size and its Effects in Fine and Applied Arts

Class size is an important factor in school and learning environment design which drives a host of costly facility-related issues that are part and parcel of the school building, planning, design construction, cost maintenance and operation (Schneider, 2002). Firstly, class size is explicitly a social/organizational variable. Secondly, it is an educational issue that has impact on school planning and design. Class size can have a mediating effect on a variety of variables

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known to have a link to student achievement, time-on-task, student-teacher interaction, classroom interruptions and student participation (Lackney, 1999). There has been intense debate over the effects of class size on educational outcomes and, in the few studies that have actual measures of class size, the results are mixed (Krueger, 2000; Schneider, 2002). While some researchers (Hanusek, 1999; Hoxby, 2000; Johnson, 2000) posit that class size does not matter, Stevenson (1996, 2002) contends strongly that class size by itself is not the real issue, instead, class size is just indicative of other factors that more directly impact on learning and teaching, for example the ability to interact on a personal basis with teachers, and having sufficient resources to attract and retain good teachers. McCauthern (2004) and White (2005) note that class size has little bearing with performance and academic achievement.

Various studies have demonstrated the relationship between class size and achievement.Class size research, most notably the longitudinal research represented by the Tennessee Student/Teacher Area Ratio (STAR) project and the follow-up lasting benefit study, point directly to a social and physical link with achievement (Finn and Achilles, 1990 and Achilles, 1992). Project STAR followed 6,500 children from kindergarten through third grade. Children in smaller classes (13-17 per room) outperformed those in regular-size classes (22-25 per room) as measured by test scores like Stanford Achievement Test. In the early grades, children in smaller classes outperformed children from regular-size classes in all subjects, but especially in reading and mathematics test scores, with average improvement of up to 15%. Smaller classes were especially helpful for children in inner-city schools. A follow-up study that used the same schools andtests showed that students previously in small classes demonstrated statistically significant advantages two years later over student previously in regular-sized classes. Performance gains ranged from 11-34% (Lackney, 1999). Few other researchers (Robinson & Whitebols, 1986; Bohrnstedt& Stecher, 2002) reported slight improvement in students' performance owing to class size.

Some other related studies, research have explored the psychological and educational effects of classroom density of both spatial (the size of the room) and social (number of students) dimensions on students' performance. In their meta-analysis of 77 different studies on class size, Kaire and Ward, (2000) argue that higher social density benchmark is three to five groups of 6 to 12 students each. Spatial density should be such that both students and instructorss have enough room to move easily from group to group (specifically 4 to 7 feet between groups). Research suggests that group of students can be expected to work together most effectively at personal distances of 2 to 4 feet without feeling crowded. Therefore, in planning an appropriate

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environment, consideration should be given to adequate space because of crowding, resulting from inadequate space leads to personal space violation (Epstein and Karlin, 1975). It is imperative, therefore, that designers pay careful attention to the degree to which students feel crowded in a class.Results from other studies were favourable towards the reduction of class size as social scientists hold the popular belief that smaller classes are better (Davis, 2008).

In a review of 19 class size studies by the Centre for Public Education in 2005, some of the studies found no strong linkages between student achievement and class-size-related issues, yet evidence abound that studies with positive effect of class size are almost 60% more prevalent than those with negative results, as earlier reported by Krueger (2000).However, some exceptional cases in few subjects have established numerous links and advantages of class size on behaviour, achievement and performance. Findings from research have also established relationship between class size, space and interaction patterns in studio-based learning settings common in art education (Lackney, 2003). Project-based learning and studio-based instruction emphasize learning as a team process that fosters cooperation and interaction through sharing of ideas that will enable students to process materials better. Rather than struggle as individuals, learners can use the strength of a group to decrease the time it takes to learn a lesson and increase the amount of information absorbed.

In Fine and Applied Arts classrooms, the size of the class has numerous and significant influences on the performance of the students. Various studies (Lackney, 2003; Schneider & Buckley, 2004; Wynn, 2005; Bartel, 2007) generally pointed to the fact that class size was a significant correlate of performance and achievement in Fine and Applied Arts. It was found that when the size of the class was small, particularly at the college level, there was increase time-on-task, more time was allowed for instruction, there was high teacher-student interaction, spatial density and crowding was reduced, spaces were adequate and the resources available went round. Also there was high concentration on the task and there was an atmosphere of satisfaction and decreased disciplinary problems which was noticeable in some studies of elementary classes (Egetson, Harman & Achilles, 1996). However, it was observed that there was no keen competition amongst the students, when the population was very small.

According to Biddle (2002), the current interest in reducing class size remains high over the foreseeable future. It is necessary to mention that, while the econometric evidence (cost of class reduction and cost of constructing more schools) has been inconclusive, there have been a series of experiments in which class sizes have been reduced, and the result of these experiments have been interpreted to support the benefits of smaller class size, as decreasing class size has

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implication for student achievement (Lackney, 1999). A good number studies (Roberts, 2002; Bahrnstedt & Stecher, 2002; Biddle, 2002; Durbin, 2001; National Association of Elementary School Principals, 2000), however, favoured small class size and found that significant relationship exists between performance achievement and class size. From the studies of class size, many inferences have been made that class size affect test scores and achievement and there are significant relationships among teacher quality, class size and student achievement (Breda, 1989; Ferguson, 1991; Folger &Ferguson, 1991; Ferguson &Ladd, 1996; Foster & Gibson, 2007)

2.4 Appraisal of Literature Review

The literature reveals that considerable studies have been done on the influence of classroom design and learning environment on students' performance. Classroom design variables, like spatial configuration, lighting (visual) effects, thermal condition, acoustic factor, facilities and equipment have been reported to affect mood, behaviour and performance. Most of these studies reported correlation between classroom design variables and performance. As noticed in these studies, a good number of design guidelines, parameters and government policies indicate the efforts being made from time to time on the search for the improvement and standardization of classroom design. The literature is also replete with the results of different studies on the effects of only one or two classroom and learning environment variables on the performance and academic achievements of students. The effects of variables like students' perception, teachers' personality, instructional methods and strategies, class size, seat arrangements, gender and socio-economic status on students' performance and academic achievement have been well documented. However, the review of literature reveals that there are no studies on multiple learning environment variables on performance and academic achievements. There is also a dearth of studies on the relationship between physical design, psychosocial variables and their composite effects on students' performance.

The literature reviewed, shows that the problem of students' not too encouraging performance owing to inappropriate classroom designs and uncomfortable learning environment has been carried out in and reported in foreign countries, while the literature has reported very few studies done in Africa. Most of the studies done and reported have not been correlational. It is noted also that, while most of the studies have been carried out in pure, physical and social sciences, very few have been done in the arts or vocational studies. The literature also shows that the majority of the studies on classroom design and learning environment have been carried

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out at the kindergarten, primary and secondary school levels while a very few of such studies have been conducted at the tertiary level. The literature reviewed does not give elaborate mention of studies of classroom design and learning environment of Fine and Applied Arts in colleges of education in Nigeria.

In the opinion of the researcher, a significant gap in the literature regarding the nature of Fine and Applied Arts education classroom design and learning environment in Nigerian institutions exists. The description of sustainable and adaptable classroom designs that could improve performance in Fine and Applied Arts education in colleges of education have not been provided in many studies reviewed. Similarly, literature has not been able to provide and suggest ways on how the current and available classroom learning environments in their present condition could be creatively used to train Pre-service teachers. Not many studies have been conducted on how the quality of training and teacher preparation provided by the Pre-service teachers' trainers affect or determine the students' performance. Variables like lecturers' teaching style, experience, qualification, methodologies, task orientation and many other factors that could collectively enhance and determine qualitative teacher preparation within a predominantly traditional classroom and learning environment have not been holistically examined.

In a way, the researcher observed that studies have not taken cognisance of the need to develop a conceptual framework and strategies on how to change or adapt the traditional classroom as presently being used to suit the demands of some changing and contemporary concepts in Fine and Applied Arts. Some peculiarity of the traditional classroom learning environment of Fine and Applied Arts that have always produced ambience and desirable changes in students are not well emphasized in studies thus, eroding the typical scenario that could be inspirational and captivating. Many studies now emphasize on how to deviate from the typical and traditional art classrooms to a more technology-supported environment which may not be naturally suitable for teaching Fine and Applied Arts. The researcher opines that changing the traditional classroom learning environment could be challenging and gradual, more studies should therefore be concentrated on how improvement could be done to maximally optimize the Fine and Applied Arts classroom learning environment. Therefore, in this study, an attempt was made to fill the gaps identified by investigating some classroom design and learning environment factors of Fine and Applied Arts as predictors of the performance of pre-service teachers in colleges of education in South-West, Nigeria.

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CHAPTER THREE

METHODOLOGY

3.1 Research Design

The study was a descriptive research design of the *ex-post facto* type. The design was considered appropriate since the variables in the study already existed and were not manipulated by the researcher. The study was also correlational, as it determined the relationships among the various variables in the study.

3.2. Variables in the Study

A. **Independent Variables**: There were two categories of independent variables in the study.

1. Classroom design variables:
   - i. Spatial configuration
   - ii. Lighting (visual) effect
   - iii. Thermal condition
   - iv. Acoustic factor
   - v. Facilities and equipment
2. Learning environment variables:
   - i. Pre-service teachers' perception of learning Environment
   - ii. Classroom seat arrangement
   - iii. Class size

B. **Dependent Variable**: There was one dependent variable in the study, which was the Pre-service teachers' performance in Fine and Applied Arts.

3.3. Target Population

The population of the study comprised all the final year Fine and Applied Arts pre-service teachers and lecturers in all the colleges of education that offer Fine and Applied Arts in South-West, Nigeria.The Colleges of Education included those in Ekiti, Lagos, Ogun, Ondo, Osun and Oyo States, namely:

1. Ondo State College of Education, Ikere-Ekiti,Ekiti State
2. Adeyemi College of Education, Ondo, Ondo State
3. Federal College of Education (Technical), Akoka, Lagos State
4. Adeniran Ogunsanya College of Education, Otto-Ijanikin, Lagos State

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5. Federal College of Education, Osiele, Abeokuta, Ogun State
6. Tai Solarin College of Education, Ijebu-Ode, OgunState
7. Osun State College of Education, Ilesa, Osun State
8. Osun State College of Education, Ila-Orangun, Osun State
9. Federal College of Education (Special), Oyo, Oyo State
10. Emmanuel Alayande College of Education, Oyo, Oyo State

3.4. Sample and Sampling Procedure

Two hundred and fifty 300-level pre-service teachers were selected through stratified random sampling technique from the ten purposively selected colleges of education that offer Fine and Applied Arts out of the eleven (state and federal) colleges of education in South-West, Nigeria for the study. Seventy lecturers of Fine and Applied Arts were also selected through the stratified random sampling technique, one each from the seven areas ofFine and Applied Arts, namely: Art History, Art Education, Painting, Sculpture, Graphics, Textile and Ceramics from the ten colleges selected.

3.5. Research Instruments

Five research instruments were used for the study. They are:

1. Fine and Applied Arts Pre-service Teachers' Classroom Design Checklist (FAAPTCDEC)
2. Fine and Applied Arts Pre-service Teachers' Classroom Acoustic Design Questionnaire (FAAPTCADEQ)
3. Inventory for Lecturers on Fine and Applied Arts Facilities, Equipment and Materials (ILFAAFEM)
4. Fine And Applied Arts Pre-service Teachers' Learning Environment Questionnaire (FAAPTLEQ)
5. Fine and Applied Arts Pre-service Teachers Performance Test (FAAPTPT).

3.5.1 Fine And Applied Arts Pre-Service Teachers Classroom Design Checklist (FAAPTCDEC)

This instrument was designed to describe the general layout, spatial, light and thermal quality of the Fine and Applied Arts Classroom environment. It also determined the availability, adequacy and utilization of some facilities and the appropriateness of the conditions that constitute the ambience of the classroom in line with the specification and requirements of the National Commission for Colleges of Education for the teaching and training of the pre-service teachers in Fine and Applied Arts. The instrument contained five (5) sections: (A) Demographic

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information,(B) classroom layout, (C) Spatial,(D) Visual effects,(E) and Thermal (E). SectionsB, C, D and E sought information on availability, adequacy, utilization, location and dimension where applicable of the categories itemised above. The Likert scale type of instrument was constructed along Available and Not Available (availability basis); Very Adequate, Adequate, Not Adequate and Not Adequate At All (adequacy basis); Always Utilized, Rarely Utilized and Not Utilized (utilization basis); and Very Appropriate, Appropriate, Not Appropriate At All (location basis).

Validity

The instrument was validated through peer/expert review; Fine and Applied Artists, Fine and Applied Arts lecturers and curriculum designers were asked to review. The suggestions of the experts, views and criticisms were used to improve the items statements.

3.5.2Fine and Applied Arts Pre-service Teachers' Classroom Acoustic Design Questionnaire (FAAPTCADEQ)

This instrument was designed to measure pre-service teachers' classroom acoustic design in Fine and Applied Arts. It consisted of two sections, A and B. Section A contained demographic information and section B contained a 4-point Likert type ordinal scale of twenty items, ranging from Strongly Agree (SA),), Agree (A), Disagree (D) to Strongly Disagree (SD). The scoring ranged from 4, 3, 2 and 1 for positively worded items, and 1, 2, 3 and 4 for negativeely worded items.

Validity

The instrument was subjected to face and content validation using two experienced Fine and Applied Arts teachers and two acoustic engineers. Their suggestions, views and criticisms were used to improve the items. The draft was then subjected to reliability test by administering it to 20 pre-service Fine and Applied Arts teachers that did not participate in the main study. The reliability index of 0.84 was obtained using Cronbach formula.

3.5.3 Inventory for Lecturers on Applied Arts Facilities, Equipment and Materials (ILFAAFEM)

This scale was used to take stock/ inventory on the availability, adequacy and usage of Fine and Applied Arts facilities, equipment and materials contained in Fine and Applied Arts studio/classroom. This instrument was divided into four sections. Section A contained

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demographic information. Section B asked some questions on quality, dimension, availability and adequacy of various facilities in Fine and Applied Arts classroom /studio. The section was sub-divided into four sections on the categories of specialized, ancillary/ auxiliary, furniture and furnishings. In all, the section had 25 items. Section C and D also asked some questions on quality, dimension, availability and adequacy of the equipment and materials available in Fine and Applied Arts classroom/studio. Section C sub-section (a) had 55 items while its subsection (b) had 5 items. Section D had 21 items.

Validity

The instrument was validated using experts who were two Fine and Applied Arts lecturers and two media technologists to review the items. Their views, suggestions and criticisms were used to improve the inventory. The internal consistency was determined by the experts who used the instruments to rate the adequacy, dimension, quantity and availability of facilities, equipment and materials in Fine and Applied Arts classroom/studio.

3.5.4 Fine and Applied Arts Pre-service Teachers' Learning Environment Questionnaire (FAAPTLEQ)

The instrument was designed to elicit Fine and Applied Arts pre–service teachers' responses on their perception of Fine and Applied Arts learning environment, classroom seat arrangement and class size. Sections B, C and D were constructed on a 4-point Likert type ordinal scale, ranging from Strongly Agree (SA), Agree (A), Disagree (D), to Strongly Disagree (SD) Subsections B, C and D contained 20 items each. The scoring ranged from 4, 3, 2 and 1 for positively worded items and 1, 2, 3 and 4 items negatively worded items.

Validity

The instrument was subjected to face and content validation using two experienced Fine and Applied Arts lecturers who were asked to review it. Their suggestions, views and criticisms were used to improve the items. The draft was then subjected to reliability test by administering it to 20 Fine and Applied Arts pre-service teachers from a college not selected for the study. The internal consistency was ensured using Cronbach method and an alpha value of 0.81 was obtained.

3.5.5 Fine and Applied Arts Pre-service Teachers' Performance Test (FAAPTPT)

This was designed to measure pre-service teachers' level of performance at the knowledge, comprehension and thinking levels of cognition of the selected Fine and Applied

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concepts. The instrument consisted of four parts- A, B, C and D. Part A consisted of demographic information and section B consisted of 40 objective questions. The questions contained one correct answer and four distracters. Questions were drawn from the concepts of Life Drawing, General Drawing, Art History and Art Education; Painting and Sculpture; Textile and Ceramics and Graphic Design.

Table 5: Test Blueprint of Fine and Applied Arts Pre-service Teachers' Performance Test (FAAPTPT)

S/N	TOPIC	KNOWLEDGE	UNDERSTANDING	THINKING	TOTAL
1.	Life Drawing	4 (1,2,7,9)	3 (5,4,10)	3 (3,6, 8)	10
2.	General Drawing	4 (11,15,17, 19)	3 (14,18,20)	3 (12,13, 16)	10
3.	ArtHistory/ Education	2 (25,28)	2 (34,35)	1 (29)	05
4.	Painting and Sculpture	2 (21, 22)	1 (23)	2 (36, 39,)	05
5.	Textile and Ceramics	1 (30,40)	2 (24)	2 (26, 31)	05
6.	Graphics and Design	2 (27, 38)	1 (37)	2 (32,33)	05
	TOTAL	15	12	13	40

* Numbers in parentheses are item numbers

Part C consisted of one question on Still Life composition apractical subject of Fine and Applied Arts. The instrument was designed to test the pre-service teachers' knowledge of the practical aspect of Fine and applied Arts in terms of their abilities to understand the principles of drawing like size, perspective, proportion and balance. The total scores obtainable in this section in the marking guide were thirty-five (35) marks: The pre-service teacher's proficiency in drawing, use of line, shapes and forms (10 marks); application of tone and shading quality (10 marks); composition, proportion, size and use of format (10 marks); and self-expression,originality and style (5 marks).

Part D instrument is the Fine and Applied Arts Practical Skills and Performance Rating Scale.It consisted of tool handling, observation, measurement, drawing and technical proficiency skills and behavioural categories, which include, the use and handling of materials appropriately; relating sizes of objects with each other and observing details; marking of format and use of layout; drawing of composition and use of line and accurate draughtsmanship. This was designed to rate the pre-service teachers' performance on the practical aspect as they draw. Marks

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obtainable in this section were twenty-five (25).The scoring in each skill category are rated 5 (Excellent), 4 (Good), 3 (Fair), 2(Poor) and1 (Very Poor).

Validity

The instrument was validated using expert review, while the internal consistency reliability measure was calculated by using KR-20 formula. After carrying out the item analysis, 40 items survivedout of the 60 items originally constructed. The 20 items with lowest and highest difficulty indices (too simple and too difficult items) were expunged. This implied that the remaining test items were neither too simple nor too difficult. The reliability index of 0 .84 was obtained, while the item difficulty of between 0.42 and 0.57 were obtained for the 40 items.

3.6 Procedure for Data Collection

The researcher personally visited all the participating lecturers in their respective colleges and informed them of the purpose of the research. The reason for the research instrument and its content were explained to the lecturers. They were also informed that the test of performance of pre-service teachers should be conducted in accordance with the college examination conditions. This lasted for two weeks.Twenty research assistants were trained personally by the researcher for two weeks on the administration of the students' questionnaires and the conduct of the Fine and Applied Art Performance Test. They were informed adequately of the purpose and content of the questionnaires and the performance test. The research assistants took inventory of items and activities in the classroom using the Classroom Design Checklist. The inventory for lecturers on facilities, equipment and materials was administered to Fine and Applied Arts lecturers by the researcher, assisted by twenty research assistants for five weeks.Two students' questionnaires namely Fine and Applied Arts Pre-service teachers' Classroom Acoustics Design Questionnaire (FAAPTCADEQ); andFine and Applied Arts Pre-service Teachers' Learning Environment Questionnaire (FAAPTLEQ) were administered to the students, with the help of the Research Assistant for two hours.The Fine and Applied Arts Pre-service teachers' Performance Test (FAAPTPT), which consisted of theory and practical, was conducted in the classroom in accordance with the college examination rules and regulation for one and half hours and two and a half hours, respectively this lasted for five weeks. The studyin all lasted for fourteen weeks.

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3.7 Data Analysis

The data collected were analysed using descriptive and inferential statistics. The descriptive statistics used included percentages, mean and standard deviation, while the inferential statistics used were Pearson's Product Moment Correlation and Multiple Regression.

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CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter presents the results of the study in line with the research questions raised and the hypotheses tested.

4.1 Answering Research Questions

Research Question One: What is the composite effect of the selected classroom design variables: Spatial configuration, visual effects, thermal condition, acoustic factor, facilities and equipment factor on pre-service teachers' performance in Fine and Applied Arts?

Table 4.1: Summary of Regression of Performance on Classroom Design Variables

R	R Square	Adjusted R Square	Std. Error of the Estimate
.355	.126	.108	9.2217

Table 4.1 shows that the five classroom design variables had positive multiple correlation with pre-service teachers' performance in Fine and Applied Arts (R= .355). This means that the five factors are in good position to determine the level of pre-service teachers' performance. The factor further explained 10.8% of the total variance in the dependent variable (Adjusted R Square= .108). This leaves the remaining 89.2% to other factors and residuals.Figure 4.1 presents the pie chart to illuminate this finding.

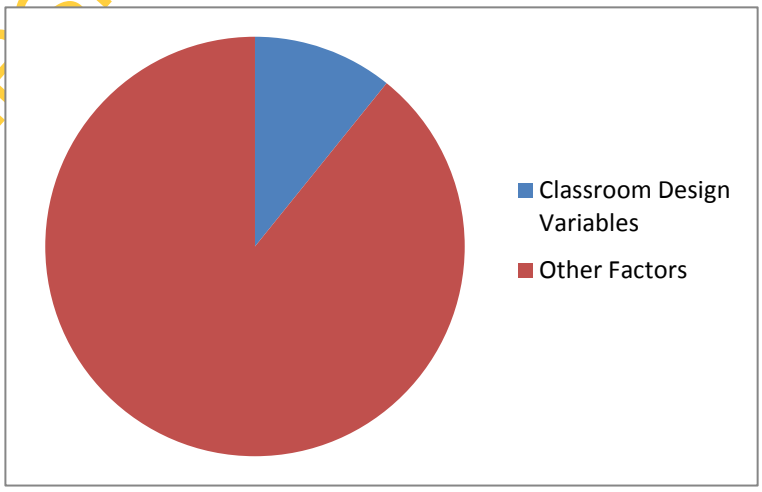

Figure 4.1 Pie Chart Showing Percentage Contributions of Classroom Design Variables to Perfomance

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Table 4.2: ANOVA for Classroom Design and Pre-service Teachers' Performance

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	2988.310	5	597.662	7.028	.000*
Residual	20749.534	244	85.039		
Total	23737.844	249			

* Significant at p<.05

Table 4.2 shows that the R- value of .355 tested significant ($F_{(5, 244)} = 7.028$; P<.05). Hence, there is significant composite effect of classroom design on pre-service teachers' performance in Fine and Applied Arts.

Research Question Two: What are the relative effects of the classroom design factors on pre-service teachers' performance in Fine and Applied Arts?

Table 4.3: Relative Contributions of the Classroom Design Variables to Performance in Fine and Applied Arts

Classroom Design Factors	Unstandardized Coefficients		Standardizd Coefficients	Rank	T	Sig.
	B	Std. Error	Beta			
(Constant)	51.863	6.626			7.828	.000
1. SPATIAL	-.775	.521	.093	4th	-1.487	.138
2. LIGHT(visual)	-.309	.237	.081	5th	-1.302	.194
3. THERMAL	-.232	.101	.139	3rd	-2.292	.023*
4. ACOUSTICS	.404	.176	.142	2nd	2.294	.023*
5. FACILITIES	1.135	.245	.286	1st	4.636	.000*

* Significant at p<.05

Table 4.3reveals that facilities and equipment made the highest relative contribution to pre-service teachers' performance in Fine and Applied Arts (β= .286), followed by acoustics (β=.142). The third in the magnitude of these relative contributions was by thermal condition (β=.139), Spatial configuration (β=.093) and visual effects (β=.081) took the fourth position,and the last position respectively.This is represented in the bar chart (Figure 4.2

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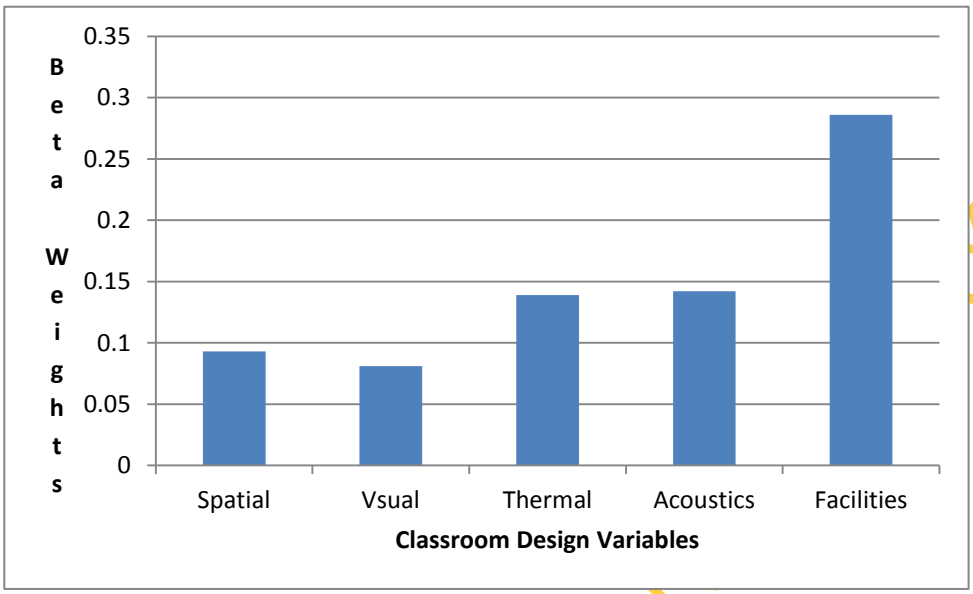

Figure 4.2: Bar Chart of relative contributions of Classroom Design Variables.

Figure 4.2 shows that facilities and equipment has the highest bar, indicating the highest Beta weight. This is followed by acoustics and thermal conditions, while spatial configuration and visual effects took the fourth and fifth positions respectively. Of these, facilities and equipment as a factor stands out from the other factors with very high Beta weight.

Research Question Three: To what extent would these classroom design variables: Spatial configuration, Visual effects, Thermal condition, Acoustics factor, Facilities and equipment factor predict pre-service teachers' performance in Fine and Applied Arts?

Table 4.3 shows that three out of five classroom design variables could predict pre-service teachers' performance in Fine and Applied Arts. These three factors are thermal condition (B= -.232; t= -2.292; p< .05), acoustic factor (B=.404; t=294; p< .05) and facilities and equipment (B =1.135; t= 4.636; p<.05) Spatial configuration and visual effect could not predict the dependent variable.

Research Question Four: What is the composite effect of the selected learning environment variables viz: pre-service teachers' perception of learning environment, seat arrangement and class size on pre-service teachers' performance in Fine and Applied Arts?

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Table 4.4: Regression Summary for Pre-Service Teachers' Performance and Learning Environment

R	R Square	Adjusted R Square	Std. Error of the Estimate
.263	.069	.058	9.4766

Table 4.4 shows that the three learning environment variables correlate positively (R= .263) with pre-service teachers' performance in Fine and Applied Arts. This means that the three factors are quite relevant to the determination of pre-service teachers' performance in Fine and Applied Arts. Further, the table reveals that 5.8% of the total variance in pre-service teachers' performance is due to the three learning environment factors (Adjusted R Square = .058). This finding implies that 94.2% of the variance in performance is accounted for by other factors and residuals. The coeffient ofdetermination(R value) obtained is represented in Figure 4.

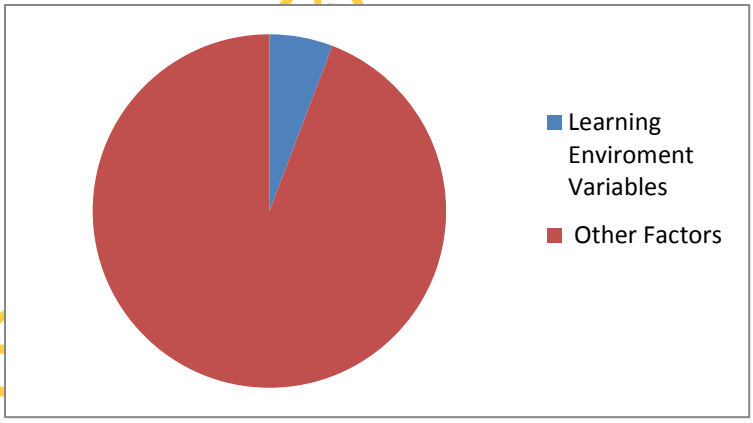

Figure 4.3: Chart Showing Percentage Contribution of Learning Environment to Performance

The chart shows that learning environment variables occupies 20.88º of the 360º pie chart. This is considered important as their contribution cannot be nullified as far as the explanation of pre-service teachers' performance in Fine and Applied Arts is concerned.Table 4.5 further shows the test of the R value for significance.

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Table 4.5: ANOVA for the Regression on Learning Environment Variables

Model	Sum of Square	Df	Mean Square	F	Sig.
Regression	1645.584	3	548.528	6.108	.001*
Residual	22092.260	246	89.806		
Total	23737.844	249			

Table 4.5 shows that the R value tested significant ($F_{(3,249)} = 6.108$; $p<.05$). Hence, the computed effect of the selected learning environment variables on pre-service teachers' performance in Fine and Applied Arts is significant.

Research Question Five: What are the relative effects of the selected learning environment variables on pre-service teachers' performance in Fine and Applied Arts?

Table 4.6: Relative Contributions of Learning Environment Variables to Performance

Learning Environment Variables	Unstandardized Coefficients		Standardized Coefficients	Rank	T	Sig.
	B	Std. Error	Beta			
(Constant)	56.980	3.458			16.479	.000
1. PERCEPTION	4.551	2.088	.135	2nd	2.179	.030*
2. SEATS	-4.220	1.214	.215	1st	-3.478	.001*
3. CLASS SIZE	-.691	.750	.057	3rd	-.921	.358

* Significant at p<.05

Table 4.6 shows that seat arrangement had the highest contribution to pre-service teachers' performance in Fine and Applied Arts (β =.215). The second in decreasing magnitude of contribution was perception of pre-service teachers' on learning environment (β =.135). Class size made the lowest contribution (β =.057).These are represented in Figure 4.4

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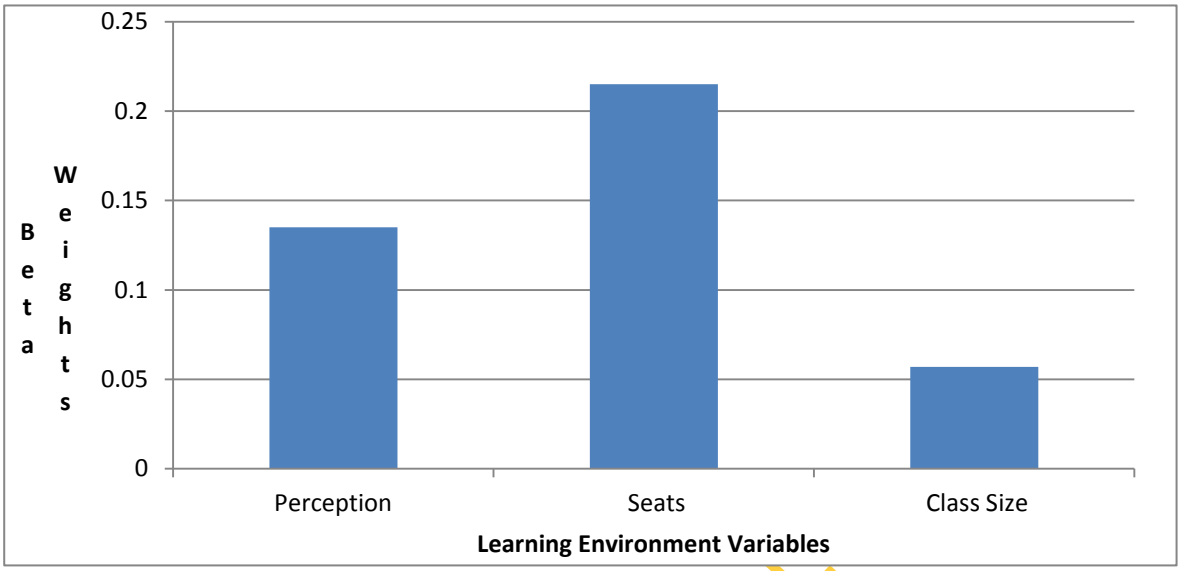

Figure 4.4: Learning Environment Variables

Figure 4.4 shows that seat arrangement contributed quite greatly, considering its very 'tall' bar. The perception of pre-service teachers' also contributed but it was lower than that of seat arrangement, Class size made very little contribution compared to the other two factors.

Research Question Six: To what extent would the three learning environment variables predict pre-service teachers' performance in Fine and Applied Arts?

According toTable 4.6, two of the three learning environment variables could predict pre-service teachers' performance in Fine and Applied Arts. These are pre-service teachers' perception of learning environment (B = 4.551; t = 2.179; p<.05) and seat arrangement (B = -4.220; t = -3.478; p<.05). Only class size could not predict pre-service teachers' performance in Fine and Applied Arts.

Research Question Seven: What is the composite effect of the classroom design and learning environment variables on pre-service teachers' performance in Fine and Applied Arts?

Table 4.7:Summary of Regression of Performance OnClassroom Design And Learning Environment Variables

R	R Square	Adjusted R Square	Std. Error of the Estimate
.407	.166	.138	9.0646

From Table 4.7, the eight variables, that is classroom design and learning environment variables, taken together, have a joint multiple correlation, which is positive with pre-service teachers'

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performance in Fine and Applied Arts (R = .407). This means that the eight factors are quite relevant in determining pre-service teachers' performance in Fine and Applied Arts. The eight factors also accounted for 13.8% of the total variance in the dependent variable, leaving the remaining 86.2% to other variables not in this study as well as the residuals.

Figure 4.5: Chart Showing Percentage Contribution of the Eight Factors to Performance

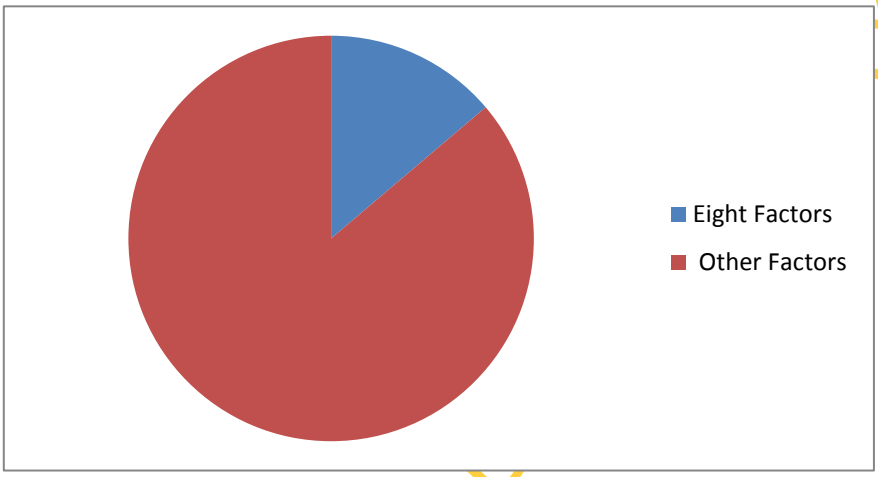

Figure 4.5 reveals that the eight factors took 49.68º out of the 360º on the chart. Hence, the roles of these eight factors are very important in explaining pre-service teachers' performance in Fine and Applied Arts. The R value was also subjected to Analysis of Variance of part of the multiple regressions. This is presented in Table 4.8.

Table 4.8: ANOVA for the Regression of Performance on Classroom Design and Learning Environment Variables

Model	Sum of Square	Df	Mean Square	F	Sig.
Regression	3935.688	8	491.961	5.987	.000*
Residual	19802.156	241	82.167		
Total	23737.844	249			

Significant at p<.05

The table shows that the R value is significant ($F_{(8, 249)} = 5.987$; $p < .05$). It could, therefore, be stated that the composite effect of the selected classroom design and learning environment variables is positive and significant.

Research Question Eight: What are the relative effects of the eight classroom design and learning environment variables on pre-service teachers' performance in Fine and Applied Arts?

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Table 4.9: Relative Contributions of the Classroom Design and Learning Environment Variables on Performance

Classroom Design and Learning Environment Factors	Unstandardized Coefficients		Standardized Coefficients	Rank	T	Sig.
	B	Std. Error	Beta			
(Constant)	55.705	6.912			8.059	.000
1. SPATIAL	-.780	.512	.093	5th	-1.522	.129
2. LIGHT(visual)	-.215	.240	.057	7th	.896	.371
3. THERMAL	-.182	.101	.109	4th	-1.805	.072
4. ACOUSTICS	.313	.181	.111	3rd	1.729	.085
5. FACILITIES	1.088	.246	.274	1st	4.425	.000*
6. PERCEPTION	1.622	2.145	.048	8th	.756	.450
7. SEATS	-3.757	1.176	.191	2nd	-3.194	.002*
8. CLASS SIZE	-760	.732	.063	6th	-1.039	.300

Significant at p<.05

As seen in Table 4.9, facilities and equipment made the highest contribution to the dependent variable (β = .274), with seat arrangement coming second (β = .191). These are the two significant contributions. Others, viz: acoustics (β = .111), thermal condition (β = .109), spatial configuration (β = .093), class size (β = .063), visual effects (β = .057) and perception of learning environment (β = .048) made contributions which are not significant.

Research Question Nine: To what extent would the classroom design and learning environment variables predict pre-service teachers' performance in Fine and Applied Arts?

Table 4. 9 shows that only two factors could predict pre-service teachers' performance in Fine and Applied Arts. These are facilities and equipment (B = 1.088; t = 4.425; p< .05) and seat arrangement (B = -3.757; t = -3.194; p < .05). The remaining six factors could not predict pre-service teachers' performance in Fine and Applied Arts.

Testing the Hypotheses

Ho1: There is no significant relationship between spatial configuration and pre-service teachers' performance in Fine and Applied Arts.

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Table 4.10: Relationship between Spatial Configuration and Pre-service Performance in Fine and Applied Arts

Variables	Mean	Standard Deviation	r	Df	Significance
SPATIAL CONFIGURATION	2.69	1.17	.081	249	.102 n.s
PERFORMANCE	53.93	9.76			

n.s = not significant at p< .05

Table 4.10 shows that the relationship between spatial configuration and pre-service teachers' performance in Fine and Applied Arts is negative, very weak and is not significant (r = .081; df = 249; p > .05). Hence, hypothesis 1 is not rejected.

Ho2: There is no significant relationship between lighting (visual) effects and pre-service teachers' performance in Fine and Applied Arts.

Table 4.11: Relationship between Lighting (visual) Effects and Pre-service Performance in Fine and Applied Arts

Variables	Mean	Standard Deviation	r	Df	Significance
LIGHTING (VISUAL) EFFECT	18.53	2.57	- .013	249	.417 n.s
PERFORMANCE	53.93	9.76			

n.s = not significant at p< .05

From Table 4.11, the relationship between lighting (visual) effect and pre-service teachers' performance in Fine and Applied Arts is negative, very weak and is not significant (r = -.013; df =249; p > . 05). Hypothesis 2 is, therefore, not rejected.

Ho3: There is no significant relationship between thermal condition and pre-service teachers' performance in Fine and Applied Arts.

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Table 4.12: Relationship between Thermal Condition and Pre-service Performance in Fine and Applied Arts

Variables	Mean	Standard Deviation	r	Df	Significance
THERMAL CONDITION	39.93	5.86	- .101	249	.056 n.s
PERFORMANCE	53.93	9.76			

n.s = not significant at p< .05

Table 4.12 reveals that there is negative, weak relationship which is not significant between thermal condition and pre-service teachers' performance in Fine and Applied Arts. (r = - .101; df 249; p > .05). Hypothesis 3 is, therefore, not rejected.

Ho4: There is no significant relationship between acoustic factor and pre-service teachers' performance in Fine and Applied Arts.

Table 4.13: Relationship between Acoustic Factor and Pre-service Performance in Fine and Applied Arts

Variables	Mean	Standard Deviation	r	Df	Significance
ACOUSTIC FACTOR	15.34	3.44	.154	249	.007*
PERFORMANCE	53.93	9.76			

*significant at p < .05

Table 4.13 shows a positive, weak and significant relationship between acoustic factor and pre-service teachers' performance in Fine and Applied Arts(r = .154; df = 249; p < .05). This means that as acoustics improves, pre-service teachers' performance in Fine and Applied Arts also improves. Hence, Hypothesis 4 is rejected.

Ho5: There is no significant relationship between facilities and equipment and pre-service teachers' performance in Fine and Applied Arts.

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Table 4.14: Relationship between Facilities and Equipmentand Pre-service Performance in Fine and Applied Arts

Variables	Mean	Standard Deviation	r	Df	Significance
FACILITIES AND EQUIPMENT	11.42	2.46	.284	249	.000*
PERFORMANCE	53.93	9.76			

*significant at p < .05

Table 4.14 shows that facilities and equipment and pre-service teachers' performance in Fine and Applied Arts have a positive, weak and significant relationship with one another (r = .284; df = 249; p < .05). Hence, as there is improvement in provision of facilities and equipmentfor Fine and Applied Arts classrooms, pre-service teachers' performance in Fine and Applied Arts improves. Hypothesis 5 is, therefore, rejected.

Ho6: There is no significant relationship between pre-service teachers' perception and pre-service teachers' performance in Fine and Applied Arts.

Table 4.15: Relationship between Pre-Service Teachers' Perceptionand Pre-ServiceTeachers' Performance in Fine and Applied Arts

Variables	Mean	Standard Deviation	r	Df	Significance
PRE-SERVICE TEACHERS' PERCEPTION	1.09	.29	.147	249	.010*
PERFORMANCE	53.59	9.76			

*significant at p < .05

Table 4.15 shows that there positive relationship which is weak and significant betweenbetween pre-service teachers' perception and pre-service teachers' performance in Fine and Applied Arts

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(r = .147; df = 249; p < .05). As perception improves, pre-service teachers' performance in Fine and Applied Arts also improves. Hence, hypothesis 6 is rejected.

Ho7: There is no significant relationship between seat arrangement and pre-service teachers' performance in Fine and Applied Arts.

Table 4.16: Relationship Relationship between SeatArrangement and Pre-Service Teachers' Performance in Fine and Applied Arts.

Variables	Mean	Standard Deviation	R	Df	Significance
SEAT ARRANGEMENT	1.56	.49			
PERFORMANCE	53.59	9.76	- .222	249	.000*

*significant at p < .05

From Table 4.16seat arrangement has negative relationship which is weak and significant with pre-service teachers' performance in Fine and Applied Arts(r = - .222 ; df = 249; p < .05). Hence, as seat arrangement improves, perception improves pre-service teachers' performance in Fine and Applied Arts drops. Hypothesis 7 is rejected.

Ho8: There is no significant relationship between class sizeand pre-service teachers' performance in Fine and Applied Arts.

Table 4.17: Relationship between Class Size and Pre-service Performance in Fine and Applied Arts

Variables	Mean	Standard Deviation	r	Df	Significance
CLASS SIZE	2.08	.80			
PERFORMANCE	53.93	9.76	-.030	249	.316 n.s

n.s = not significant at p < .05

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Table 4.17 shows that there is no significant relationship between class size and pre-service teachers' performance in Fine and Applied Arts ($r = .80$; $df = 249$; $p > .05$). Hence, hypothesis 8 is not rejected.

4.2 Discussionof Findings:

The result obtained in the study indicates a correlation between spatial configuration and pre-service teachers' performance in Fine and Applied Arts. It means that spatial configuration is in a position to determine the level of pre-service teachers' performance.The result shows that spatial configuration has an effect on pre-service teachers' performance. In this study, the relative contribution of spatial configuration to pre-service teachers' performance is fourth according to magnitude amongst the other classroom variables, with a weak and negative relationship with pre-service teachers' performance. In this study, most of the classrooms examined had very inadequate and poor spaces which were not clearly apportioned to the different areas of Fine and Applied Arts. There were great overlaps in terms of functions this therefore, in a way affected their performance. This agrees with the findings of Chism and Bickford (2002), Schneider (2002),Snow (2002), Chism (2003), Prince (2003), Brown (2005), Oblinger (2006), Akinsanmi (2007),Bartel (2007), Dittoe & Potter (2007), AIA (2009) and Baker (2012) that if aspace is not appropriately designed and assigned for specific function it can affect performance negatively.The result is also in line with the findings of Fisher (2000), Nelson (2003), Webber (2004) andBartel (2007), who argue that spaces correlate significantly with performance and academic achievement when they are well designed and assigned to various roles. Other studies have provided empirical evidence to show that space design contribute significantly to academic success; create a flexible and fluid environment and it is a prerequisite for achieving higher academic achievement when they are well configured and utilised.

The result of this study also shows that lighting (visual) effect correlated positively with pre-service teachers' performance in Fine and Applied Arts. From the result of the study, lighting (visual) effect was in position to determine the level of pre-service teachers' performance because it affected the performance of pre-service teachers. This finding supports the results of studies by Heschong-Mahone Group (1999), IESNA (2000),Benya (2001), Fielding (2001), Fielding and Nair, (2006) that there is a relationship between the effects oflight (visual) and lighting conditions in classrooms which could determine the performance and academic achievement of pre-service teachers in Fine and Applied Arts. However in the magnitude of

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relative contributions to pre-service teachers' performance, it was observed that light (visuals) effect made the least among the variables. Lighting could not predict the pre-service teachers' performance in Fine and Applied Arts because lighting in most of the classrooms was too poor, general and uniform. This is in line with the findings ofBartel (2007), USGBC (2009) and McGraw-Hill Construction (2010) and Baker (2012), that, when lighting conditions are flat and not planned, the performance of tasks becomes difficult and productivity can be affected.

Also the result obtained in this study reveals that thermal condition positively correlated with the pre-serviceteachers' performance in Fine and Applied Arts. The study shows that the thermal condition of classroom can determine pre-serviceteachers' performance. From the result obtained in this study, thermal condition contributed significantly to the composite effect of other classroom design variables on the pre-serviceteachers' performance. In the magnitude of relative contributions to the pre-serviceteachers' performance amongst other classroom design variables, thermal condition with βeta weight of .139 ranked third. This is reflected in the bar chart (Figure 4.2).These findings are considered relevant and support the findings of Barr (2000), Platts-Mill (2000), Leyten and Boerstra (2002),Wargock and Wyon (2002)and Ito (2006), that how human beings work on psychomotor tasks, like construction, carving, drawing and painting in Fine and Applied Arts, is affected by the thermal condition of the environment. Related studies by Bako-Biro (2000), Wallinderner (2000),Kajtar(2006),Soppanen, Fisk and Lei (2006) andBartel (2007) produced evidence that, when the thermal environment is not ideal, it will affect task performance, concentration, and creative thinking.This finding is in line with the observations of Nelson (2003), Mendell and Heath (2005), Wargoki and Wyon (2007), US EPA (2010).

Furthermore, the findings of this study reveal that acoustic factor has a positive correlation with the pre-serviceteachers' performance in Fine and Applied Arts. Acoustic factor was in a good position to determine the level of the pre-serviceteachers' performance. Acoustic factor also made a significant contribution to classroom design on the pre-serviceteachers' performance in Fine and Applied Arts by ranking second in the magnitude of contribution. This implies that there was no identified noise control mechanism which could have minimized the effect of noise on performance. This finding is in line with the result from studies conducted by Mackenzie and Airey (1999), Nelson and Soli (2000), Sutherland and Lubman (2001) andMelson (2003). These studies revealed that loud noise from the equipment used in industrial technology and Fine and Applied Arts classroom environment caused reverberation and was hazardous to students. It was further observed that the noise caused stress, induced feelings of

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helplessness and persistently broke concentration. Other studies (Schmid & Thimbcuilt, 2001; Nelson 2003; Acoustical Society of America, 2009; AIA, 2010) reported that poor acoustics can have a major impact on student's ability to hear, focus, concentrate and learn. It was found that generally high noise impaired performance significantly. This result shows that acoustic factor could predict pre-serviceteachers' performance in Fine and Applied Arts.

The outcome of this study shows that there was positive correlation between Facilities and equipment and pre-service teachers' performance. As a classroom design variable, facilities and equipment factor was in a good position to determine the level of pre-serviceteachers'performance. Facilities and equipment made the highest significant contribution to the variance in the performance of pre-serviceteachers in Fine and Applied Arts making it the highest amongst other variables. This corroborates the findings of and ERIC, (1995),Abimbade(1997), Butin (2000),Polette (2002), Ahievboloria (2005) and Bartel (2007) that the availability of facilities and equipment could determine and affect pre-serviceteachers' training and performance.These studies also showed significant findings that performance could be determined and enhanced by the quality of facilities and equipment available. Further studies (Mamza, 2007; Emi, 2005; Uwhereka, 2005) reported a dearth of facilities and equipment in many courses including Fine and Applied Arts in Colleges of Education thus accounting for the average performance of pre-service teachers' in Nigerian Colleges of Education. Reports from a comparative study of two classes in Fine and Applied Arts by Oghuvbu (2009) established differences in students' performance due to non-availability and quality of facilities and equipment. In this study, facilities and equipment were able to predict pre-service teachers' performance in Fine and Applied Arts. This is in line with the findings of Idiagbe (2004), Uwheraka (2005), Emi (2006), Mamza (2007), Oghuvbu (2009), UNESCO (2010), Baker, (2012).

The findings of this study shows that the perception of the pre-service teachers of Fine and Applied Arts correlated positively with the pre-service teachers' performance, considering the Regression summary for the pre-service teachers' performance and learning environment (R=.263), as indicated in Table 4.4. It also means that pre-service teachers' perception is relevant towards the determination of pre-service teachers' performance, in Fine and Applied Arts, contributing to the 5.8 % of the total variance in pre-service teachers' performance which is due to the three learning environment variables. This is in line with Frazer, Fisher and Wood (2002), Zandvliet (2003) and Waxman and Chang (2006), who observed that students' perception of their learning environment contributed to the overall ambience of the environment and accounted

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for significant percentage of academic performance. Old father (1995), Aldridge (2002), Fraser and Wood (2002), Bako-Biro (2004) and Doorman, Fisher and Woldrip (2006) and Burden and Frazer (1993) also found that performance was significantly affected by students' perception, as it was in this present study. The pre-service teachers' perception of learning environment made a significant contribution to their performance and could in a way predict their performance in Fine and Applied Arts. The results of Waxman and Frazer (1998), Chung (2006) and Goh (2007) support this finding.

The study shows that classroom seat arrangement correlated positively withpre-service teachers' performance in Fine and Applied Arts. It means that classroom seat arrangement has effect on performance and, as a learning environment variable; it is relevant in determining pre-serviceteachers' performance. This finding is in line with the submission from the research work of McGroskey and Sheanan (1976), Long and Johnson (2004), McCroskey andMcVetta (2004) andBartel (2007), that positive correlation existed between seat arrangement and performance, in which remarkable interaction between the teachers and students ensued thus enhancing productivity. Owu (1992), Tessmer and Harris (1992) also found in some studies that increased student participation was due to students' preference of seat arrangement. The influence of seat arrangement on performance in Art classrooms was significant in studies conducted by Pappas (1990), Vosko (1991), AIA (2009) and Baker (2012).In this study, a relative contribution of seat arrangement to the performance of pre-serviceteachers in Fine and Applied Arts was recorded as the highest amongst the learning environment variables. Seat arrangement was able to predict the pre-serviceteachers' performance.

Finally, the result obtained in this study shows that class size as a learning environment variable correlated positively with pre-serviceteachers' performance in Fine and Applied Arts. The contribution of class size to the explanation of pre-serviceteachers' performance in Fine and Applied Arts cannot be nullified. The result of the study also revealed that the relative contribution of class size to the pre-serviceteachers' performance was the least amongst the three variables. This is supported by the finding of Hosby (2000), Stevenson (2002), Chilles (2003), McCauther (2004), Nye, Hedges and Konstantpoulos (2004) that, in most cases class size has not been in any position to determine students' performance and hence had no bearing with performance or academic achievement. However, Kaire and Ward (2000), Krueger (2000) and Iroegbu (2003) reported a correlation between class size and students performance in some subjects. In the present study, class size could not predict the pre-service teachers' performance in Fine and Applied Arts. This finding is in line with the claim of Stevenson (2002), that class

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size is not an issue but indicative of other factors that directly impact more on learning, performance and academic achievement. The influence of class size on performance was reported as not significant by Egetson, Harman and Achilles (2005). This, therefore, implies that class size could not contribute significantly and predict pre-serviceteachers' performance in Fine and Applied Arts.

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CHAPTER FIVE

Summary, Conclusion and Recommendations

This chapter presents the summaryof the findings from this study**.**It states the conclusion as well as the recommendations made.

5.1 Summary of Findings

The findings of the study are summarised as follows:

i. There is a positive and significant composite effect of the classroom design variables on pre-service teachers' performance in Fine and Applied Arts. They constituted 10.8% of the variance in the dependent variable/measure.

ii. Among the five classroom design variables, the order of relative contribution to pre-service teachers' performance in Fine and Applied Arts is: Facilities and equipment > Acoustic factor > Thermal condition > Spatial configuration > Visual effects

iii. Three of the classroom variables, namely thermal condition, acoustic factor, and facilities and equipment could predict Pre-service Teachers' performance in Fine and Applied Arts

iv. There is a positive and significant composite effect of learning environment variables on pre-service teachers' performance in Fine and Applied Arts. They accounted for 5.8% of the variations in the dependent measure.

v. The order of magnitude of the contributions of learning environment variables to the dependent variable is: Seat arrangement > Pre-service Teachers' perception > Class size.

vi. Two learning environment variables: Pre-service Teachers' perception > seat arrangements could predict pre-service teachers' performance in Fine and Applied Arts.

vii. The composite effect of classroom design and learning environment variables on pre-service teachers' performance in Fine and Applied Arts is positive and significant. They also contributed 13.8% to the total variance in the dependent variable.

viii. The magnitude of the contribution of the eight factors to pre-service teachers' performance in Fine and Applied Arts revealed that facilities and equipments > Seats arrangements > Acoustic factors > Thermal conditions > Spatial configuration > Class size > visual effect > Pre-service teachers' perception.

ix. Out of the eight factors, only two factors - facilities and equipment, and seat arrangement- could predict pre-service teachers' performance in Fine and Applied Arts.

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5.2 Conclusion

The training and performance of pre-service teachers in Fine and Applied Arts in colleges of education depend largely on the quality and availability of facilities and some environmental conditions. This study was carried out as part of efforts by Art educators and researchers at understanding that the quality of facilities and condition of learning environment influence students' performance. The findings of this study have shown that classroom design and learning environment factors contribute to the variance in performance of pre-service teachers. Hence, they can determine their level of performance in Fine and Applied Arts. This study revealed that there were other numerous factors that were present in Fine and Applied Arts classroom and learning environment which could account and explain pre-service teachers' performance. An open traditional/ conventional classroom as currently being used for the training of pre-service teachers will affect performance as indicated in the result obtained. The study shows that the lack of purpose-built studios with the required and prerequisite conditions constitutes a major hindrance to the training and performance of pre-service teachers.

5.3 Contributions to knowledge

This study extended previous classroom design and environment research outcomes by examining some physical and psychological variables in a complementary, correlational and holistic manner. Pre-service teachers' trainers in Fine and Applied Arts should consider the results of this study as significant noting that apart from the skill and talents of students, the environment in which they learnalso contribute to their performance. This study has provided evidence and basis for Fine and Applied Art educators, institutions, regulatory bodies and policy makers that, someless considered variables like seat arrangement; acoustics and light could still enhance freedom of expression, creativity and originality in art.

The importance of using ergonomic parameters in analyzing some furniture items, facilities and equipment variable in classroom design in order to provide a rationale for appropriately designed furniture that could provide high level of comfort in case of a prolonged period of sitting in courses like Fine and Applied Arts, computer studies and architecture has been highlighted. The study finally established that, while students' performance, success and failure in school are dependent upon a number of influential determinants, it is apparent that classroom design and learning environment variables influence performance significantly than some variables.

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5.4 Recommendations

On the basis of the findings of this study, the following recommendations are made

1. For the training of pre-service teachers to be in consonance with the minimum standard requirements by NCCE, a purpose-built studio complex made up of classrooms must be a criterion for accreditation and approval of Fine and Applied Arts Department in colleges of education
2. The National Commission for Colleges of Education (NCCE) should provide comprehensive classroom design guidelines/parameters which will specify visual, thermal, acoustic and spatial conditions of a Fine and Applied Arts learning environment in all institutions.
3. Pre-service teachers' trainers should to be made to understand the importance of creating a flexible learning environment that sees the physical variables complementing the psychosocial variables. This will promote pre-service teachers' freedom of expression, style, originality and improved performance.
4. Pre-service teachers' trainers must be encouraged to adopt teaching/instruction strategies that could enhance interaction, collaboration and promote healthy competition amongst pre-service teachers. Small class-size could be used to the students' advantage in this regard.
5. Ancillary spaces, racks and stores should be created for the proper organization and storage of equipment, tools and materials to facilitate easy accessibility and usage.
6. Acoustically treated materials should be used for work spaces (sculpture, metal works and ceramics studio) where heavy and reverberating equipment is used to control noise and sound.
7. Galleries should be created for the display of pre-service teachers' art works, as this would serve as a critique class and reference point for the improvement of students' performance
8. As an off-shoot of Fine and Applied Arts, an entrepreneurial skill acquisition course should be made compulsory for all pre-service teachers in the NCE programme. This could lead to self-sustenance and reduce unemployment.
9. Through Fine and Applied Arts, more awareness should be created on the prospects of individuals developing vocational and creative skills that could lead to small scale industries and self-employment.

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5.5 Limitation of the Study

In the course of the study, the researcher encountered some challenges which could be considered as limitations. Firstly the researcher was unable to interact extensively with pre-service teachers' trainers on their experience and challenges in the training of pre-service teachers due to their limited time, administrative resposibilities and job schedule. Secondly, there was an initial reluctance on the part of the lecturers to actively participate in the study on the assumption that results of previous and similar studies have not been implemented, therefore, the impact of such studies has not been felt thereby, concluding that the present study could also be a waste of time or just a mere academic exercise. Finally, the researcher had to contend with the differences in the calendar of the selected colleges of education thus, making it a bit longer to conclude the study as was originally scheduled.

5.6 Suggestions or Further Research

The following suggestions are considered useful;

i. Further studies should be carried out to provide quantitative interpretations of the result of the present study into parameters and guidelines that could complement the minimum standard for classroom, studio and facilities requirements as stipulated by the NCCE.

ii. Other disciplines, like Psychology, Architecture and Engineering, may use the variables examined in providing a structural design and a prototype classroom design.

iii. The area of ergonomics and some other learning environment dimensions, like teacher support,computer usage, task orientation, attitude, involvementand equitycould be broadly explored in subsequent learning environment research in order to provide a technology-friendly and stimulating learning environment.

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APPENDIX I

UNIVERSITY OF IBADAN

EDUCATIONAL TECHNOLOGY UNIT

DEPARTMENT OF TEACHER EDUCATION

FINE AND APPLIED ARTS PRE-SERVICE TEACHERS' CLASSROOM DESIGN CHECKLIST

(FAAPTCDEC)

This checklist is designed to describe the general layout, the spatial configuration, visual effects/ light, the thermal condition and quality of the Fine and Applied Arts classroom environment of the college. It is also to determine the availability, adequacy, utilization and appropriateness of the conditions that constitute the ambience of the class in line with the specifications and requirements of the National Commission for College of Education (NCCE) for the teaching and training of Pre-service teachers in Fine and Applied Arts.

Honest and diligent entry is required

Tick ☐ where applicable or fill in. Write NA where not applicable

SECTION A

Name of College:_____

No of Students:_____

Type of Facility:_____

Dimension:_____

Activity:_____

SECTION B

Classroom Layout

1. **Classroom Type**: Traditional ☐ Specialized ☐

2. **Layout Type**: Open ☐ Closed ☐

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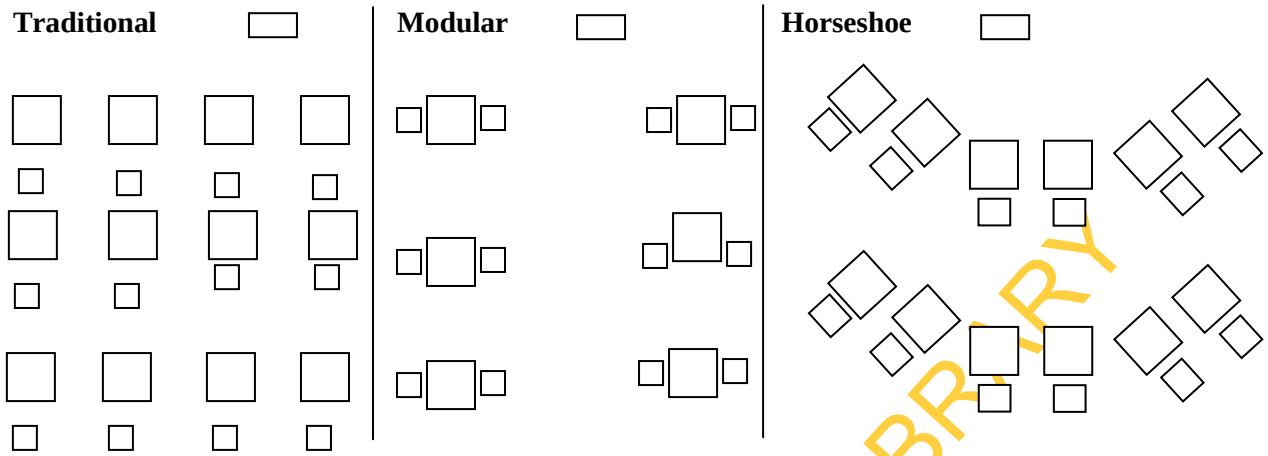
3. **Seats arrangement**



Key: AV – Available VA – Very Adequate VAP – Very appropriate AU - Always Utilized
NA – Not Available AD – Adequate AP - Appropriate RU – Rarely Utilized
NA-Not Adequate NAP- Not Appropriate NU – Not Utilized
NADA – Not Adequate at all NAPA – Not Appropriate at all

Equipment Layout

S/N		Availability		Adequacy				Location				Utilization		
	Items	AV	NA	VA	AD	NAD	NADA	VAP	AP	NAP	NAPA	AU	RU	NU
1.	Chalkboard													
2.	Display board													
3.	Project screen													
4.	Magnetic board													
5.	Tracing Board													
6.	Workbench													
7.	Printing board													
8.	Bulletin board													
9.	Stage													
10.	Models throne													

SECTION C: Spatial Configuration

S/N		Availability		Adequacy				Location				Utilization		
	Items	AV	NA	VA	AD	NAD	NADA	VAP	AP	NAP	NAPA	AU	RU	NU
1.	Teaching Space													
2.	Work Space													
3.	Display Space													
4.	Projection Area													
5.	Presentation Area													
6.	Storage Space (Teacher)													
7.	Storage Space (Student)													
8.	Personal Space													
9.	Ancillary Space													
10.	Auxiliary Space													

SECTION D: Visual effects/Lighting

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Source of Light: Daylight/Natural ☐ Electrical ☐

S/N		Availability		Adequacy				Location				Utilization		
	Items	AV	NA	VA	AD	NA	NADA	VAP	AP	NAP	NAPA	AU	RU	NU
1.	Fluorescent lamp													
2.	Spotlight													
3.	Full spectrum lamp													
4.	Dimmable light													
5.	Programmable light													
6.	Overhead lamp													
7.	Accent lamp													
8.	Presentation lamp													
9.	Daylight/Sunlight													
10.	Window													
11.	Blinds/overhangs													

SECTION E: **Thermal Condition**

1. **Indoor Air**: Good ☐ Poo☐ ☐
2. **Humidity**: High Relative Humidity L Low ☐tive Humidity ☐
   Damp air ☐ Dry air ☐
3. **Moisture Composition**:
   (i) Volatile Organic Compounds (VOCs)/Pollutants High ☐ Low ☐
   (ii) Carbon Dioxide High Low ☐ ☐
   (iii) Dust High ☐ Low ☐
4. **TemperatureRange**:
   70°F 69-68°F 67-66°F 65°F
   Very Adequate Ad☐te ☐ Not Adequate Not Ad☐te at all ☐
5. **Type of Ventilation System**:
   Active/Mechanical ☐assive/Cross-Ventilation ☐ted/Combined ☐

6.	**Active Ventilation**	**QTY**	**Availability**		**Adequacy**				**Utilization**		
	(Mechanical)	(Unit)	AV	NA	VA	AD	NA	NAA	AU	RU	NU
a.	Ceiling fans										
b.	Pedestal fans										
c.	Standing fans										
d.	Air extractor										
e.	Kiln fume extractor										
	Active Ventilation	**QTY**	**Availability**		**Adequacy**				**Utilization**		
	(Mechanical)	(Unit)	AV	NA	VA	AD	NA	NAA	AU	RU	NU

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f.	Air conditioners										
g.	Heat pump										
7.	**Passive Ventilation (Cross Ventilation)**								**Dimension**	**Utilization**	
a.	Large windows									AU	RU	NU
b.	High level windows											
c.	Low level windows											
d.	Trickle ventilators											
e.	Large doors											
f.	Small doors											

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APPENDIX II

UNIVERSITY OF IBADAN

EDUCATIONAL TECHNOLOGY UNIT

DEPARTMENT OF TEACHER EDUCATION

FINE AND APPLIED ART PRE-SERVICE TEACHERS'CLASSROOM ACOUSTIC DESIGN QUESTIONNAIRE (FAAPTCADEQ)

Dear Respondent,

This questionnaire has been designed to determine the extent of the effects of acoustic variable in the Fine and Applied Art classroom of your college.

This is NOT a test. Your honest response(s) to the questionnaire is kindly solicited.

SECTION A

NAME OFCOLLEGE……

LEVEL OF STUDY…….

Please tick (✓) the column that best represents your description of the physical variables of your classroom environment.

Key: SA: Strongly Agreed A: Agreed

D: Disagreed SD: Strongly Disagreed

SECTION B: ACOUSTIC VARIABLE

S/N	STATEMENT	SA	A	D	SD
1.	Good acoustics are fundamental to good academic performance				
2.	The lower the noise in the classroom the higher the concentration level				
3.	High noise does not cause distraction in the Fine and Applied Arts classroom				
4.	Acoustical treatment of the classroom is not necessary in Fine and Applied Arts				
5.	Unpredictable noise requires attention because it interferes with task performance				
6.	Lack of control over noise is detrimental to performance				
7.	Too much noise leads to off-task behaviour				
8.	Exposure to high noise leads to deficit in mental concentration and the ability to think creatively				
9.	Noise within the classroom affects time management as teachers are forced to pause thus decreasing the teaching time				
10.	Location of classroom is not a crucial factor in the control of noise.				

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		SA	**A**	**D**	**SD**
11.	External noise causes increased students dissatisfaction and stress within the classroom				
12.	High level noise influences cognitive task, and increases feelings of helplessness in learning tasks				
13.	Acoustical performance is not an important consideration in the design of Fine and Applied Arts classrooms				
14.	Acoustical treatment of Fine and Applied Arts classrooms will control machine noise within the learning environment				
15.	The level of reverberation from a practical task will not affect the performance of students				
16.	Poor classroom acoustic is not a barrier to learning, intellectual growth or diminishing the potentials of a learner.				
17.	Noise in a Fine and Applied Arts classroom is a normal phenomenon that should not attract any special control or attention				
18.	The use of background music during practical aids performance				
19.	Having some types of background music is not, beneficial to student learning especially in Fine and Applied Arts classrooms				
20.	In Fine and Applied Arts classroom the more quiet the classroom is, the more focused and creative the students are.				

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APPENDIX III

UNIVERSITY OF IBADAN

EDUCATIONAL TECHNOLOGY UNIT

DEPARTMENT OF TEACHER EDUCATION

INVENTORY FOR LECTURERS ON FINE AND APPLIED ARTS FACILITIES, EQUIPMENT AND MATERIALS

(ILFAAFEM)

This inventory is designed to enable the Student- Teachers' Trainers provide quantitative and qualitative information on the facilities i.e specialized and ancillary/auxiliary spaces; furniture and furnishings, equipment i.e machine/tools, instructional media and materials required for the for the teaching and learning of Fine and Applied Arts in terms of their availability, adequacy, utilization and suitability in a Fine and Applied Arts classroom environmentof a College of Education.

Your honest entry is highly solicited.

SECTION A

Name of College:_____

Qualification:_____

Teaching Experience (Years):_____

Area of Specialization:_____

Status:_____

Key: AV – Available VA – Very Adequate VAP – Very appropriate AU - Always Utilized
NA – Not Available AD – Adequate AP - Appropriate RU – Rarely Utilized
NA-Not Adequate NAP- Not Appropriate NU – Not Utilized
NADA – Not Adequate at all NAPA–NotAppropriateatall

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SECTION B: Facilities

S/N	Description	Qty.	Dimension	Availability		Adequacy				Utilization		
				AV	NA	VAD	AD	NAD	NADA	AU	RU	NU
(a)	**Specialized**											
1.	Classroom											
2.	Studio											
3.	Photographic darkroom											
4.	Computer graphics room											
5.	Art Gallery room											
(b)	**Ancillary/Auxiliary**											
6.	Office (lecturer)											
7.	Office(support staff)											
8.	Library											
9.	Store											
10.	Toilet											
(c)	**Furniture**											
11.	Workbenches											
12.	Storing racks											
13.	Donkey chairs											
14.	Easles											
15.	Model's throne											
16.	Platform											
17.	Screen printing table											
18.	Drawing boards											
19.	First Aid box											
20.	Racks											
21.	Tracing tables											
22.	Locks											
(d)	**Furnishings**											
23	Curtains											
24.	Window blind											
25.	Backdrops											

SECTION C: Equipment

	Machine and tools	QTY	Availability		Adequacy				Utilization		
			AV	NA	VAD	AD	NAD	NADA	AU	RU	NU
1	Printing/etchingmachine										
2	Lino cutting sets										
3	Rollers										
4	Etching Plates										
5	Graphic enlarger										
6	Sets of rapidography										
7	Sets of Calligraphic pens										

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	Machine and tools	QTY	Availability		Adequacy				Utilization		
			AV	NA	VAD	AD	NAD	NADA	AU	RU	NU
8	Sets of Drawing Pens										
9	Sable brushes Points1,2,3,4,5,6,7,8,9, 10,etc										
10	Air Brush										
11	Atomizer spraying gun										
12	Screen printing squigees and frames										
13	Computer										
14	Scanner										
15	Printers										
16	Digital photographic equipment										
17	Single reflex camera and tripod stand										
18	Photographic Enlarger										
19	Photo developing tools										
20	Photographic drying machine										
21	Photo developing tank										
22	French Curve										
23	Bench vices (medium and large)										
24	Radial drilling machine with accessories										
25	Pillar drilling machines with accessories										
26	Assorted drills										
27	Surface grinder with accessories										
28	Power hacksaw										
29	Sanding machine										
30	Sledge hammer punches										
31	Leg vice										
32	Electric soldering iron										
33	(15/45/watts pipe cuts										
34	Spraying machines with guns										
35	Arch welding machine										
36	Hand sanders										
37	Potter's wheel(electric)										
38	Potter's wheel(kick)										
39	hand looms										
40	Vertical looms										
41	Horizontal loom										
42	Wood or gas kiln										
43	Steel rules (300mm)										

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44	Meal scrapers										
	Machine and tools	**QTY**	**Availability**		**Adequacy**			**Utilization**			
			AV	**NA**	**VAD**	**AD**	**NAD**	**NADA**	**AU**	**RU**	**NU**
45	Hand hacksawframes										
46	Chisels (assorted sizes)										
47	Fire extinguishers										
48	First aid box										
49	Goggles										
50	Head, pans										
51	Head, pans										
52	Curving gauges (various sizes)										
53	Modelling tools (spatula)										
54	Cement modelling knives										
55	(metal), Painting knives										
(b)	**Instructional Media**										
1	Multi Media Projector										
2	Computer										
3	Slides (assorted)										
4	Chalkboard										
5	Bulletin board										
(ii)	**Books**										
	On different areas of Art										
(iii)	**Journals/Perodicals**										
	Magazine										

SECTION D: Materials

	Description	**QTY**	**Availability**		**Adequacy**				**Utilization**		
			AV	NA	VAD	AD	NAD	NADA	AU	RU	NU
1	Lino sheets										
2	Sculpture Acid										
3	Printing inks										
4	Rolls of catridge paper										
5	Rolls of embossed paper										
6	Poster colours,										
7	Letrasets,of Different sizes										
8	Letratones Different Texture										
9	Screen Printing ink										
10	White Cloth for sample printing										
11	Developer chemicals										
12	Fixative chemicals										

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13	photo printing papers										
	Machine and tools	**QTY**	**Availability**		**Adequacy**			**Utilization**			
			AV	**NA**	**VAD**	**AD**	**NAD**	**NADA**	**AU**	**RU**	**NU**
14	photographic films										
15	black and red cloth.										
16	Slides assorted										
17	flat files of assorted grades										
18	Hacksaw blades glaze										
19	Oxide										
20	resin										
21	Dye										

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APPENDIX IV
UNIVERSITY OF IBADAN
EDUCATIONAL TECHNOLOGY UNIT
DEPARTMENT OF TEACHER EDUCATION
FINE AND APPLIED ARTS PRE-SERVICE TEACHERS' LEARNING ENVIRONMENT QUESTIONNAIRE (FAAPTLEQ)

Dear Respondent,

This questionnaire has been designed to enable you describe your perception of theFine and Applied Arts Learning Environment of your College, seats arrangement and the class size (population) of students in your class.

This is NOT a test. Your honest response(s) to the questionnaire is kindly solicited.

SECTION A

NAME OF COLLEGE……

LEVEL OF STUDY……

Please tick (✓) the column that best represents your description of your learning environment.

Key: SA: Strongly Agreed A: Agreed

D: Disagreed SD: Strongly Disagreed

SECTION B: STUDENT'S PERCEPTION OF LEARNING ENVIRONMENT

	STATEMENT	SA	A	D	SD
1.	The Teacher's presence in the classroom assists in the completion of task in good time				
2.	Teachers' demonstration, display and understanding of concepts do not affect students' performance				
3.	A student should be allowed to go at his / her pace				
4.	How the teacher teaches does not affect learners' attitude to learning				
5.	Teachers' personal interest in learners aids performance				
6.	Students' interaction with one another assist in learning difficult tasks				
7.	How a learner sees his/her environment affects how he learns				
8.	Students' performance is affected by the availability and adequacy of equipment and materials				
9.	Positive perception of class increases performance of task				
10	Working in groups on projects hinders individual creativity and affects performance				
11	It is good to explain one's ideas to others				
12	Students can suggest what type of learning environment they desire				

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		SA	A	D	SD
13	Students who perceive their teachers positively will perform better				
14	The quality of learning environment will not affect the performance of task and learning outcome				
15	A positively perceived learning environment breeds satisfaction				
16	Perception of learning environment is a subjective issue and not relevant in Fine and Applied Arts				
17	Perception of learning environment influences students' motivation and achievement				
18	The nature of the pre-service interaction is a key variable in any learning environment				
19	Teacher-student interaction dictates the climate of learning environment				
20	Creating a positive classroom climate is a probability				

SECTION C: CLASSROOM SEAT ARRANGEMENT

S/N	**STATEMENT**	**SA**	**A**	**D**	**SD**
1	A particular seat arrangement is determined by the availability of space in Fine and Applied Arts classroom				
2	There should be no consideration for seat arrangement in Fine and Applied Arts classroom				
3	In Fine and Applied Arts, seat arrangement is influenced by the source and quality of lighting in the classroom				
4	Tasks to be performed do not determine where seats are arranged in the classroom				
5	Seat arrangement in Fine and Applied Arts class does not affect performance				
6	In Fine and Applied, Arts seats arrangement should be flexible				
7	Seats arrangement has a psychological influence on learner				
8	General drawing classes do not require any special seat arrangement				
9	Seats arrangement does not affect sightline				
10	The way seats are arranged can affect the concepts in perspective as relate to students drawings and other works				
11	Seat arrangement determines how close a teacher can work with the students				
12	Isolated seat arrangement in Fine and Applied Arts class promotes originality and increases performance				
13	Seat arrangement promotes innovative ways of thinking				
14	Seat arrangement in life drawing sessions should be horse-shoe formation				
15	Seat arrangement influences a student's interaction with colleagues				

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		SA	A	D	SD
16	Students pay more attention when they are seated in rows				
17	Seat arrangement of the Fine and Applied Arts classroom reveal the nature of the subject				
18	Seat arrangement is a psychological attribute that does not affect task performance				
19	Seat arrangement a times may affect students participation in Fine and Applied Art classes				
20	Seat arrangement determines the level of students' participation in the class.				

SECTION D: CLASS-SIZE

	STATEMENT	SA	A	D	SD
1.	In Fine and Applied Arts, class-size is not an issue for consideration				
2	Small class-size allows the teachers to give adequate attention to learners				
3	Reduction of class-size lead to high achievement				
4	Class-size contributes significantly to the noise level of a Fine and Applied Arts class				
5	The larger the size of the class the more competitive and the more ideas are generated				
6	The size of a class does not affect students' participation and performance in Fine and Applied Arts				
7	The size of a class does not affect the utilization rate of equipment, materials and facilities				
8	Class-size influences originality and creativity in Fine and Applied Arts				
9	Small class-size provides opportunity to exchange ideas between class members				
10	In practical sessions, class-size is a factor in promoting learning and encouraging social relationship				
11	Large class size reduces teachers' dominance				
12	The size of a class promotes positive learning environment				
13	The use of technological equipment assists in overcoming the barriers of large class				
14	The size of a class does not affect or contribute to students' performance				
15	Small class-size affects classroom atmosphere and interaction				
16	The impact of class size is minimal on students' performance during practical				
17	Class-size determines the level of attention that could be received from the teacher				
18	In Fine and Applied Arts practical, class-size generally assists the critique session				
19	Large class-size does not help in recognizing individual learners problems				
20	Reducing or enlarging class-size does not guarantee significant increase in performance				

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SECTION E:CLASS SIZE BY FACILITIES RATIO

S/N	Item	Standard Ratio	No of student	No of item available	Very Adequate	Adequate	Not Adequae	Not Adequate At All
1	Drawing board	1:1						
2	Easel	1:1						
3	Donkey chair	1:1						
4	Drawing table	1:6						
5	Tracing tableW1	1:2						
6	Storing rack	1:1						
7	Screen printing table	1:2						
8	Work benches	1:4						
9	Display board	1:6						
10	Exhibition stand	1:4						

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APPENDIX V

UNIVERSITY OF IBADAN
DEPARTMENT OF TEACHER EDUCATION
EDUCATIONAL TECHNOLOGY UNIT

FINE AND APPLIED ARTS PRE-SERVICE TEACHERS' PERFORMANCE TEST (FAAPTPT)

THEORY
SECTION A
Name of College: ……..

Level: ……

SECTION B

Instructions

Candidates are to answer all questions in this section

Pick suitable options from the alternatives (A-E) to answer questions 1-10 by filling the gaps in the passage below:

In a life drawing exercise the object of study for the artist is the -1- whose -2- is carefully observed and drawn. The use of -3- as a delineating element is the first step of representing the object of study in the -4-. A good knowledge and understanding of -5- is required to portray -6- as a crucial principle in life drawing because each -7- of the object is relatively compared to one another. More than a rule, the variations in the use of line suggest the -8- of light which brings out the -9- of the figure through a -10- technique if a pencil is used as a medium of drawing.

	A	B	C	D	E
Q1	Actor	Artiste	Artist	Model	Poser
Q2	Action	Pose	Position	Gaze	View
Q3	Shape	Size	Weight	Line	form
Q4	Board	Easel	Donkey chair	Frame	format
Q5	Ceramics	Anatomy	Textile	Graphics	Photography
Q6	Balance	variation	Repetition	Distance	Proportion
Q7	Size/part	Weight	Shape	Colour	Length
Q8	Intensity	Direction	distance	Type	Degree
Q9	Forms	Colour	Outline	Weight	Balance
Q10	Painting	Washing	Shading	Priming	Glazing

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Use fig I to answer questions 11-15

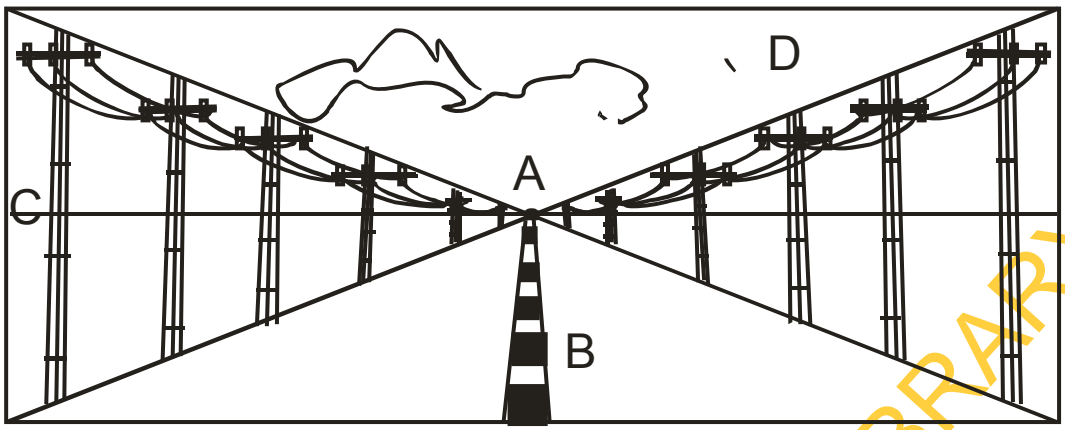

Fig I

11. The drawing in fig I portrays the principle of
    A. proportion
    B. repetition
    C. perspective
    D. variation
    E. equilibrium
12. Point A in the drawing is
    A. Eye level
    B. Horizontal level
    C. Vanishing point
    D. Birds view
    E. Distant level
13. What does line C represents?
    A. Background level
    B. Demarcation level
    C. Horizontal level
    D. Eye level
    E. Mid point level
14. From the drawing in fig I and as a rule of perspective, given that all the poles are of the same size, the nearest to the viewer from point B will be
    A. The shortest and blurred
    B. The highest and blurred
    C. The highestand detailed
    D. The shortest and detailed
    E. None of the above
15. One of these plays an important role in getting an accurate view from a perspective
    A. Size
    B. Weight
    C. Shape

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D. Distance
E. Light

Use Fig II to answer questions 16-20

Fig II

16. From the drawing above (Fig II) the source of light is from what part?
    A. B
    B. C
    C. A
    D. D
    E. E
17. The drawing in fig II is
    A. Nature drawing
    B. Imaginative composition
    C. Life Drawing
    D. Still life composition
    E. Abstract drawing
18. The effect of light on the objects is demonstrated by
    A. The shadow
    B. Tonal value
    C. Solidity and shading
    D. A, B and C
    E. A only

19. If the format in Fig II is divided horizontally and equally i.e. i-ii what type of balance will occur?
    A. Symmetric
    B. Asymmetric
    C. Top level balance
    D. Equilateral
    E. Bottom level balance

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20. Which of the objects in the composition is isolated and not related to others?
    A. The Bottle
    B. The Gallon
    C. The Tea Pot
    D. The Orange
    E. The Cube

21. A terracotta is a fired piece of artwork made with
    A. Cement
    B. Clay
    C. Plastercine
    D. Sand
    E. Wood

22. In casting, this material cannot be used as a separator
    A. Engine oil
    B. Glue
    C. Grease
    D. Groundnut oil
    E. Palm oil

23. This describes best, a monochromatic painting
    A. Colours of the same class are used
    B. Many colours are used with one tonal value
    C. Many colours can be used to paint the background but one colour is used to paint the object
    D. One colour is used as the background
    E. One colour is used with different tonal values

24. Waxing,threading and printing are all aspects of
    A. Ceramics
    B. Graphics
    C. Painting
    D. Photography
    E. Textile

25. Esie a town near Oro, in Ilorin is noted for its
    A Brass works
    B Calabash carving
    C Mat weaving
    D Soap stones figures/monoliths
    E Woven clothes

26. If a textile artist uses a loom and thread, a ceramist will use a
    A Potters' wheel and cement
    B Potters' wheel and clay
    C Potters' wheel and ink
    D Potters' wheel and paint
    E Potters' wheel and paper

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27. This cannot be used for drawing on a paper
    A Charcoal
    B Pastel
    C Pen
    D Pencil
    E Spatula

28. The famous Igbo Ukwu pottery originated from which part of Nigeria?
    A Central
    B Eastern
    C Northern
    D Northwest
    E Southwest

29. Uli is a form of body painting and adornment amongst the
    A Fulani
    B Hausa
    C Ibibio
    D Igbo
    E Kalabari

30. Glaze is a protective coat applied on
    A Ceramic ware
    B Metal wares
    C Painting
    D Textile
    E Weaving

31. Batik as a technique in textile makes use of this material most
    A Glue
    B Gum
    C Pap
    D Starch
    E Wax

32. The shape of the human head is
    A Circle
    B Cuboid
    C Oval
    D Sphere
    E Triangle

33. A type of drawing or painting whose meaning and interpretation demands very deep thinking is
    A. Abstract
    B. Imaginative composition
    C. Nature studies
    D. Outdoor studies
    E. Skill life composition

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34. Fine and Applied Art describes thoughts, feeling and ideas thus serving as a medium of
    A. Affection
    B. Demonstration
    C. Expression
    D. Expression and communication
    E. Intuition
35. Fine and Applied Art develops artistic ability as well as
    A. Creative skills
    B. Scientific skills
    C. Vocational skills
    D. a,b and c
    E. All of the above
36. An easel is best used for
    A. Ceramics
    B. Graphics
    C. Painting and drawing
    D. Photography and architecture
    E. Sculpture and textile
37. The relative comparison of the sizes of objects to one another in a composition is
    A. Balance
    B. Equilibrium
    C. Gauge
    D. Measurement
    E. Proportion
38. In Fine and Applied Arts, this is the most used as a delineating element
    A. Line
    B. Object
    C. Shape
    D. Size
    E. Weight
39. This material cannot be used for sculpture
    A. Dye
    B. Metal
    C. Plaster of Paris
    D. Stone
    E. Wood
40. One of these materials is best used on a potters' wheel
    A. Cement
    B. Clay
    C. plastercine
    D. Sand
    E. Wood

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SECTION C: PRACTICAL

Instructions

Candidates are to draw and shade the still life composition set before them. The choice of seating formation/arrangement is the candidates'. The candidates drawing must show an understanding of the principles of drawing like size, perspective, proportion and balance. The candidates must also use good shading techniques to determine the source of light and toreflect tonal value, forms and solidity. Space and format utilization must also reflect harmony in the composition thereby portraying an understanding of the rudiments of still life drawing.

Time Duration: 2½ hours

Composition: Still life objects (A kettle, a mug, a flask. Tea cup and saucer, a loaf of bread, spoon ,sugar container and a tin of milk.)

Title: My Breakfast table

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SECTION D

FINE AND APPLIED ARTS PRACTICAL SKILLS AND PERFORMANCE RATING SCALE

S/N	Skills Category	Behavioural Category	Excellent	Good	Fair	Poor	Very Poor
			5	4	3	2	1
1.	Tool handling Skill	- Using appropriate materials/ tools for drawing - Correct handing of materials - Correct sitting position					
2.	Observation Skill	- Ability to relate each object with one another - Ability to observe details in composition					
3.	Measurement Skill	- Accurate rating of objects proportionately on the format - Accurate use of layout to emphasize balance - Marking of foreground and background accurately					
4.	Drawing Skill	- Ability to draw the composition correctly - Ability to use lines to reflect source or light					
5.	Technical Proficiency Skill	- Using correct shading technique - Display of originality and style - Display of accurate draughtsmanship					

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APPENDIX VI

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FINE AND APPLIED ARTS PRE-SERVICE TEACHERS' PERFORMANCE TEST
ANSWER SHEET

COLLEGE:_____

CANDIDATE NO._____

INSTRUCTION: Circle the alternative chosen from A-E

1	= A=	= B=	= C=	= D=	= E=	21	= A=	= B=	= C=	= D=	= E=
2	= A=	= B=	= C=	= D=	= E=	22	= A=	= B=	= C=	= D=	= E=
3	= A=	= B=	= C=	= D=	= E=	23	= A=	= B=	= C=	= D=	= E=
4	= A=	= B=	= C=	= D=	= E=	24	= A=	= B=	= C=	= D=	= E=
5	= A=	= B=	= C=	= D=	= E=	25	= A=	= B=	= C=	= D=	= E=
6	= A=	= B=	= C=	= D=	= E=	26	= A=	= B=	= C=	= D=	= E=
7	= A=	= B=	= C=	= D=	= E=	27	= A=	= B=	= C=	= D=	= E=
8	= A=	= B=	= C=	= D=	= E=	28	= A=	= B=	= C=	= D=	= E=
9	= A=	= B=	= C=	= D=	= E=	29	= A=	= B=	= C=	= D=	= E=
10	= A=	= B=	= C=	= D=	= E=	30	= A=	= B=	= C=	= D=	= E=
11	= A=	= B=	= C=	= D=	= E=	31	= A=	= B=	= C=	= D=	= E=
12	= A=	= B=	= C=	= D=	= E=	32	= A=	= B=	= C=	= D=	= E=
13	= A=	= B=	= C=	= D=	= E=	33	= A=	= B=	= C=	= D=	= E=
14	= A=	= B=	= C=	= D=	= E=	34	= A=	= B=	= C=	= D=	= E=
15	= A=	= B=	= C=	= D=	= E=	35	= A=	= B=	= C=	= D=	= E=
16	= A=	= B=	= C=	= D=	= E=	36	= A=	= B=	= C=	= D=	= E=
17	= A=	= B=	= C=	= D=	= E=	37	= A=	= B=	= C=	= D=	= E=
18	= A=	= B=	= C=	= D=	= E=	38	= A=	= B=	= C=	= D=	= E=
19	= A=	= B=	= C=	= D=	= E=	39	= A=	= B=	= C=	= D=	= E=
20	= A=	= B=	= C=	= D=	= E=	40	= A=	= B=	= C=	= D=	= E

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APPENDIX VII

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FINE AND APPLIED ARTS PRE-SERVICE TEACHERS' PERFORMANCE TEST ANSWERS

1. D
2. B
3. D
4. E
5. B
6. E
7. A
8. B
9. A
10. C
11. C
12. C
13. D
14. C
15. D
16. A
17. D
18. D
19. A
20. D
21. B
22. B
23. E
24. E
25. D
26. B
27. E
28. B
29. D
30. A
31. E
32. C
33. A
34. D
35. E
36. C
37. E
38. A
39. A
40. B

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LIST OF COLLEGES OF EDUCATION

1. Ondo State College of Education, Ikere-Ekiti,Ekiti State;
2. Adeyemi College of Education, Ondo, Ondo State;
3. Federal College of Education (Technical), Akoka, Lagos State;
4. Adeniran Ogunsanya College of Education, Otto-Ijanikin, Lagos State;
5. Federal College of Education, Osiele, Abeokuta, Ogun State;
6. Tai Solarin College of Education, Ijebu-Ode, Ogun State;
7. Osun State College of Education, Ilesha, Osun State;
8. Osun State College of Education, Ila-Orangun, Osun State;
9. Federal College of Education (Special), Oyo, Oyo State;
10. Emmanuel Alayande College of Education, Oyo, Oyo State.

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