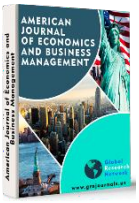

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Development of Clothes Sizing System for Designing School Uniform for Pre-school Children Using Anthropometric Data in Rivers State, Nigeria

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Abstract:
The purpose of this paper was to develop a clothes sizing system for designing pre-school uniforms using anthropometric data from Rivers State, Nigeria. Guided by eleven objectives, eleven research questions, and seven hypotheses, the study adopted a combination of survey and Research and Development (R&D) designs, conducted in four phases. The population included 129,960 respondents: 2,127 pre-school teachers, 127,047 pre-school children, 266 tailors, and 520 parents. A sample of 1,267 respondents was selected using a multistage sampling technique: 819 respondents for phase one (327 teachers and 226 parents randomly selected, and 266 tailors included for needs assessment) and 400 preschoolers randomly selected for body measurements in phase two. Purposive sampling was used to select 12 user models and 36 judges for prototype evaluation. Data collection instruments included the School Uniform Needs Assessment Instrument for Teachers, Parents, and Tailors (SUNAITPT), the Standard Anthropometric Data Chart (SADC) for pre-school children, and the School Uniform Design Assessment Instrument for Judges (SUDAIJ). Data were analyzed using One-way ANOVA at a 0.05 significance level. Findings indicated that pre-school children need uniforms that offer protection, durability, comfort, safety, easy movement, attractiveness, flame resistance, washability, and shrinkage resistance. Preferred attributes included various fabrics, bright colors, and aesthetic designs. Uniform sizes were categorized into three groups using basic block patterns for shirts, tops, skirts, jackets, pinafores, and ties. Twelve prototype uniforms were designed, meeting aesthetic and expressive attributes. The study recommended that Nigerian garment stakeholders use these findings to create functional, aesthetic, and expressive pre-school uniforms. The developed size chart, sizing system, and block patterns should be adopted, and the pattern drafting method should be published for broader knowledge sharing.

Keywords: Development, Clothes, Uniform, Pre-school, Designing, Anthropometric.

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Introduction

Clothes is one of the oldest things that have been in existence. It is one of the basic human needs beside food and shelter and meeting this need provides satisfaction and enjoyment to human in life. Clothes is anything used by human to cover their body in order to be comfortable. Idowu (2016) posited that clothing is all things worn or applied to the human body to fulfill its function. Clothes serves many functions such as coverage of one's nakedness; protection from weather condition, rough surfaces, injury, insect bites among others. Clothes is also used for beautification, adornment, identification of status and as a communication tool for cultural and occupational identity by the old, adult, adolescent, children and pre-school children

Pre-school children are children between ages 2 to 5 years. At this age, most children are introduced to the school which is a different environment. Pre-school also called nursery school is the first experience of a child in a structured setting to learn the importance of sharing new things which foster personal growth (Rani, 2020). The pre-school educational period is a critical one in the development of the child. Not only do physical defects manifest themselves but also faulty attitudes, anxieties, insecurities, instabilities and distortion of personality may be produced. Pre-school education plays a pivotal role in pre-school children life as they are often engaging in vigorous everyday activities such as sitting, standing, bending, lying down, running, jumping, climbing, push and pull with ease, dancing among others. In the pre-school period, the children develop more quickly and learn more activities through play and they have need for clothing's according to these activities. Pre-school children wearing appropriate school uniform can help them perform everyday activities with ease and build up their self-concepts and personality right (Rano, 2022). This help and make pre-school period a delightful one when pre-school children wear school uniform to school.

School uniforms are the distinctive design clothes worn by the students of schools and are purposely designed for undifferentiated identification. Rani (2020) opined that school uniform is an outfit or a set of standardized clothes-worn primarily for an educational institution. The word, uniform means literally having the same form. This means that every child in the school wears the same clothes (though girls often have a different uniform (style and design) from boys). School uniform is the identity of the pre-school child and it helps them identify with their schools and make them feel attached to learning community (William, 2022). Due to school uniforms, pre-school children give respect to other children and see themselves as equal. A pre- school child who wears a uniform feels pride and confidence. A school uniform is necessary for pre-school children because when they wear it, they feel happiness and satisfaction and get confidence for better and more study (Williams, 2022).

Uniforms for preschool children play several roles as it can help them to feel that they are connected to their teachers and their classmates. It can also help them mentally and emotionally as they feel independence. Williams (2022) explained that school uniforms of preschool children help students as well as parents. This is because as precious time of parents are saved when they spend less time in the morning searching for matching clothes. This makes the morning routine easier for parents. Different pre-schools have their different school uniforms style and design.

Design as a word, has several meanings such as purpose, plan, scheme, selection, arrangement and organization. It describes the entire design procedure. Both design and designing are important in the field of fashion as well as art. Design is a part of our daily life. Gbetodeme et al., (2016) asserted that design in fashion and designing is an art of putting things around us artistically and skillfully on paper and it's then transformed to fabric. This art sometimes conveys individual creativity on different circumstances which requires the ability to arrange and relate object such as lines, angles, spaces, shapes, colors, texture and other hidden values that come together to exemplify the designers abstract (Maya et al., 2016). In designing pre-school children school uniform, it is essential to put into consideration their clothes requirements/needs.

Clothes requirements/needs of pre-school children should be patterned for growth; have ease and freedom; yet it should not be too large. It should be well constructed to standard wear and be comfortable; roomy neck opening; strong reinforcements at all points of strain such as placket-openings, pocket-corners, knees, elbows, armholes and under buttons; closely woven material which remain fresh even after several washes; good workmanship, durable flat seams; simple, accompanied by becomingness of line

and colour; fasteners sewn firmly to withstand tugging and pulling and button holes closely worked. In essence, an ideal pre-school children uniform should be soft, comfortable, light-weight, non-irritating, absorbent, non-flammable and easy to put on and take off and comparatively loose. In the same vein, pre-school children uniform should be durable enough to accommodate all pre-school play and activities. Therefore, pre-school children uniform is expected to meet their needs and fit their body shape. Hallette (2021) stated that for children clothes to fit their body shapes, sizes should be used as their clothes needs in all its variations are very relevant in making clothes sizes.

Clothes size is a method used to create clothes that will fit target population of different sizes. Clothing industries identify and base their sizing systems on a standard figure, measurements of which are proportionately graded into sets of bigger and smaller sizes. Sizing systems vary based on country and type of garment such as dresses, tops, trousers, skirts among others (Zakaria, 2016). A sizing system is a table of numbers that represents the value of key dimensions used to classify the bodies encountered in a population (Gills &Ahmed, 2022). A sizing system is a set of body sizes (mean body size) designated in a standard manner which is based on anthropometric data taking on a cross section of a target population.

A sizing system based on anthropometric data (measurement of humans) is known as an anthropometric sizing system in clothing. Zakaria (2016) opined that sizing system is a set of clothes sizes that are created by a clothes construction firm to fit a range of people in a target market. Sizing system was developed as a way of classifying body shapes and providing size increments for clothes manufacturers. Several sizing systems exist. One of them is the traditional confection system based on chest circumference. It is the most common sizing system. Another sizing system is the NATO sizing system based on length and circumference parameters. A sizing system consists of the number of sizes and intervals between sizes (e.g the size roll), and a size designation or labelling system (Zakaria, 2016). Sizes are based on suitable control dimensions; thus, identifying these control dimensions around which the sizing roll or structured is critical. Control dimension is related to both height and breadth/width. This control dimension is generally understood thus, the use of bi- or tri-dimensional systems to represent different aspects of variability in body size has been suggested (Gills & Ahmed, 2022).

Bi- and tri-dimensional systems have a primary control dimension with fixed intervals between sizes while the secondary and tertiary control dimensions enable a more precise fit at several locations on the body (Zakaria, 2016). Internationally, a variety of sizing designations is used, such as sizes by code (e.g. Small, Medium, Large), by a generalized 'size' (e.g. small, medium, large), by body dimension (e.g. waist and leg measurements for men's trousers) or by age (especially for children). Gills and Ahmed (2022) asserted that this sizing system for children is based on body height as the primary dimension and not on age, as height differs greatly between countries, resulting in considerable variations in height within age groups. Sizing system and sizes are essential in designing pre-school children uniform. This is because their body sizes and proportion of each are different according to gender, age, ethnicity, race and environmental background (Lim, 2017). The author noted that pre-school children have a wide variety of body types and shapes. Thus, their clothes developers should be aware of the body shapes and proportion changes according to a particular child's growth stage to develop well-designed and well-fitted clothes using a sizing system based on anthropometric data.

Anthropometric data also known as anthropometric measurement in clothes construction for data on human body size and shape. It is the science of measuring the human body and its parts in specific areas with a view to determine its average dimensions and proportion of body parts (Bilhassan et al., (2022). Anthropometry is the

branch of the human sciences that deals with body measurement, such as size, shape, strength and working capacity (Gupta, 2014)). It provides different scientific methods and techniques for taking various measurements. This science helps designers to create spaces and products that are more suitable for the users, by taking into consideration different body dimensions and different activity requirements. Designers used anthropometric data and drawings according to their purpose, which include measurements of human beings in all age groups and sizes. It is a requirement for the designers to keep in mind that how users would interact with the product or service, use and misuse it is an important concern. There may be significant variations in the anthropometric data sets among different populations. The variance in these data sets impacts the size range of clothes for demanding markets in fashion industry as well as development of clothes.

Development means to change with a specific direction in order to create something new. Development is seen as a process of producing something tangible (a new product) and bringing it to the market place (Wijewardhana et al, 2022). All the activities related to development of the new product including idea generation, screening, testing and getting customer approval happen in new product development (NPD) life cycle. In every industry, NPD process has significant value because it greatly influences the whole value chain. Clothes development process consists of several steps: identification of the needs of the wearer, measurement and sizing, design or sketching, drafting the pattern, cutting and construction of the clothes (Gupta, 2021). The overall process of development starts and ends with meeting specific needs of the users. Therefore, the process of developing school uniform for pre-school children was designed to meet their activity requirement (specific needs). It is also necessary to measure deficiencies in products against the user's ideal of those products. This process is known as need assessment (Gordon, 2015).

Need assessment has been utilized by many apparel researchers when designing apparel for special group (Chae & Schofield-Tomschin, 2020). Therefore, designing pre-school children uniform requires suitable features to make them comfortable, smart and appealing while performing activities in school.

This study was aimed at developing clothes sizing system for designing school uniform for pre-school children using their anthropometric data. This would result to a school uniform that is comfortable and fits well with appropriate size. It would also help them to be comfortable, smart and appealing while performing school activities. The school uniform was developed based on activities performed in school by pre-school children while ensuring comfort, appropriate size and fit. The school uniform was designed to meet physical and psychological needs with new shape and unique appearance in order to attract pre-school children attention and allow pre-school children perform school activities with ease. Hence, there is a need existed to develop clothes sizing system for designing school uniform for pre-school children in Rivers State using their anthropometric data to ensure appropriate sizing and fit which was not well considered and provided for by school authority and the clothes industry. Therefore, the aim of this was to develop clothes sizing system for designing school uniform for pre-school children using anthropometric data in Rivers State, Nigeria. Specifically, the study seeks to:

1. identified various school activities involved by pre-school children during school period in Rivers State, Nigeria;
2. determined the clothes needs of pre-school children based on the activities performed during school period in Rivers State, Nigeria;
3. determined the design criteria required to generate design ideas of school uniform for pre-school children in Rivers State, Nigeria.

4. determined the necessary design features based on clothes needs of pre-school children in Rivers State, Nigeria;

Hypotheses

The following null hypotheses were tested at 0.05 level of significance.

Ho1: There is no significant difference between the mean responses of (teachers, parents and tailors) on the various school activities involved by pre-school children during school period in Rivers State, Nigeria.

Ho2: There is no significant difference between the mean responses of(teachers, parents and tailors) on the clothes needs of pre-school children based on the activities performed during school period in Rivers State, Nigeria?

Ho3: There is no significant difference between the mean responses of (teachers, parents and tailors) on the design criteria required to generate design ideas of school uniform for pre-school children in Rivers State, Nigeria.

Ho4: There is no significant difference between the mean responses of (teachers, parents and tailors) on the necessary design features based on clothes needs of pre-school children in Rivers State, Nigeria

Theoretical Framework

The paper was anchored on the three related theories, the Protection Theory of Clothing, Modesty theory, and Adornment theory

Protection Theory of Clothing

The protection theory propounded by Westermark& Havelock in Sonye (2018) states that defence of the body is based on physical and psychological protection which are achievable by wearing clothes. Thus, protection against weather, elements, insects, human enemies, injuries and hazards propels man to wear clothes. The Propounder indicates that utility apparel provides a buffer between people and their environment, protecting them from harmful element both physical and psychological. Protective and safety clothes according to the propounder is essential in such areas as sports or occupations requiring contacts with potentially dangerous substances or elements. Applied to this study, proper dressing during school activities protects pre-school age children from unintentional injury. In line with this theory, this study design school uniform using selected clothes/fabrics for pre-school age children to protect the body (from weather condition, rough surfaces, injury, insect bites among others) and give greater freedom of movement during school activities. This theory is related to this study because in this study, features of protective and functional clothes (comfort, performance enhancement) help protect school age children from unintentional injuries during school activities in school.

Modesty theory

Modesty theory was propounded by Thomas in Kasembela (2016). The theory states that decency is the major reason for wearing clothes and thus, clothes are worn to conceal or cover nakedness. This theory emphasis that in designing clothes, attention is focused on standards regarding the areas of human anatomy to be covered. Modesty in relation to clothes has to do with simplicity, unwillingness to draw attention to one self and it is based on the idea that morality is dependent upon modesty as expressed through the concealment of the human body. This theory is traced to the biblical fall of Adam and Eve who were not ashamed of their nakedness until they committed sin by eating the forbidden fruit, which opened their eyes to discover that they were naked (Gen.3:7). Modesty theory supports this study since pre-school age children need to cover their body to prevent shame and disgust. This theory help the researcher to

produce school uniform that would cover the body of pre-school children to make them look decent and attractive during school period. In applying the principles of modesty, the researcher pick colourful fabrics to designs school uniform to make them look beautiful and appealing to pre-school children while still making sure the school uniform design covers the pre-school age children appropriately.

Adornment theory

The adornment theory was propounded by Veblen Thorstein in Sonye (2018). The theory states that clothes is worn for beauty, personal decoration, aesthetics and expression. Aesthetically, human beings want to appear beautiful and attractive and one important function of clothes is to decorate the body. The emphasis of this theory is on people wearing clothes to decorate or adorn the body. This theory guides the researcher to pick and utilize colourful fabrics, appliques, bias cut for aesthetic expression and attraction to pre-school age children. Pre-school age children like beautiful colours and they are easily attracted to beautiful and colourful designs. The development of school uniform for pre-school age children derives its foundation by integrating these theories to meet the physical, environment and psychological factors required in meeting users need in clothes.

Materials and Method

The design of the study was a combination of two research design as both survey design and Research and Development (R and D) were used. The survey research was used to gather facts from members of the chosen population using a questionnaire. The survey research was used to respond to objective one to six while research and development was used in the development of school uniform for pre-school children. R and D design is an industry-based development instrument in which the findings of research were used to design new products and procedures or improve on existing product, followed by the application of research methods to field-test, evaluate and refine the products and procedures until they meet specified criteria of effectiveness, quality or similar standards (Gall, Gall &Borg (2007).

The R & D system approach model of educational research and development comprise ten steps called the cycle (Gall, Gall &Borg, 2007).The ten steps comprised:

1. Defining of goals. This includes need assessment.
2. Review of literature necessary for product development.
3. Stating specific objectives and criteria for product development.
4. Development of prototype based on scientific evidence available for pertinent research findings.
5. Field testing prototype in the setting where it was finally used.
6. Revision of the prototype to correct deficiencies find in field testing stage.
7. Conduct a main field test of the revised product.
8. Design and conduction of formative evaluation of the product.
9. Revision of the prototype
10. Designing and conducting of summative evaluation

The current research adapted the R & D cycle using seven steps because many steps of the research design were in line with the purposes of the current study. R & D research design was also used for this study because it is research approached based on designing and developing new products and materials to improve education and the existing products which is also the aims of this present study.

This study was carried out in Rivers State, Nigeria. Rivers State is one of the states in South-South geopolitical zone of Nigeria. Rivers State is bounded on the North by Imo, Abia and Anambra States, on the East by Akwa- Ibom State, on the West by Bayelsa and Delta States and on the South by Atlantic Ocean. Rivers State has three senatorial districts with 23 Local Government Areas (LGA). A lot of pre-school children who are in pre-school are found in Rivers State. Most of these pre-school children wear school uniforms that do not size and fit their body shape and sizes (body built) appropriately. This makes them appear unattractive, dull and poorly groomed.

The population for the study comprised 129,960 respondents made up of four groups; 2,127 registered pre-school teachers, 127,047 enrolled pre-school children (2022/2023) Rivers State Universal Basic Education Board), 266 tailors (Rivers State Ministry of Commerce, 2022/2023 update) and 520 parents from selected pre-schools (parents' attendance in Parents Teachers Forum (PTF) meetings of selected schools (2022/2023 academic session). Three sets of population (I, II and III) were used in this study.

Three sets of samples (I, II and III) were used in the study. The sample for the study comprised 1,267 respondents made up of four groups; 327 registered pre-school teachers, 400 enrolled pre-school children 266 tailors and 226 parents. Three sets of sample (I, II and III) were used in this study. The sample size for phase I of this study was 819 respondents comprising; 327 pre-school teachers and 226 parents (who were randomly selected from 2, 127 school teachers and 520 parents respectively), and 226 tailors. In phase II of the study, 400 pupils were randomly selected from 127,047 pre-school children whose anthropometric data was used for pattern drafting in phase II of the study. This sample size was drawn from 127,047 enrolled pupils using "Taro Yamane formula. Uzoagulu, (2011) noted that Taro Yamane statistical method can be used to determine the sample size for a population whose number is known. No sampling was used for tailors since the population is manageable (Explorable.com, 2009). Also, 12 users (preschoolers) was conveniently selected from 400 pupils who consent to participate in fit-testing of the constructed prototype school uniform design for preschool children clothes sizes in phase III; 36 judges was purposively selected from the population of judges as follows: 12 Teachers, 12 parents and 12 tailors all of whom gave their consent to participate in the study. Four sampling techniques was utilized to draw the samples. The multi-stage sampling, simple random sampling, purposive sampling and accidental sampling, multi-stage sampling.

Three sets of instruments were used for data collection in phases, these are:

1. School uniform Needs Assessment Instrument for Teachers, parents and Tailors (SUNAITPT). This was used in phase I.
2. Standard anthropometric data chart (SADC) for obtaining measurement for small, medium and large sizes for pre-school children. This was used in phase II
3. School uniform Design Assessment Instrument for Judges (SUDAIJ). This was used in phase IV.

Three research assistants were used by the researcher from among Home Economics students of Ignatius Ajuru University of Education, Port Harcourt. The research assistants were prior to data collection and they assisted the researcher in recording measurements taken, pattern drafting and alterations, interpreting the contents of the questionnaire to respondents and assisting respondents where necessary. The researcher used consent form to seek consents of participants prior to the study.

Data obtained for the study were analyzed using mean and standard deviation, frequency and percentages as well as Analysis of Variance. Specifically, research question 1 to 4 was analyzed using the mean and standard deviation. Frequency and percentages were used to analysed research question 5. Mean of 2.5 was used as cut-off

point for decision making for each item. Any item with mean rating of 2.5 and above was considered as agreed and highly required while mean value below 2.5 was considered disagreed and not preferred for research question 1 to 4 while research question 10 to 11 utilized cut –off of 3. Mean of 3 was used as cut-off point for decision was rule for the five-point scale of each (SUDAIJ) items. Any item with mean rating of 3 and above considered as excellent fit while mean ratings less than was regarded as no fit/ not satisfactory. The 7 null hypotheses generated was tested using Analysis of Variance. Null hypothesis with P value (P > 0.05) greater than 0.05 level of significance was considered significant and null hypothesis rejected while P value (P< 0.05) less than 0.05 level of significant was considered not significant and the null hypothesis accepted. All data collected was analyzed using statistical package of social science (SPSS) version 25

Data Presentation

Test of Hypotheses

The study tested the following null hypotheses at 0.05 level of significance.

The results of the hypotheses are presented below;

Ho$_1$: There is no significant difference between the mean responses of teacher, parents and tailors on the various school activities involved by pre-school children during school period in Rivers State, Nigeria

Table 4.29: Analysis Of Variance On The Mean Responses Of Teacher, Parents And Tailors On The Various School Activities Involved By Pre-School Children During School Period In Rivers State, Nigeria

Source of variance	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.011	2	.005	.006	.994
Within Groups	647.828	9	.865		
Total	**647.839**	**10**			

The data in Table 4.29 showed the analysis of variance on the mean responses of the parents, teachers, and tailors on the various school activities involved by pre-school children during school period in Rivers State, Nigeria. The hypothesis tested showed that there is no significant difference between the mean responses at 0.994 (>0.05), thus the alternative hypothesis Ha$_1$ is retained.

Ho$_2$: There is no significant difference between the mean responses of teacher, parents and tailors on the clothes needs of pre-school children based on the activities performed during school period in Rivers State, Nigeria

Table 4.30: Analysis Of Variance On The Mean Responses Of Teacher, Parents And Tailors On The Clothes Needs Of Pre-School Children Based On The Activities Performed During School Period In Rivers State, Nigeria

Source of variance	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.011	2	.005	.006	.994
Within Groups	647.828	9	.865		
Total	**647.839**	**10**			

The data in Table 4.30 showed the analysis of variance on the mean responses of teacher, parents and tailors on the clothes needs of pre-school children based on the

activities performed during school period in Rivers State, Nigeria. The hypothesis tested showed that there is no significant difference between the mean responses at 0.510 (>0.05), thus the alternative hypothesis Ha_2 is retained.

Ho_3: There is no significant difference between the mean responses of teacher, parents and tailors on the design criteria required to generate design ideas of school uniform for pre-school children in Rivers State, Nigeria

Table 4.31: Analysis Of Variance On The Mean Responses Of Teacher, Parents And Tailors On The Design Criteria Required To Generate Design Ideas Of School Uniform For Pre-School Children In Rivers State, Nigeria

Source of variance	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	7.562	2	3.781	2.643	.072
Within Groups	1071.672	9	1.431		
Total	**1079.234**	**10**			

The data in Table 4.31 showed the analysis of variance on the mean responses of teacher, parents and tailors on the clothes needs of pre-school children based on the activities performed during school period in Rivers State, Nigeria. The hypothesis tested showed that there is no significant between the mean responses at 0.072 (>0.05), thus the alternative hypothesis Ha_3 is retained.

Discussion of Findings

The study found throwing and catching, clapping, jumping, pulling and pushing, drawing, riding toys, counting, singing, running, squatting, arm stretching, sitting, walking, lifting up and dancing were reported by teachers, parents, and tailors etc. as the various activities the children engage in during school period in Rivers State, Nigeria. Also, the study found no significant difference in the mean ratings of the judges (parents, teachers, and tailors) on the various school activities involved in by pre-school children during school period in Rivers State, Nigeria. The both studies relates in that they examined the activities of the early school children's activities in the schools. The study is also in synergy with Mamadaminova (2021) on the role of pre-school education in the child's development and analysis of current pre-school education system in Uzbekistan. The study found that developed countries pay more and more attention to boost the quality of pre-school educational institutions, the efficiency of curriculum, and implementation of more social and physical activities such as bending, crawling, and throwing, among other. This present also conforms to the findings of Siti et al. (2015) who found that target sample involve in activities such as dancing, arm stretching, bending among other activities. The findings of the study also corroborated with that of Betzina (2017) who established that pre-school children are constantly involved in a range of activities during school games and that most games played at school involves sitting, dancing, standing, and arm stretching.

The study found that the pre-school children clothes need include protection, durability, comfort, safety, easy movement, attractiveness, flame resistance, washability, and shrinkage resistance, etc. The study also found no significant difference in the mean ratings of the judges (parents, teachers, and tailors) on clothes needs of pre-school children based on the activities performed during school period in Rivers State, Nigeria**.** The study is in line with Dogbey et al. (2015), the study found that more parents considered the appearance of their children before other factors such as safety and comfort ability. The main factors considered by the tailors in the selection of fabrics for constructing children's clothes were colour, design, and purpose of

clothes. The majority of the tailors adopted a number of safety measures, such as linen of apparel, light-weighted zippers and use of few buttons, to enhance the comfortability of children's clothes. The study also relates with Betzina (2017) whose study result showed that clothes needs should include comfort, safety, easy movement, attractiveness, etc. The study also relates with Nathan et al (2021) who noted that fabric designers must change their operations from exchange value to use value, which offers the opportunity to increase clothes appearance through identification of school uniform with options such as comfortability, durability, washability, among others. Supporting the present findings, Gupta (2011) opined that tailors of school uniform should seek for ways of designing and manufacturing school uniform that is based on meeting pre-school children needs such as being comfortable, durable and with less material intensity. Knight (2011)) asserted that one of the most important tools to gain a sustainable competitive advantage is innovation and innovative management approach through the use of design criteria that meets the usability of the wearer, comfort of the wearers, facilitates activities performance, have good fit on the wearers. Siti et al. (2015) in support of the finding, asserted that needs such as easy movement, attractiveness, flame resistance, washability, and shrinkage resistance, etc should be considered when choosing fabric types and design.

The study found that the design criteria required for generating design ideas of school uniform for pre-school children in Rivers State, Nigeria are based on comfort, play items, fall prevention, safety, size range, movement, activity performance, aesthetics, and easy donning and doffing. Furthermore, there was no significant difference in the mean ratings of the judges (parents, teachers, tailors) on the design criteria required to generate design ideas of school uniform for pre-school children in Rivers State, Nigeria. The study is in line with Gogoi & Baruah (2015) who conducted a study on designing of dresses for pre-school girls in Assam, India. Their findings revealed that all the design were stitched in various colour like red, light and dark blue, pink, brown both printed and plain materials (after examine the strength, colour fastness and soil release properties) by incorporating accessories and fasteners accordingly. The study also agrees with Hye-Won et al., (2015) conducted research on the current infant and children's clothes size charts in the United Kingdom.

According to the results, the average size measurements from the selected size charts were smaller than the Shape GB but the fit form made by the Shape GB data had similar size with the average sizes. The considerable number of brands provided the body measurements of 'Height, Chest, waist, and Hip' with additional weight measurement at the infant targeted brands. The size charts were more classified by age, gender, clothes type, and fitting but those were different from all size charts and it can be suggested that united size charts should be suggested. This study is similar to the current study in that, both studies focus on clothes sizes for children. The previous study is related to the present study as both studies focused on children's clothes size chart. This study collaborates with Prathyusha et al. (2015) carried out a study on smart uniforms for primary school children. It was found that there was a definite need for specialized uniforms in order to meet the basic functions and comfort of children. Four school uniforms (two for boys and two for girls) were designed and manufactured. Further findings showed that the designed school uniforms can be introduced for primary school children to improve their comfort while performing different activities in schools. The previous study is similar to the current study as both studies centers on design of school uniform for children. The difference between the previous study and the current study is that primary school children were used in the previous study while the present study used pre-school age children.

The study found that clothes with a straight sleeve, shirt sleeve; collar, Peter pan collar/flat collar, and Bishop Collar were most preferred by judges for the pre-school

children in Rivers State, Nigeria. Based on pocket placement; pocket on the shirt, side seam, short, pants, skirt gown, front, and back pocket were preferred. On the fastener types, fastening and opening buttons, button holes, press-stud buttons, and elastic button and loop were preferred. Moreso, no significant difference was found in the mean ratings of the judges (parents, teachers, tailors) on the necessary design features based on clothes needs of pre-school children in Rivers State, Nigeria. The present correlates with Bezerra et al, (2017) carried out a study on anthropometry for children's clothes: difficulties and limitations. The study was designed based on importance emphasis on sleeve, pocket placement, fastener types, etc. The previous study is similar to the present study as both studies focused on anthropometric data for children's clothes.

The present study as well relates with Wijewardhana. (2022) on 'Design Creativity and Clothing Selection: The Central Focus in Clothing Construction'. The study's result as well made emphasize on factors such as pocket placement and fastener types, among others. The study as well agrees with Prathyusha et al. (2013) on Features Preferred by Primary School Children in School Uniforms. From their study it was found that children preferred cotton patterned fabric with shades of green and blue for their school uniforms because of its light weight, absorbing capacity and comfort ability. Girls preferred features like peter pan collar, Set in sleeves, Back yoke, patch pockets on the front left panel and pleats for skirt, flaps for belt and pockets on side seam, few of them preferred pinafore style of uniform. Boys even preferred shirt with pocket at left panel, raglan sleeve and back yoke. Short with flaps and set in pockets were their preferences.

Conclusion and Recommendations

The study has shown that the most predominant requirements for the pre-school children clothes needs include protection, durability, comfort, safety, easy movement, attractiveness, flame resistance, was durability, and shrinkage resistance, etc. Since people have differences in what they like it is essential to determine what is needed before production. The two characteristics that governed the clothes needs of the pre-school children were reflected in the choice of types of clothes, functional aesthetics and expressive design preferred by the teachers, parents and tailors. The need for taking anthropometric data of individuals while developing new clothes products was confirmed in the research especially due to the disparity between the sizes of users in this study. It was revealed that sizing of pre-school children's uniforms should be determined by waist, bust and hip measurements.

Based on the uniform design and development, 12 prototypes of school uniforms were drafted, each having small, medium and large sizes. Design is important in developing clothes. Clothes patterns are very necessary in clothes construction for necessary alternations before the fabric is finally cut. Clothes made from drafted patterns always give very good fit. The most preferred designed clothes therefore were skirt, and short, shirt, pinafore, jacket, and crossing belt style preference, because of the functionality of the clothes that made the pre-school children comfortable. After evaluation, the overall feedback from the models was highly favorable. It was concluded that the study was successful since the prototype functional clothes designed, constructed and fit-tested satisfied both the users and judges.

Based on the findings, the following recommendations were made:

1. The clothes industries, manufacturer and School authorities should ensure to identify schools activities such as running, jumping, squatting, dancing and arm stretching etc before designing and developing school uniform clothes, to enable free movement, motion position and accommodates different posture during school activities.

2. The clothing industries, manufacturer and School authorities should capitalize on pre-schoolchildren clothes needs, and minimize profit growth, they should ensuring appropriate school uniform clothes while following children's fashion trends.

3. Parents, teachers and tailors should choose suitable material that doesn't irritate the children's delicate skin. Construction should be simple and comfortable, considering parents' and children's preferences. The design should meet the right proportions, fabric choice, opening and fastenings, fittings, and trimmings.

4. Teachers, parents, and tailors should select pre-school uniform fabrics such as cotton, wool, linen, cotton/polyester, cashmere, and synthetic blends. Preferred colors should include bright, soft, cool, medium, shiny, and smooth designs. Additionally, patterns like plain and flannel, plain and flowered, plain and striped, and plain and plaid/checks/polka dots should be considered top choices.

REFERENCES

1. Betzina, S. (2017). Clothes that fit. https://www.storetaunton.com/onlinestore.
2. Bezerra, G., Carvalho, M., Rocha, M., &Xu, B. (2017). *Anthropometry for children's clothing:*
3. Bilhassan, S., Albalaaze, R., Elgheriane, M. & Elkwafi, N. (2022). A Statistical Model for Analyzing Anthropometric Data and Developing Clothing Sizing Systems for Libyan School Children. *International Journal of Science and Engineering Applications*. *11*. 9-21. 10.7753/ijsea1101.1002.
4. Chae, J. & Schofield-Tomschin, J. (2020). Anthropometry in engineering design (a case study of cassava grating machines installed in Doko and Kutigi metropolis of Lavun local government areas of Niger state) Niger. Acad. Forum, *22* (1), pp. 132-139.
5. Dogbey, R. Rotzy, E., &Chizi, H. (2015). The Effect of Fabrics and Designs on the Physical Comfort of Children Clothes in the Accra Metropolis.
6. Gall, M. D., Gall, S. P. & Borg, W. R. (2017). Educational Research and Introduction (8th ed.) U.S.A. Pearson Education. Inc.
7. Gbetodeme, S. A. (2001). *A Manual on Basic Design for Fashion Students*.
8. Gills, S. & Ahmed, M. (2022). Digital manufacturing technology for sustainable anthropometric
9. Gogoi, M. &Baruah, B. (2015). Designing of dresses for pre-school girls. Asian J. Home Sci., 10 (1): 84-87.
10. Gupta, D. &Zakaria, N. (2014). Anthropometry, apparel sizing and design, Woodhead Publishing Limited, UK, 1st Edition.
11. Hye-won, Lim, Tracy Cassidy &Thouass Cassidy (2015). A study of the current infants and children's clothing size charts in UK. *International textiles and consumers congress ITCC/stanbul/Turkey.*
12. Idowu, T. J. (2016). *The impact of modern clothing on indigenous attires in Niger State.*
13. Kloss, K. (2021). 20 ways to boast your baby's brain power, scholastic www.scholastic.com>family-life
14. Lim, H. (2017). *Comparative analysis of sizing in children's wears between the UK and Korea*.
15. Mamadaminova, N. (2021). The Role of Pre-School Education in the Child's Development and Analysis of Current Pre-School Education System in Uzbekistan. *Journal of VasylStefanykPrecarpathian National University.8*. 205-211. 10.15330/jpnu.8.1.205-211.
16. Nathan, N., McCarthy, N., & Hope, K. (2021). The impact of school uniforms on primary school student's physical activity at school: outcomes of a cluster randomized controlled trial. *International Journal of Behavioral Nutrition and Physical Activity*. *18*. 10.1186/s12966-021-01084-0.
17. Prathyusha, K., Sharada, A. Devi & Antha, G. (2015) features preferred by primary schools children in school uniforms. *International journal of science and research (IJSR) ISSN* (online): 2319-7064, index copernicas value 6.4, Impact factors: 4:4:38 vol. 4 Issue 3.

18. Rani, L. (2020). Designing of the School Uniforms for Pre-School Children.
19. Siti, B. B., Naimah, M. S, Northasmah, S. & Mumtazah O. (2015). Development of clothing size for pro-school children. Based on anthropometric measurements. *Australian Journal of sustainable business and society* vol, 1. No. 2
20. Sonye, C. (2018). Development of safety playground apparels for school age children in Rivers State, Nigeria. An unpublished thesis submitted to University of Nigeria, Nsukka.
21. Uzoagulu, A. E. (2011). Practical Guide to writing research project Reports. Entertaining Institutions, Cheston Ltd.
22. Westernmark, A. & Havelock, E. (2018). The development & function of clothing. *Journal of general psychology*. *2*(1)262-364.
23. Wijewardhana, A., Abdelsalam, A., & Mohamed, H. (2022). Development of clothing charts
24. William, P. (2022). *Why do preschoolers wear uniform-everything you need to know?*
25. Zakaria, N. (2016). Sizing and fit of clothing for children and teenagers.