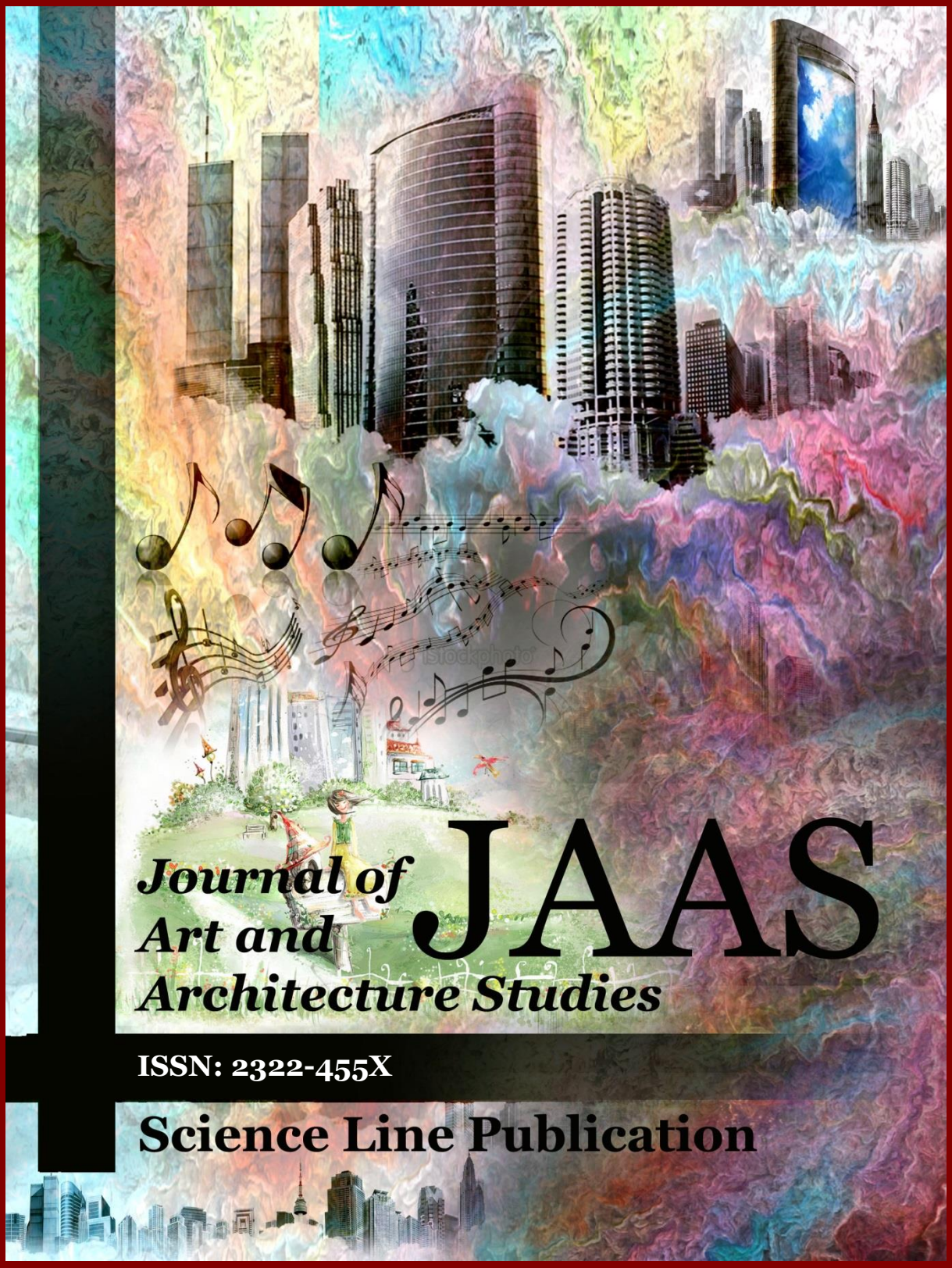
In the Name of God



An international peer-reviewed journal which publishes in electronic format

Volume 7, Issue 1, June 2018

Journal of Art and Architecture Studies

J. Art Arch. Stud., 7 (1): 01-20; June 15, 2018

Editorial Team

Reviewers

crossref metadata search

Volume 7 (1); June 15, 2018

Research Paper

Aesthetics and day-lighting correlation: an experimental study of form and placement of windows on buildings.

Idowu O. M. and Humphrey S.

J. Art Arch. Stud., 7(1): 01-10, 2018; pii:S238315531800001-7
DOI: https://dx.doi.org/10.51148/jaas.2018.1

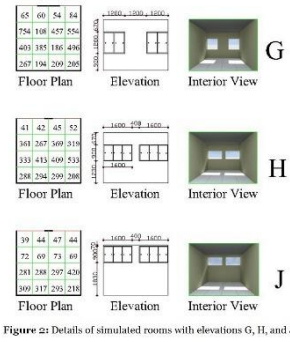


Figure 2: Details of simulated rooms with elevations G, H, and J.

ABSTRACT
Design concepts or principles such as 'Form follows function', 'Beauty in usability', or 'Attractive things work better' suggest that a positive correlation exists between aesthetics and functions of a building. Windows are designed probably for aesthetics and daylight in spaces of a building. However the design of windows for adequate daylight may be antithetical to that of aesthetic enhancement. This study sought to ascertain the effect of window form and position on, and the correlation if any, between aesthetics and daylight in spaces of a building. 143 respondents in four groups who were mainly undergraduate and postgraduate students and lecturers in Architecture were the respondents in the study. Six simulated elevations of an existing building with different form and placement but same window area were ranked in order of aesthetic pleasantness. Six architectural models of a typical room in the building were constructed with the window forms and placement as on the simulated elevations. Day-lighting levels were observed with lux meter outside, and at 16 positions on the floor of the simulated rooms. Mean daylight factors and daylight levels of in the rooms were calculated. Spearman's Rank Order Correlation Coefficients were employed to ascertain correlation between aesthetic rankings of the elevations and respective daylight factors. It was found that window forms and positions affect both aesthetic rankings and daylight factors in rooms of the buildings. Correlation coefficients of +0.94 were obtained in three of the four ranking groups, while the other ranking group recorded a coefficient of +0.77. The study concluded that the correlation between aesthetics and day-lighting through window design is at least appreciable and positive. It was recommended that windows form be rectangular with geometric proportion toward 'the golden ratio'

Keywords: Buildings; Window form; Window position; Aesthetics; Day-lighting; Correlation.

[Full text-PDF] [HTML] [ePub] [XML]

Research Paper

Heritage architecture in Ibadan, Nigeria: the house of Adebisi Giwa of Idikan.

Oluwaseyi A.D., Akande A. and Akeem O.A.

J. Art Arch. Stud., 7(1): 11-20, 2018; pii:S238315531800002-7
DOI: https://dx.doi.org/10.51148/jaas.2018.2

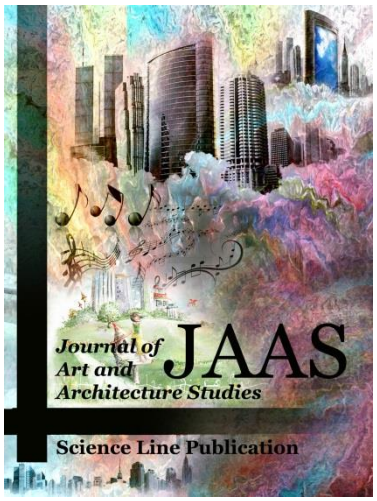
ABSTRACT
This paper examines the architectural design and planning of the residential apartment of the great Ibadan icon, businessman and philanthropist. The architecture is neo-classical and the building boasts of at least eighty five living spaces (parlour and rooms). The Adebisi mansion is a symbol of Ibadan-Yoruba material heritage. The people of Ibadan had great respect for the patron of the house - Giwa Adebisi and this is confirmed in the fact that his memories are preserved in legend, songs and poems that enunciate the man's wealth and influence. These legends and songs that accompany his home in Ibadan is rarely found elsewhere in Yoruba society. The paper discusses the grandeur of the Adebisi mansion and concludes that the building is of significant historic and architectural heritage value and thus makes a worthy material for preservation.

Keywords: Heritage, Architecture, Colonial, Patronage, Ibadan.

[Full text-PDF] [HTML] [ePub] [XML]

Archive

Journal of Art and Architecture Studies



ISSN: 2383-1553

Frequency: Quarterly

Frequency: Biannual (June & December)

Current Issue: 2018, Vol: 7, Issue: 1 (June)

Publisher: SCIENCELINE

Journal of Art and Architecture Studies aims to promote an integrated and multidisciplinary approach to art and architecture
view aims and scope

http://jaas.science-line.com

» Indexed/covered by Ulrich's™, RICeST (ISC), OCLC, TOCs, TIB, ROAD, Genamics, Google Scholar, IndexCopernicus (view full index information)

» Open access full-text articles is available beginning with Volume 1, Issue 1.

» Full texts and XML articles are available in ISC-RICeST.

» This journal is in compliance with Budapest Open Access Initiative.

» High visibility of articles over the internet.

» This journal encourage the academic institutions in low-income countries to publish high quality scientific results, free of charges... view Review/Decisions/Processing/Policy

Editorial Offices:
Atatürk University, Erzurum 25100, Turkey
University of Manitoba, Winnipeg, Manitoba R3T 2N2, Canada
University of Maragheh, East Azerbaijan, Maragheh 55136, Iran
Homepage: www.science-line.com
Phone: +98 914 420 7713 (Iran); +90 538 770 8824 (Turkey); +1 204 8982464 (Canada)
Emails: administrator@science-line.com ; saeid.azar@atauni.edu.tr

DOI: https://dx.doi.org/10.51148/jaas.2018.1

AESTHETICS AND DAY-LIGHTING CORRELATION: AN EXPERIMENTAL STUDY OF FORM AND PLACEMENT OF WINDOWS ON BUILDINGS

Olusegun Moses Idowu (PhD) and Sumadanda Humphrey

Department of Architecture, Modibbo Adama University of Technology, Yola, Nigeria

Original Article

PII: S238315531800001-7

Received: 27 Feb. 2017
Accepted: 20 Jun. 2017
Revised: 25 May. 2018
Published: 05 Jun. 2018

Corresponding author:

E-mail:
idowumosegun@gmail.com

Tel: +2348061510635

ABSTRACT:

Design concepts or principles such as 'Form follows function', 'Beauty in usability', or 'Attractive things work better' suggest that a positive correlation exists between aesthetics and functions of a building. Windows are designed probably for aesthetics and daylight in spaces of a building. However the design of windows for adequate daylight may be antithetical to that of aesthetic enhancement. This study sought to ascertain the effect of window form and position on, and the correlation if any, between aesthetics and daylight in spaces of a building. 143 respondents in four groups who were mainly undergraduate and postgraduate students and lecturers in Architecture were the respondents in the study. Six simulated elevations of an existing building with different form and placement but same window area were ranked in order of aesthetic pleasantness. Six architectural models of a typical room in the building were constructed with the window forms and placement as on the simulated elevations. Day-lighting levels were observed with lux meter outside, and at 16 positions on the floor of the simulated rooms. Mean daylight factors and daylight levels of in the rooms were calculated. Spearman's Rank Order Correlation Coefficients were employed to ascertain correlation between aesthetic rankings of the elevations and respective daylight factors. It was found that window forms and positions affect both aesthetic rankings and daylight factors in rooms of the buildings. Correlation coefficients of +0.94 were obtained in three of the four ranking groups, while the other ranking group recorded a coefficient of +0.77. The study concluded that the correlation between aesthetics and day-lighting through window design is at least appreciable and positive. It was recommended that windows form be rectangular with geometric proportion toward 'the golden ratio'

KEYWORDS:

Buildings; Window form; Window position; Aesthetics; Day-lighting; Correlation.

INTRODUCTION

Aesthetics has been referred to as that branch of philosophy dealing with the nature, art, taste and expression of beauty. Involving the study of sensory or sensori-emotional values, it is sometimes described as 'judgement of sentiment and taste' [1, 2], and 'the science of how things are known via the senses' or 'standards of taste' [3]. Environmental aesthetics has also been defined [4] as psychological pleasure sensation towards the environment. Architreacher [5] held that architectural aesthetics is governed by elements such as form, colour, light and shade.

Windows are designed for day-lighting, natural ventilation, outdoor view prospects, and to enhance the aesthetics of buildings [6, 7]. Rich and Dean [8] are of the opinion that the proportions, framing materials and position of windows can influence the feel and quality of spaces in a building. Climatic factors, thermal and visual comfort needs may influence the form, materials and components of windows. The resultant window designs sometimes enhance aesthetics in buildings retrofitted for thermal performance through changes in materials and components of window as reported in Gyimah and Tetlow [9] and Apogee Enterprises [10]. Window design for thermal or visual comfort may also be antithetical or contradictory to aesthetics enhancement. For instance, passive cooling enhancement in the warm-humid and hot-humid climates requires window areas and positions different from those required in the hot-dry and cold-dry climates [11]. Visual comfort challenges may not be equally addressed through daylight in these scenarios.

Windows and day-lighting

Daylight is admitted into architectural spaces through design of fenestrations in form of side-lighting (wall opening) or top-lighting (roof openings) of buildings [7]. While side-wall windows and clerestory windows are components of side-lighting, monitor light, saw-tooth light, and north roof light are examples of top-lighting. Even though day-light quantum admitted into space partly

Citation: Idowu O. M. and Humphrey S. (2018). Aesthetics and day-lighting correlation: an experimental study of form and placement of windows on buildings. *J Art Arch Stud.* 7 (1): 01-10.

DOI: https://dx.doi.org/10.51148/jaas.2018.1

Journal of Art and Architecture Studies (JAAS)

ISSN: 2383-1553

Volume 7, No. 1: 01-10.

2018 SCIENCE LINE

depends on height of fenestration as cited in Abraham [7], Moscoso [12] described windows as the most basic daylight collectors, capable of influencing the aesthetic quality of spaces in a building. Other factors that may affect amount of daylight admission include: intensity and direction of sunlight; luminance (photometric brightness) and luminance distribution of clear, partly cloudy, and overcast skies; surrounding physical features and terrain [6]. The light falling on a point indoors is made of the sky component, the component reflected by interior surfaces, and the component reflected by external surfaces. Daylight factor is a measure of interior day-lighting and defined [13] as a ratio of the light falling on a point indoors to that which would fall on the point from an unobstructed sky.

Daylight influences the pleasantness, excitement, order, complexity, legibility, coherence, spaciousness, openness, and spatial definition of a space [12, 14]. In Abraham [7], day-light is also cited to create healthier and more stimulating work environment, enhance productivity and afford better quality illumination. Efficient Windows Collaborative [15] adds that these attributes are influenced by the size, geometry, distribution and placement of widows on the building. Abraham [7] however warns that visual problems may be created by windows if not fitted with light shelves (Figure 1a) or venetian blinds. Unacceptable brightness levels and excessive contrast ratios of the background to the foreground are among the problems associated with windows.

Windows and aesthetics

According to Ching [16], the visual properties of shape, size, colour and texture, position, and orientation constitute the form of a building, and that the aesthetics of an architectural form or element is influenced by variables including proportion, scale, balance, rhythm, contrast, and unity. Aesthetic judgement, according to Smith [17], often engages visual proportions at both primary (first-order) and secondary (second-order) levels. In a similar vein, Vitruvius [18] believed that due regard for proportion creates orders and makes architecture beautiful. For him, harmony is achieved only when correct proportions are employed (throughout) from the whole to the individual elements of the building, as evident in the natural proportion of the human body. Often referred to as 'the golden ratio' (harmonic or divine proportional ratio), this natural proportion has been celebrated as the hallmark of aesthetic proportion in historic buildings such as the Pantheon. It is expressed [19] as the proportion of two dimensions such that the ratio of the shorter (s) to the longer (l) is the same as the ratio of the longer to the sum of the shorter and the longer (*i.e,* $s:l = l:[s+l]$). Empirical studies [17, 19, 20] show that architectural forms with proportions closer to the golden ratio (1: 1.618) are adjudged more aesthetically delightful to beholders from diverse backgrounds. The golden ratio is often correlated with the 'Fibonacci Sequence' of numbers in which each number is the sum of the two preceding numbers (e.g.,0,1,1,2,3,5,8,13,21,34,65,99,164). The sequence is believed to be exhibited in patterns found in some natural forms including bones in the human hand [19].

The proportional quality of a building is determined in part by the relationship between window and wall. The extent to which a building displays the quality of proportion is an aggregation of characteristics, ranging from the massing of its principal features to the proportion and disposition of windows, the ratio of the ground storey to upper floors and wall to roof. According to Smith [17], the sum of 'window-ness' is pitched against the totality of 'wall-ness', one against the other within the limit of deferential dominance (figures 1b & 1c). Windows as a discrete feature have significance in terms of proportion. The Georgian and Victorian windows for instance conform to the golden ratio, but differ sharply in aesthetic value due to the difference in number of their panes (Figure 1d).

Eurythym and symmetry are related criteria for judging the beauty of the design. Eurythym is the right relationship, proportional as well as formal, of the parts of an individual element (such as window). Symmetry on the other hand is the right relationship of individual elements to the composition as a whole. For Vitruvius, symmetry is the most important aesthetic quality in a building, and it is the harmonious correlation of proportions throughout a design [18].

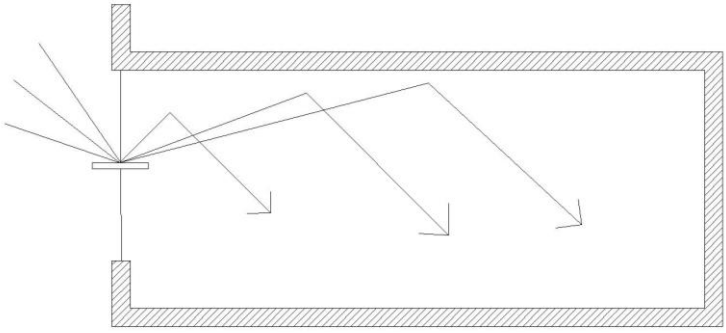


Figure 1a: Light shelf daylight distribution. Source: Abraham [7]

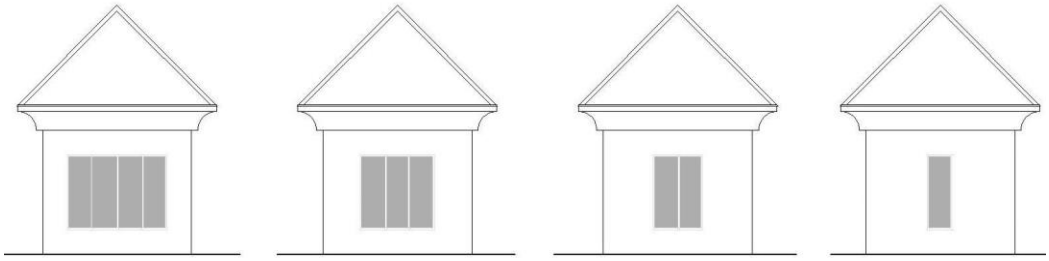


Figure 1b: Building aesthetics and window size

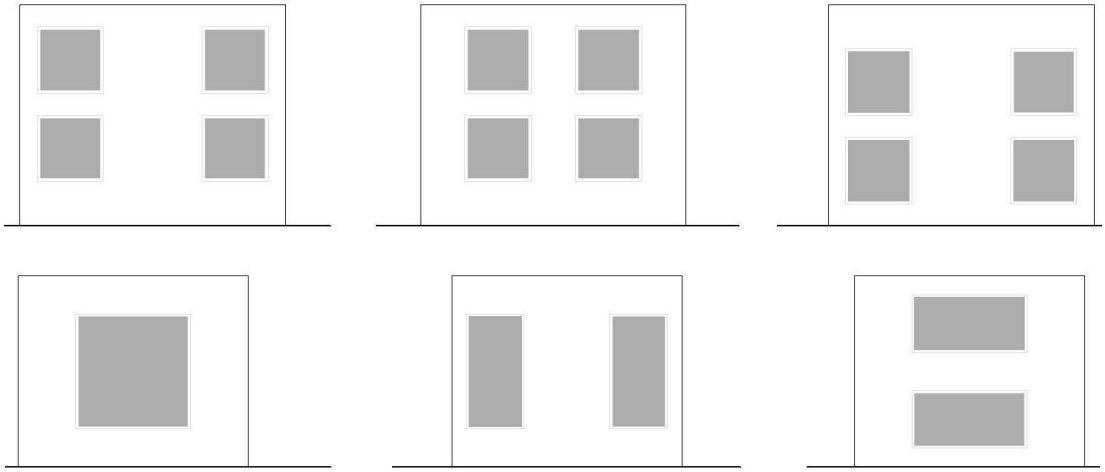


Figure 1c: Aesthetics, window distribution and placement on wall

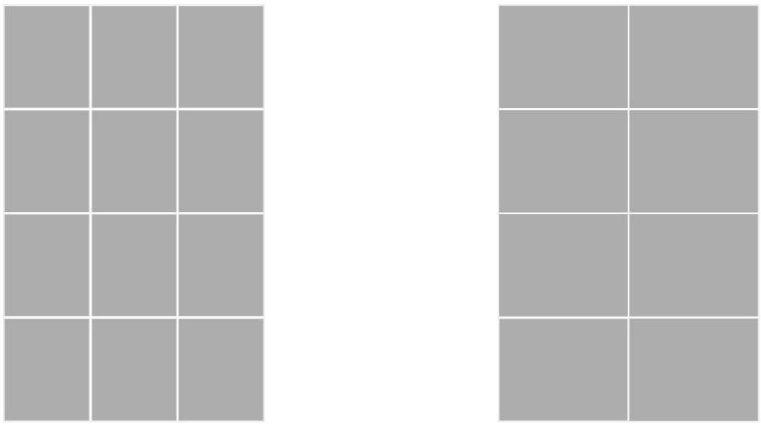


Figure 1d: Georgian (three panes) and Victorian (two panes) windows

The research problem

The prescriptive interpretation of "form follows function" [19] holds functional requirements to be more important than aesthetic considerations of buildings.

But for architects like Alberti and Ruskin [18], beauty was the overriding criterion in determining the success of a building; beauty is inseparable from suitability for use, and hence an aspect of utility.

Given that daylight for visual comfort is one of the functional requirements of an architectural space influenced by form and position of windows, how much of it (day-lighting) is provided in a 'beautiful building'? In other words, what is the correlation between the daylight in spaces and the aesthetics of a building? This study elicits the nature and degree of correlation, if any, between the aesthetic and the day-lighting values of window forms and placement on buildings.

METHODOLOGY

The investigation is a simulated experimental design as espoused in Groat and Wang [21]. It is a graphical simulation of the elevation of part of an existing Department of Architecture building. Five other elevations with same area but different form and position of windows were simulated, and the six elevations presented on A-4 paper-page (Figure 4). Physical architectural models of a room in the building were constructed with the six different forms and positions of windows on the external walls.

Description of the study objects

All the elevations (named G, H, J, K, L, and M) have same wall, room, and window areas but differ in the form (shape) and distribution (position) of their windows. Windows of the rooms on each elevation are of the same form and distribution. Elevation G has two windows each 1200 x 1200mm, 1200mm apart and 930mm above floor. Elevation H has two windows 1600 x 900mm each, 400mm apart and 1230mm above floor. J and K have same window shape and spacing as H, but different positions of 1830mm and 630mm respectively above floor level. L and M have one window each 2400 x 1200mm centrally placed along the wall length but of different height above floor level: 930mm and 1530mm respectively above floor level (Figures 2 to 4; Table 1).

A lux meter was deployed to measure daylight levels (DL) outside and on 16 designated points on the floor of the model rooms placed at window sill level indoors. Two out-of-the-model measurements were taken before and after the in-the-model measurements. Daylight factor (DF) for each of the model rooms were calculated as ratio of in-the-model mean daylight level to the average value out-of-the-model.

Copies of the simulated elevations were produced and administered to the respondents who were mostly architectural educators and students. Weighted means were calculated to obtain the aggregated aesthetic 'weight' of each elevation by respondent groups. The mean daylight factors of the model rooms and the corresponding elevations' aesthetic weighted means were ranked in order of magnitude from the highest (ranked as 1st) to the lowest value (ranked as 6th). Aesthetic rankings by the four respondent groups were in-turn paired with the corresponding daylight factor rankings in order to establish any correlation. The Spearman's Rank Order Correlation Coefficients, as described in Koleoso [22], were calculated for the four groups. Values obtained were interpreted using the following rule of thumb: ±0.00 to ±0.19, negligible; ±0.20 to ±0.39, low; ±0.40 to ±0.59, moderate; ±0.60 to ±0.79, substantial; ±0.80 to ±0.99, high; ±1, perfect.

Table 1: Design attributes of the study objects

Window attributes	G	H	J	K	L	M
Geometry: (Ratio)	Square (1: 1)	Rectangle (1: 1.8)	Rectangle (1: 1.8)	Rectangle (1: 1.8)	Rectangle (1: 2)	Rectangle (1: 2)
Dimension	1200 x 1200mm	1600 x 900mm	1600 x 900mm	1600 x 900mm	2400 x 1200mm	2400 x 1200mm
Number	2	2	2	2	1	1
Horizontal spacing	400mm	400mm	400mm	400mm	mid-wall length	mid-wall length
Height above floor	630mm	1230mm	1830mm	630mm	930mm	1530mm

RESULTS

Table 2 shows the daylight levels (DL) and daylight factors (DF) in the model rooms of the simulated elevations G, H, H, K, L, and M. The aesthetic rankings of the elevations according to respondent groups are indicated in tables 3 to 6, while in table 7 are the correlation coefficients of the daylight factor of the elevation-rooms and aesthetic ranking of the elevations by respondent groups.

Daylight levels in elevation G-room range from 54.0 lux to 758.0 lux with mean value of 280.3 (and standard deviation, SD of 207.92 lux). The mean daylight factor for the room is 0.31. Elevation H-room has daylight factor of 0.30, daylight level range of 492.0 lux, and mean daylight level of 267 lux. Observed in elevation J-room are daylight level range of 381.0 lux, mean value of 180.0 lux, and daylight factor of 0.20. Daylight factor of 0.33, daylight level range of 512.0 lux, and mean daylight level of 284.5 lux were observed in elevation K-room. In elevation L-room, observed were daylight factor of 0.34, mean daylight level of 310.3 (and SD of 236.7), and daylight level range of 759.0 lux. 585.0 lux was the range of daylight level observed in elevation M-room, while the means of daylight level and daylight factor in the room were 224.3 lux (and SD of 175.3) and 0.24 (SD of 0.18) respectively (Table 2).

The 300 level student respondents (Table 3) ranked the aesthetic appeals of elevations G, H, J, K, L, and M as 4th (mean rank weight of 3.71), 3rd (mean rank weight of 3.84), 6th (mean rank weight of 1.84), 2nd (mean rank weight of 4.32), 1st (mean rank weight of 5.12), and 5th (mean rank weight of 2.25), while their rankings by 500 level student

respondents (in table 4) were 2nd (mean rank weight of 4.18), 4th (mean rank weight of 3.42), 6th (mean rank weight of 2.24), 3rd (mean rank weight of 4.02), 1st (mean rank weight of 4.73), and 5th (mean rank weight of 2.75). The elevations in the same order were ranked by the 600 level students (table 4) as 3rd (mean rank weight of 4.06), 2nd (mean rank weight of 4.26), 6th (mean rank weight of 1.84), 4th (mean rank weight of 3.58), 1st (mean rank weight of 4.77), and 5th (mean rank weight of 2.55); and were ranked by architects (table 5) as 2nd (mean rank weight of 4.31), 4th (mean rank weight of 3.38), 6th (mean rank weight of 1.38), 3rd (mean rank weight of 3.53), 1st (mean rank weight of 5.15), and 5th (mean rank weight of 3.23).

The Spearman's Rank Order Correlation Coefficient of the daylight factor of the elevation-rooms and aesthetic ranking of the elevations by 300 level student respondents (ARTS/DFR) was +0.94. Same values of correlation coefficient (+0.94) were obtained for 500 level students and architects respondents groups, while the value obtained for 600 level students respondents was +0.77.

Table 2: Daylight levels (DL) and daylight factors (DF) in the model rooms

S/N	Elevation G Room		Elevation H Room		Elevation J Room		Elevation K Room		Elevation L Room		Elevation M Room	
	DL	DF	DL	DF	DL	DF	DL	DF	DL	DF	DL	DF
1	65.00	0.07	41.00	0.05	39.00	0.04	51.00	0.06	31.00	0.03	30.00	0.03
2	60.00	0.07	42.00	0.05	44.00	0.05	46.00	0.05	47.00	0.05	35.00	0.04
3	54.00	0.06	45.00	0.05	47.00	0.05	48.00	0.06	55.00	0.06	36.00	0.04
4	84.00	0.09	52.00	0.06	44.00	0.05	55.00	0.06	42.00	0.05	34.00	0.04
5	758.00	0.83	361.0	0.40	72.00	0.08	485.0	0.56	367.0	0.40	76.00	0.08
6	108.00	0.12	267.0	0.30	69.00	0.08	230.0	0.27	790.0	0.86	232.0	0.24
7	457.00	0.50	369.0	0.41	73.00	0.08	398.0	0.46	732.0	0.80	231.0	0.24
8	554.00	0.60	319.0	0.36	69.00	0.08	363.0	0.42	201.0	0.22	80.00	0.08
9	403.00	0.44	333.0	0.37	281.0	0.31	335.0	0.39	355.0	0.39	249.0	0.26
10	385.00	0.42	413.0	0.46	288.0	0.32	513.0	0.59	582.0	0.63	503.0	0.53
11	186.00	0.20	409.0	0.46	297.0	0.33	395.0	0.46	481.0	0.52	615.0	0.65
12	496.00	0.54	533.0	0.60	420.0	0.47	558.0	0.65	235.0	0.26	291.0	0.31
13	267.00	0.29	288.0	0.32	309.0	0.34	291.0	0.34	193.0	0.21	220.0	0.23
14	194.00	0.21	294.0	0.33	317.0	0.35	284.0	0.33	315.0	0.34	313.0	0.33
15	209.00	0.23	299.0	0.34	293.0	0.33	284.0	0.33	323.0	0.35	395.0	0.41
16	205.00	0.22	208.0	0.23	218.0	0.24	216.0	0.25	216.0	0.23	250.0	0.26
Range	704.0	-	492.0	-	381.0	-	512.0	-	759.0	-	585.0	-
Mn	280.31	0.31	267.0	0.30	180.0	0.20	284.5	0.33	310.3	0.34	224.3	0.24
SD	207.92	0.23	150.8	0.17	132.9	0.15	169.0	0.20	236.7	0.26	175.3	0.18
Rank	3rd		4th		6th		2nd		1st		5th	

Table 3: Aesthetic ranking by 300 level students (ARTS)

S/N	Subject	Rating frequency positions/(weigth)						Mean weight	Mean rank
		1st (6)	2nd (5)	3rd (4)	4th (3)	5th (2)	6th (1)		
1	Elevation G	6	10	17	12	4	6	3.71	4th
2	Elevation H	5	14	12	19	4	2	3.84	3rd
3	Elevation J	1	1	4	3	19	27	1.84	6th
4	Elevation K	14	12	11	15	2	1	4.32	2nd
5	Elevation L	30	11	9	2	2	1	5.12	1st
6	Elevation M	1	6	3	3	20	22	2.25	5th

Table 4: Aesthetic ranking by 500 level (graduating) students (ARFS)

S/N	Subject	Rating frequency positions/(weigth)						Mean weight	Mean rank
		1st (6)	2nd (5)	3rd (4)	4th (3)	5th (2)	6th (1)		
1	Elevation G	8	14	9	7	3	3	4.18	2nd
2	Elevation H	6	4	7	16	10	2	3.42	4th
3	Elevation J	3	1	5	5	9	20	2.24	6th
4	Elevation K	8	9	14	5	5	3	4.02	3rd
5	Elevation L	21	8	7	3	4	2	4.73	1st
6	Elevation M	3	7	3	7	11	13	2.75	5th

Citation: Idowu O. M. and Humphrey S. (2018). Aesthetics and day-lighting correlation: an experimental study of form and placement of windows on buildings. *J Art Arch Stud.* 7 (1): 01-10.
DOI: https://dx.doi.org/10.51148/jaas.2018.1

Journal of Art and Architecture Studies (JAAS)
ISSN: 2383-1553
Volume 7, No. 1: 01-10.
2018 SCIENCE LINE

Table 5: Aesthetic ranking by 600 level students (ARSS)

S/N	Subject	Rating frequency positions/(weigth)						Mean weight	Mean rank
		1st (6)	2nd (5)	3rd (4)	4th (3)	5th (2)	6th (1)		
1	Elevation G	5	9	9	3	1	4	4.06	3rd
2	Elevation H	7	9	3	9	3	0	4.26	2nd
3	Elevation J	2	0	1	4	5	19	1.84	6th
4	Elevation K	4	5	6	10	2	4	3.58	4th
5	Elevation L	12	7	7	3	2	0	4.77	1St
6	Elevation M	1	2	5	1	18	4	2.55	5th

Table 6: Aesthetic ranking by architects (ARAR)

S/N	Subject	Rating frequency positions/(weigth)						Mean weight	Mean rank
		1st (6)	2nd (5)	3rd (4)	4th (3)	5th (2)	6th (1)		
1	Elevation G	3	2	6	1	0	1	4.31	2nd
2	Elevation H	0	4	2	4	1	2	3.38	4th
3	Elevation J	0	0	0	0	5	8	1.38	6th
4	Elevation K	3	0	3	4	1	2	3.53	3rd
5	Elevation L	7	3	1	2	0	0	5.15	1S
6	Elevation M	0	4	1	2	6	0	3.23	5th

Table 7: Correlation of aesthetic and daylight factor rankings (DFR)

	ARTS/DFR	ARFS/DFR	ARSS/DFR	ARAR/DFR
*SROCC	+0.94	+0.94	+0.77	+0.94
Remarks	High	High	Substantial	High

*Spearman's Rank Order Correlation Coefficient.

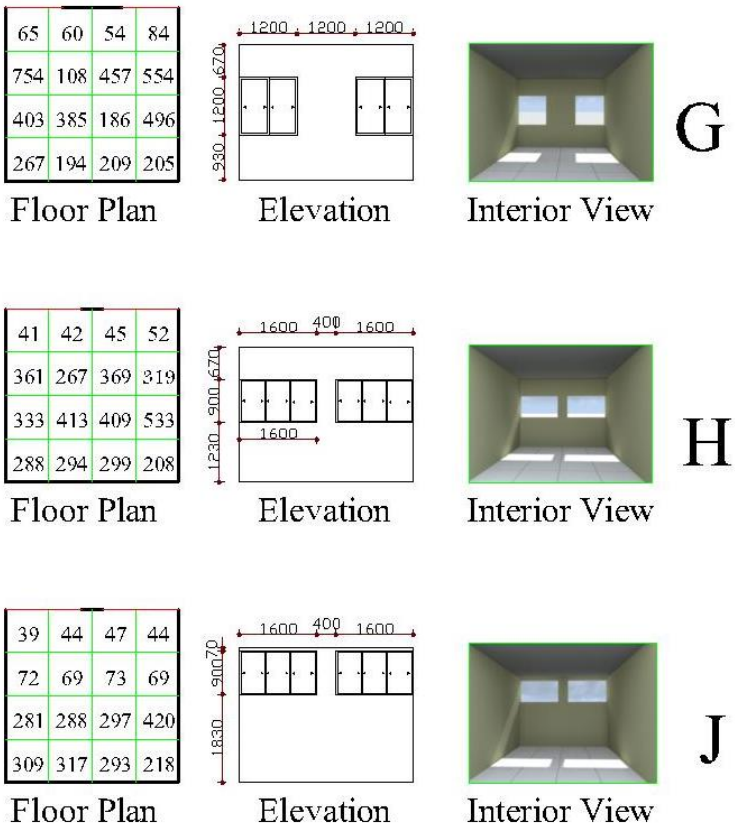


Figure 2: Details of simulated rooms with elevations G, H, and J.

Citation: Idowu O. M. and Humphrey S. (2018). Aesthetics and day-lighting correlation: an experimental study of form and placement of windows on buildings. *J Art Arch Stud.* 7 (1): 01-10.
DOI: https://dx.doi.org/10.51148/jaas.2018.1

Journal of Art and Architecture Studies (JAAS)
ISSN: 2383-1553
Volume 7, No. 1: 01-10.
2018 SCIENCE LINE

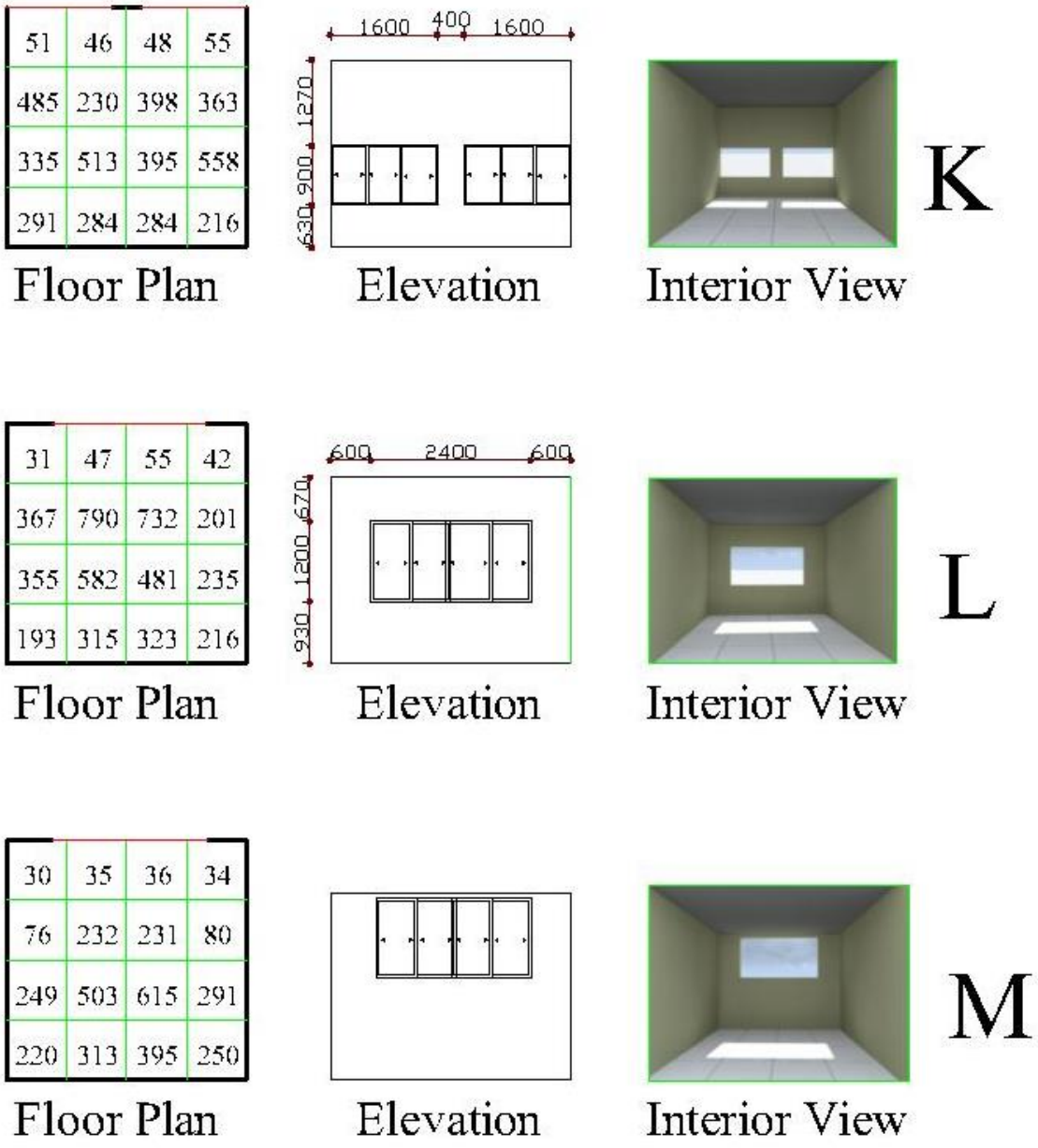


Figure 2: Details of simulated rooms with elevations G, H, and J.

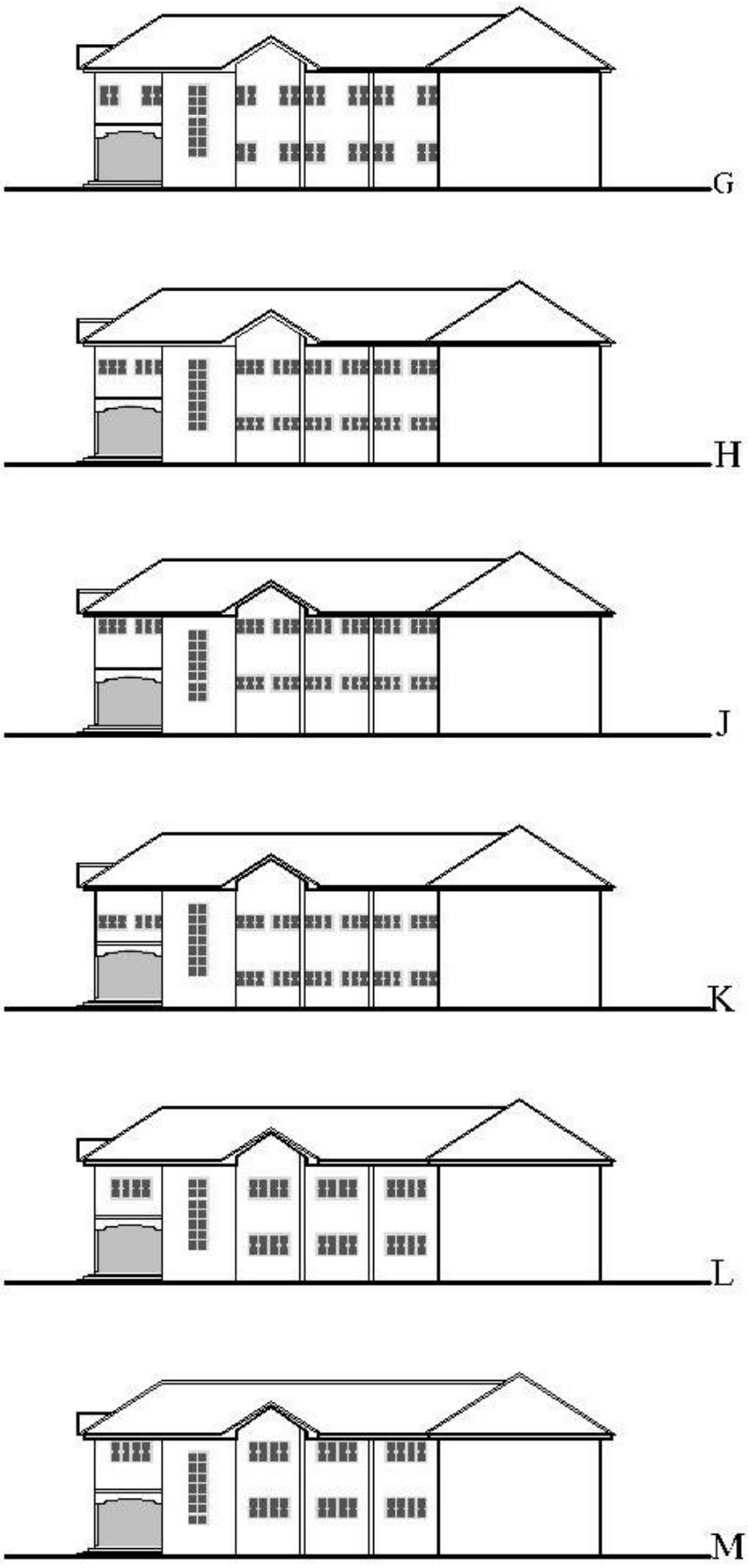


Figure 4: Simulated elevations of part of an existing building.

Citation: Idowu O. M. and Humphrey S. (2018). Aesthetics and day-lighting correlation: an experimental study of form and placement of windows on buildings. *J Art Arch Stud.* 7 (1): 01-10.
DOI: https://dx.doi.org/10.51148/jaas.2018.1

Journal of Art and Architecture Studies (JAAS)
ISSN: 2383-1553
Volume 7, No. 1: 01-10.
2018 SCIENCE LINE

DISCUSSION

The results reveal differences in mean and individual floor-bay values of daylight level and daylight factor in the rooms under study. Whether these differences are significant or not, they suggest that one or the two window design variables (form and position) under study affect daylight quality and quantity. The effect of individual variables may be appreciated by paired comparison of daylight in rooms with windows of only one different design parameter. For instance, comparisons of elevation H- and J-rooms, and L- and M-rooms reveal that windows at higher level conduced to lower mean daylight levels (DL) and daylight factors (DF) on the room floor. It also shows that daylight is more evenly distributed (of better quality) on the floor of rooms with higher level windows. A comparison of H- and K-rooms (having same window form) also reveals the same pattern of more evenly distributed daylight on floor of room with higher window level.

A comparison of G- and L-rooms (of same widow height) reveal that L-room with a rectangular window-form conduce to higher values of daylight level and daylight factor than G-room with two (smaller) square window-forms. However, daylight levels are more evenly distributed in the room with two smaller (square) windows than in the room with one rectangular window.

The aesthetic rankings of the elevations are also different, again suggesting that one or the two variables under study (window form and position) affect aesthetics. There is some level of consistency in the rankings among the respondent groups. For instance elevations J, L, and M were ranked as 6th, 1st, and 5th respectively by the four respondent groups. L and M have same window form but differ only in window vertical position on wall. Their aesthetic ranking gap (1st to 5th) seem too wide to ignore, and this is suggestive of a significant aesthetic effect of window vertical position on wall. The same pattern is noticeable between J and H having same form but different window positions on wall. Lower aesthetic values are observed as window moves vertically away from the centre of wall. L and G are of the same height but different window forms, and were ranked seemingly different in aesthetic appeals, also suggesting that window form has effect on aesthetics. The ratio of the rectangular window (1:2) in L is closer to the golden ratio (1: 1.62) than that of square windows (1:1) in G. This result concurs with Lidwell et al. [12] and Idowu and Okonkwo [20], and further strengthens the aesthetic harmony theory of the golden ratio.

The Spearman's Rank Order Correlation Coefficients of +0.94 in three of the four ranking groups and +0.77 in one suggest that there is a high positive correlation between aesthetics and daylight design of windows on walls. It indeed reinforces the believe [12, 13] that attractive things work better or beautiful forms are more functional (form follows function).

CONCLUSION AND RECOMMENDATIONS

The study attempted to ascertain the effects of window forms and positions on day-lighting and aesthetics of buildings.

It was revealed that rooms with a rectangular window-form conduce to higher values of daylight level and daylight factor than those with two (smaller) square window-forms. However, daylight levels are more evenly distributed in the room with two smaller (square) windows than in the room with one rectangular window.

It was also found that windows at higher level conduced to lower mean daylight levels (DL) and daylight factors (DF) on the room floor. It also shows that daylight is more evenly distributed (of better quality) on the floor of rooms with higher level windows.

Window forms and vertical positions on walls were also found to affect aesthetic ranking of buildings. Aesthetic ranking stepped up as window form got closer to the golden ratio; lower aesthetic values were observed as window moved vertically away from the centre of wall. A high or an appreciable and positive correlation between aesthetics and daylight design of windows on walls was discovered in the study. To enhance aesthetics and daylight through window designs, it is recommended that: (i) windows form be of rectangular geometry of proportion close to the golden ratio; (ii) windows be positioned to minimise eccentricity on individual room-walls.

DECLARATIONS

Authors' Contributions

All authors have directly participated in the planning, execution, or analysis of this study, and have read and approved the final version submitted.

Competing interests

The authors declare that they have no competing interests.

REFERENCES

[1] Nick Z (2007). Aesthetic judgement. In: Stanford encyclopaedia of philosophy.

[2] Architecture-student (n.d): Aesthetic components of architecture. Online: Retrieved 15th April 2011. http://www.architecture-student.com/tag/aesthetics.

[3] Lang J (1987). *Creating architectural theory: The role of the behavioural sciences in environmental design*. New York: Van Nostrand Reinhold. Google Scholar

[4] New World Encyclopaedia (n.d): Aesthetics. Retrieved October 31, retrieved from: www.newworldencyclopedia.org/entry

[5] Architeacher (2002). Aesthetics. Centre for the Study of Art and Architecture. Retrieved 2015, retrieved from: http://www.architeacher.org/aesthetics/archi-main.html.

[6] Harrold RM (1983). Daylight. In: Callender, J. H. (Ed): *Time saver standards for architectural design data*. Singapore: McGraw-Hill, Inc. Google Scholar

[7] Abraham LE (1996). Daylighting. In Gottfried, D. A., and Simon, L. N. (Eds.): *Sustainable building technical manual*. U. S. A.: Public Technology, Inc. Google Scholar

[8] Rich P and Dean Y (1999). *Principles of element design: windows*. London: Architectural Press. Google Scholar

[9] Gyimah KA and Tetlow D (2014): Achieving energy efficiency and aesthetics through windows in the Tropics. Google Scholar; https://doi.org/10.26796/jenrm.v1i1.42

[10] Apogee Enterprises (2015). Chicago's Prudential Tower I replaces windows for updated aesthetics, tenant comfort, energy-efficiency. Retrieved October 31, 2016 from: http://www.apog.com

[11] Odim OO, Okonkwo MM and Idowu OM (2012). *Thermal comfort passive design*. AARCHES monographic series, 2. Google Scholar

[12] Moscoso CP (2016). Daylighting and architectural quality: Aesthetic perception of daylight indoor environment. Retrieved Oct. 30 from: http://hdl.handle.net/11250/2379863 ; Google Scholar

[13] Burberry P (1979). Environment and Services. New York: B. T. Batsford Limited. Google Scholar

[14] Kendall D (2011): Aesthetic and happiness: How space affects well-being. Retrieved October 30 from: www.huffingtonpost.com/dylan-kendal.

[15] Efficient Windows Collaborative (2016). Design considerations for window performance. Retrieved October 31 from: www.efficientwindows.org/design.php

[16] Ching F (2007). *Architecture: Form, space and order*. New York: John Wiley & Sons Inc. Google Scholar

[17] Smith PF (2003). *The dynamics of delight: Architecture and aesthetics*. London: Routledge. Google Scholar

[18] Hearn MF (2003). *Ideas that shaped buildings*. London: The MIT Press. Google Scholar

[19] Lidwell W, Holden K and Butler J. (2003). *Universal principles of design*. Massachusetts: Rockport Publishers. Google Scholar

[20] Idowu OM and Okonkwo MM (2011): Aesthetic effect of building's structural forms: An experimental study of columns, beams, arches, and triangular pseudo-arches. Environmental Review, 4(2). Google Scholar

[21] Groat L and Wang D (2002). *Architectural research methods*. New York: John Wiley and Sons Inc. Google Scholar

[22] Koleoso A (1999). *Research methods and statistics*. Ondo: Alex Publishers.

DOI: https://dx.doi.org/10.51148/jaas.2018.2

HERITAGE ARCHITECTURE IN IBADAN, NIGERIA: THE HOUSE OF ADEBISI GIWA OF IDIKAN

Adeoye Dorcas Oluwaseyi[1]✉, Akande Adeyemi and Oladiti Abiodun Akeem

[1]*Department of Architecture, Ladoke Akintola University of Technology, Nigeria*
[2]*Department of Architecture, University of Lagos, Akoka, Lagos, Nigeria*
[3]*Department of General Studies, Ladoke Akintola University of Technology, Nigeria*

Original Article

PII: S238315531800002-7

Received: 30 Apr. 2018
Accepted: 15 Jun. 2018
Published: 30 Jun. 2018

✉ Corresponding author's e-mail: aaoladiti@lautech.edu.ng

ABSTRACT

This paper examines the architectural design and planning of the residential apartment of the great Ibadan icon, businessman and philanthropist. The architecture is neo-classical and the building boasts of at least eighty five living spaces (parlour and rooms). The Adebisi mansion is a symbol of Ibadan-Yoruba material heritage. The people of Ibadan had great respect for the patron of the house - Giwa Adebisi and this is confirmed in the fact that his memories are preserved in legend, songs and poems that enunciate the man's wealth and influence. These legends and songs that accompany his home in Ibadan is rarely found elsewhere in Yoruba society. The paper discusses the grandeur of the Adebisi mansion and concludes that the building is of significant historic and architectural heritage value and thus makes a worthy material for preservation.

KEYWORDS

Heritage, Architecture, Colonial, Patronage, Ibadan.

INTRODUCTION

"Eni ti o ba fe ko iru ile Adebisi, ko ni ile ko"
"One who seeks to build a house like Adebisi, is not ready to build a house".

The aforementioned maxim in the Yoruba repertoire is a popular saying in Ibadan in the 20th century. It was used to advise young people not to nurture the desire to build a house like Adebisi's mansion as it will be futile. The mansion of Adebisi has been portrayed in the Ibadan worldview as a structure like the Mapo hall in grandeur, elegance and splendor. The prevalent belief at the time the structure was built was that materials for the construction of the building could only have come from Europe. The construction of the building started in 1927 and was completed before the commissioning of Mapo Hall in October 5, 1929 [1]. The idea behind heritage Architecture which is primarily concerned with structures or parts of structure which carry a historical value often in the context of its host culture or society helps us put this study of the Adebisi mansion in perspective. The study helps us demonstrate and appreciate the importance attached to the brilliance of human creativity as expressed in built form. Architectural heritage embodies the outstanding artistic and historic value of a monument while manifesting human ingenuity [2]. This paper advances the functional use of space as a creative material culture independent from colonial finance, maintenance or repairs. The building symbolizes the wealth of Adebisi as cultural metaphor and a significant historical connotation for the Oyo Yoruba groups in Southwest Nigeria. It emphasizes the phenomenal position of the built environment in the architectural development of Ibadan society.

Sanusi Adebisi Giwa of Idikan

An Ibadan native, Sanusi Adebisi Giwawas a prominent businessman in Ibadan in the first half of the twentieth century. Owing to the sketchy and uncoordinated process of formal registration of birth in the late nineteenth century in western Nigeria, Sanuni's exact date of birth is unknown but he is believed to have been born around early-1890s. Historian professor Adesina describe him as a hard driven entrepreneur in the Ibadan cocoa business scene. The story of his childhood is scanty but research shows that as a youth, he was involved in his father's business enterprise which was basically the marketing of traditional textiles -Adire and Aso-Oke. He hawked from one Yoruba town to another

and this provided an outlet of his spirit of enterprise and ingenuity in the field of business [3].

Adebisi rose to a position of respect and honor among his peers due to his success and achievements. On account of this achievements, legends, songs, and poems that celebrated his popularity, wealth and influence played a significant role in immortalizing him as a great Ibadan entrepreneur. Further to this, and possibly more significantly, his famous residential building known as "Ile Adebisi Giwa of Idikan" made him a household name all through Ibadan city. The structure is indeed a worthy architecture icon and material heritage for coming generations.

A vivid illustration of the eminence the building carries among the Ibadan people is captured in the Yoruba poem documented by Odunjo and used in the teaching of Yoruba literature among the primary school students in western Nigeria. The poem titled "owo Apekanuko" celebrated Adebisi thus:

"osi nii je ta ni-mo-o ri
Se owo lo nje mo-ba-o-tan
Buroda idi-kan
L'owo so Adebisi
Gbogbo aye nii d'ebi
Eni owo ba n ba je."

"Poverty brings about *who are who?*
Money (wealth) brings about *I'm your kindred*
Brother at Idi-kan
Is what money made Adebisi
Everyone becomes a relation
Of whosoever swims in prosperity (Odunjo, 2010)" [4].

This poem has become legendary as it accompanies Adebisi's name and is rarely found elsewhere in Yoruba land. The wealth, fame and prestige acquired by Adebisi made him a respected individual that everyone wishes to identify with and refer to as "my brother" who reside at Idi-Kan - the place in Ibadan where the mansion built. The design plan of Adebisi's mansion is quintessential and representative of the emergence of modernist Architecture in colonial Ibadan city.

The architects/ builders of the building

The Adebisi building was designed and constructed by a Scottish Engineer Robert Taffy Jones, (1882-1949). Taffy Jones supervised the construction of the structure in conjunction with other local professional builders like Engineer Carew, all working as a consortium [5]. Mr Robert Taffy Jones was the first Ibadan colonial engineer, who worked in Southern Nigeria between 1910-1944 [6]. He started work as a road foreman and was later appointed Engineer to the Ibadan native authority in 1923 [7]. He remained in the ancient city of Ibadan until his retirement and return to Wales in Scotland. He is reputed to be among the leading engineers in the colonial service of the mid twentieth century. His architectural works presented mostly in neo-classical style were pronounced, brutish but often off tangent with the local urban character and usual Yoruba cluster of twentieth century Ibadan. On the road infrastructural end, Taffy's construction were often commissioned and financed by colonial government in Ibadan [8]. He obtains the agreement of the local community for the necessary demolition of obstruction that affected road construction in the city. His legacy in Ibadan is not easy to occlude. Taffy is responsible for the wide main artery road through the heart of Ibadan (known as Taffy highway). He also designed and constructed the Ibadan town hall at Mapo and the Bower's Tower at Oke Are Hill near Sapati area of Ibadan. This tower is also known as Layipo among the local people. The monument was erected to immortalize the first Resident and Travelling commissioner for the interior of Yoruba land, Captain Robert Lister Bower, who served 1893-1897 [6].

The tower is 60 ft. high with an 11ft. square base and two entrances. It also has a 45 double spiral stair case which gave it the name *Layipo* -- which means meaning spinning around -- amongst the natives. This monumental project was financed by the Ibadan native authority in memory of Sir Robert Lister Bower, K.B.E., C.M.E, and first Colonial Resident of Ibadan 1893-1897 whose character, courage and administrative ability won the universal and lasting esteem of the Yoruba. During his time, he firmly established the loyalty of the people to the imperial crown [6].

At the time Robert Taffy Jones was supervising and constructing the Mapo hall, he was commissioned by Sanusi Adebisi Giwa to design an architectural masterpiece closely related but not necessarily similar to the Mapo Hall that he, at that time was working as site engineer [1].

The building of Sanusi Adebisi Giwa was rated as one of the prominent structures that prides the development of the city of Ibadan and the place called Idi-Kan in particular. The grandeur of the structure was one of its kind and such that was not to be seen in Ibadan or elsewhere in Yoruba society

during colonial times. The building takes on a dual role of residence and court in the manner that contest with the loftiest abodes of Ibadan royals. Many Ibadan indigenes derived pleasure in the use of the building for social, political and economic interactions within the city. The building has an inspiring influence towards higher ideals in the city's development and broadened their outlook by given them a taste for finer things (Figures 1, 2 and 3).

METHODOLOGY

The study adopted a historical approach by examining the monumental and popular historic buildings designed by a British engineer in colonial Ibadan city in the first half of the 20th century.

The data for the study were obtained through direct observation, oral interviews with families and relatives to the owner of the building as well as information from books and journal articles related to the study. Photographs of the building were taken by the authors after obtaining permission and acceptance of the occupants living in the residential apartment. The sketch plan of the building provides the background plan of the building.

Description of the Building: Building materials, techniques and construction of Ile–Adebisi Giwa of Idikan walls.

The sandcrete wall of the building was finish with cement mortar and concrete blocks (Figure 4). With this technique and materials, the Adebisi house accommodated vernacular building practice. What is more concerting is in spite of the unapologetic neo-classical exuberance, the structure remains faithful in philosophy to the use of materials that are in synchrony with traditional Yoruba building ideology.

1) Doors and windows: Doors were made from timber typical of Yoruba traditional houses and windows are made up of glass materials with timber frames in order to admit light into the inside of the building from the outer surroundings or from the courtyard. The main buildings have large glass windows while the bungalows have wooden boards as windows. In fact, in some living and sleeping areas, the windows were so small admitting little light through the outside rather reminiscent of early traditional Yoruba building conceptions.

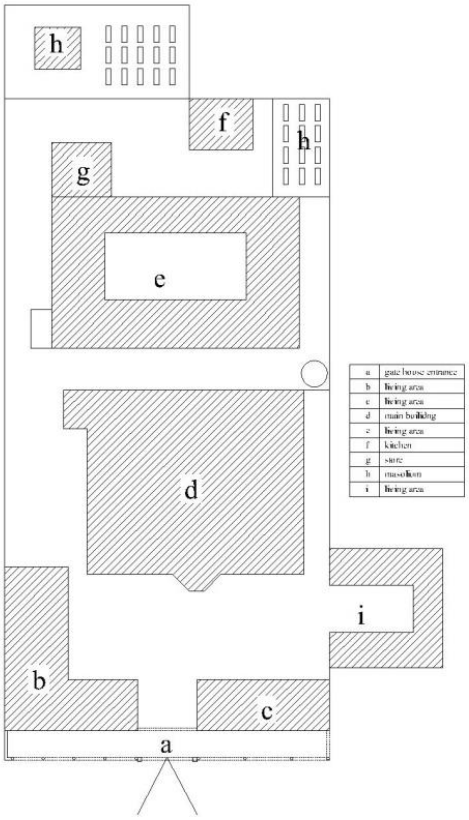


Figure 1: Site Layout.
a. Entrance façade; b. Living area 1; c. Living area 2; d. Main Building; e. Living area 3 (children and wives); f. Kitchen; g. Store; h. Burial area (Cemetery/mausoleum); i. Extended family living area (Source: Authors' Survey, 2017).

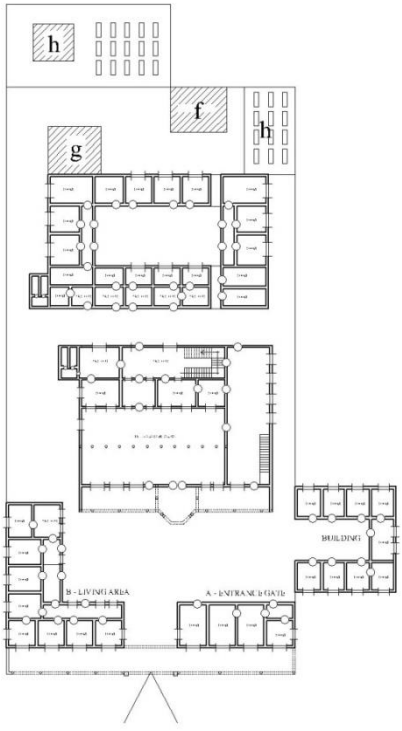


Figure 2: Ground Floor Plans.

Citation: Oluwaseyi A.D., Akande A. and Akeem O.A. (2018). Heritage architecture in Ibadan, Nigeria: the house of Adebisi Giwa of Idikan. *J Art Arch Stud.* 7 (1): 11-20.
DOI: https://dx.doi.org/10.51148/jaas.2018.2

Journal of Art and Architecture Studies
ISSN: 2383-1553
Volume 7, No. 1: 11-20.

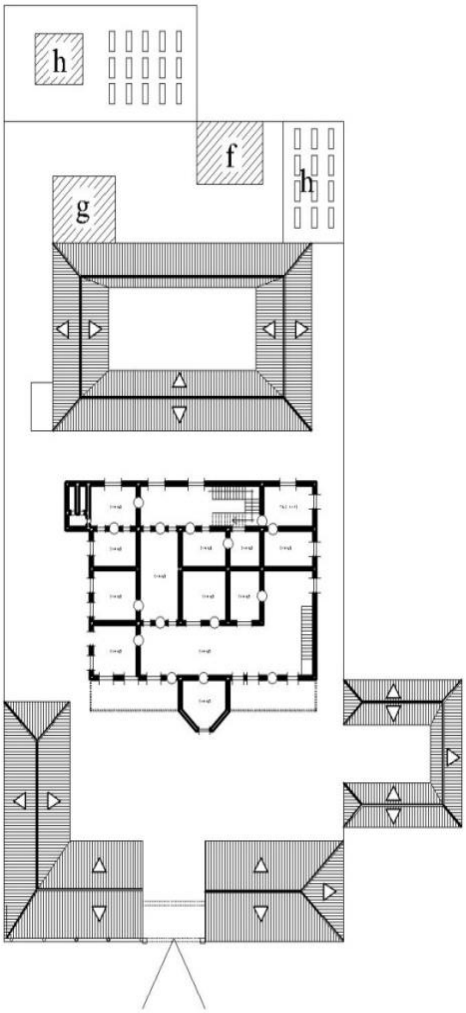


Figure 3: Upper Floor, and roof Plans.

2) Roofs: The main building and the adjoining living areas were roofed with corrugated iron sheets draining into a roof gutter and connected with pipes to drain of the run-off from the hipped end roof. The roof of the main building and the adjoining living areas to the main entrance of the compound were also finished with concrete facial round the total perimeter of the building (Figures 3 and 5).

3) Fencing: The fencing of Adebisi house was well articulated to delimit the property from other structures. The fencing was done in such a way that different flanges between wings of the property were well differentiated from the main building. For instance, the wing housing the parents and other extended family were fenced off from the main building premises but was connected with a gate entrance to accommodate them too (Figure 6). The space left out (at the rear end of the compound) for burial of the dead was also fenced off from the main compound.

Figure 4: Side view of the building

Figure 5: Extended Family house

Figure 6: Entrance gate to the extended family area

RESULTS AND DISCUSSION

The Adebisi Sanusi mansion in Idikan has been described by Ibadan locals as parallel to no other building owned by an individual under colonial rule

in Western Nigeria. The house was indeed a symbolic creative form of art and architectural master piece of its time. The planning and architectural design of the building was a product of colonialist ideology distilled in modernity. The architecture of the building was articulated in a careful mix of neo-classical and Afro- Brazilian style. Both the western and eastern entrance of the building features a 19th century Portuguese style curved pediment. The eastern end features a remarkably simple low bas relief rendition of a flower on the frontal end. The main approach view of the building is symmetrical and formal in appearance.

The arch curvature at the entrance is supported by two square base columns to each side of the entrance gate. The curved pediment on top of the western entrance is also engraved but this side features an elephant motif with a squirrels placed on either side in an arrangement style that mimics the medieval western European crests. The pediment is further decorated with a flower verse and the inscription "SAG" which stands for Sanusi Adebisi Giwa, the patron of the building (Figure 7).

Figure 7: Entrance gate to the building (the elevation rests on an imposing column signifying the strength, power and quality of the building).

Architectural design and planning of the building

The built area of the Idi-Kan house of Adebisi seats on about a half-acre (3 and ½ plots) parcel of land. The house comprises of about 85 rooms on two floors of four separate structures with adjourning bungalows providing shelter for other members of the family (Figures 1, 2 and 3). Made entirely of sandcrete walls and floors, the structure features typical modern fitted doors and windows made from timber/wood and glass. Reputed to be about ninety years old, it is now mostly in a state of disrepair. That notwithstanding, the building still carries an aura of brilliance and it is still occupied by the members of the Adebisi's family.

Symmetry was a design ideology in the conceptualization of this structure. This is evident in the careful arrangement of the Doric style columns on the approach elevation. Each arch lands on Doric columns and are distributed at equal distance from each other. The central arch which hosts the pediment is flanked by three columns each to both sides (Figure 9) emphasizing balance in the arrangements and forms, a key aesthetic character of the building. The deliberate use of sturdy Doric columns further enunciates rigidity, power and influence; all hallmarks of the patron Adebisi. Though on a minuscule scale, the balustrade on the first floor of the building gives balance and verticality to the otherwise sturdy character of the ground floor.

The central arch which doubles as the entrance porch leads to a big hall (*Igbejo*) (Figure 10) which is about 86.4m² in size and serves as visitor's waiting area and the patron's court used for general family meetings and disputes resolution for neighbours and family members alike. In addition to the court, the ground floor of the main building also consists of a large living room and five adjourning bedrooms. The ceiling of the hall was made of a wooden slab supported by arch curvatures of 10 columns doubling as support for the upper floor slab. The columns serve as the main structural support to the upper floor slab (Figures 8, 9 and 10).

The ground floor of the hall was finished with PVC tiles with wooden skirting round the wall edges to make a neat and well-finished edge. The enclosed walls were finished with glossy paint while the windows are of well-designed wooden net/blind and glass windows (Figures 11 and 13).

It is however clear that the oil paint on the wall now is not the same that was used at inception. It is not uncommon in the western part of current Nigeria for wealthy patrons to repaint their houses yearly in some type of renewal ritual and also as a show of continued affluence and relevance. The ceiling was finished with well-seasoned timber laid in layers and painted in white colour though in dilapidating state now (Figure 12).

The *Igbejo* hall (Figure 10) on the ground floor also leads to a central lobby which in turn continues to other four adjoining bedrooms and a private

apartment with a living room and two bedrooms. The private apartment can be accessed via a separate lobby which also provides access to a stair well. The left wing of the hall leads to a stair hall doubling as corridor leading to other parts of the compound. The stair is made of concrete at the lower part (about 10 risers and 9 goings) while the rest (upper) part was made up of timber with wooding balustrades (Figures 14 and 15).

The upper part of the staircase is protected with a wooden door providing security to upper parts of the main building (Figures 15 and 16). The rear part of the building features another stair hall leading to the upper part of the building from the rear which houses the Chief's big private sitting room and his personal bedroom with other bedrooms (about five) used for special guests as the need arose.

The upper floor consists of a long (wide) terrace (Figure 17) in the exterior with wooden balusters/ handrails round the terrace with a pronounced centrally positioned pediment at the top of the main facade finished with the earlier described elephant motif flanked two squirrels showing purposeful ornamentation, a composite order of classical architecture (Figure 17). The pronounced enclosure serves as bedroom for one of Chief Adebisi's sons.

The adjoining two other structures at the back of the main building is famed to house the 36 wives of Chief Sanusi Adebisi Giwa and his children. The other structure adjacent to the main building is built in form of a boy's quarters with sitting rooms and adjoining bedrooms while the last structure at the rear was arranged in a row round a central courtyard and also serves as living apartment for the wives of the Chief and other members of the extended family. The rectangular arrangement in courtyard style aids circulation, lighting and ventilations. Towards the rear of the compound is located the central kitchen which is now out of commission. In the early days, it served as the central cook-house were all the main meal of the compound was prepared. Toward the left was an open bathroom located at the very end of the compound.

In the rear portion of the entire structure and compound houses the mausoleum and the cemetery for the dead members of the family. The main mausoleum houses the remains of Chief Adebisi while the rest of the surrounding land is where his late parents, brothers and some wives were interred. This portion of the compound was fenced off from the main compound to give privacy and respect for the dead.

Figure 8: Approach view of the main building

Figure 9: Doric style columns holding the main entrance arches/porch to the building

Figure 10: *Igbejo* Hall

Citation: Oluwaseyi A.D., Akande A. and Akeem O.A. (2018). Heritage architecture in Ibadan, Nigeria: the house of Adebisi Giwa of Idikan. *J Art Arch Stud.* 7 (1): 11-20.
DOI: https://dx.doi.org/10.51148/jaas.2018.2

Journal of Art and Architecture Studies
ISSN: 2383-1553
Volume 7, No. 1: 11-20.

Figure 11: Glass windows with wooden finished blind

Figure 12: Wooden ceiling in the *Igbejo* Hall.

Figure 13: Broken glass window with wooden frames

Figure14: Concrete staircase

Figure15: Wooden part of the staircase

Figure 16: Wooden door used as security to upper start of the staircase

Figure 17: Upper terrace and the elephant motif grounded with squirrels in both sides

Design patterns, layout and function of the building

The primary purpose and typology of the building is residential for the Adebisi family at Idikan, Ibadan. The plans of Adebisi Idikan house as depicted by Figures 1, 2 and 3 showed the compound layout. In figure 1, the site layout is seen showing the Gate house(a) and the adjoining living areas (b & c), next to it is the main residential building (d) accommodating the chief and some of his guests and grown-up sons. The boys' quarters and the rest living areas (e) house the children and the other wives of the Chief Adebisi. The main significant proportion of the living area in this wing combined the traditional impulvium - courtyard which shows that not only does the design rests on two major neo-classical styles already mentioned, but it also borrows from traditional expressions making it a significant example of hybrid experimentation in colonial western Nigeria. The back of the building contains cooking area-kitchen (f) and the store (g) while the last portion (h) was used as cemetery. The separated living area to the right wing of the compound at the entrance of the compound accommodates the extended family members and Adebisi's parents (Figure 6).

Table 1 below revealed that the building form is rectangular in shape with courtyards showing the characteristics of new-classical and Afro-Brazilians style. The floor finish comprises – polyvinyl chloridetiles while the upper floor (stab) was finished with timber finished. The major function of the floor is to enhance smooth movement of occupants and to prevent moisture and (damp penetration) vegetation growth with the building. Other functions of the floors are to support the occupants to rest their feet and withstand the loads that will be imposed upon it. These loads could be persons, furniture, machines, equipments and book among other.

Table 1. Analysis of the Design Form and Building components of Ile-Adebisi.

Generic structure	Type	Material	Functions usage	
Building form	Rectangular with traditional courtyard system. Neo-classical and Afro-Brazillian style	Purely sancrete and concrete	Residential Building.	
Floor	Sandcrete, PVC tiles and timber.	PVC floor tiles, concrete slab and timber	For resting and smooth movement of occupants.	
Walls and materials uses	Sandcrete block, concrete block wall and paint.	Cement and sand	Privacy and protection.	
Door type and their sizes	Wood/ timber	Timber and glass	Accessibility and circulation movement	
Window type and floor sizes	Wood/ timber and glass	Timber and glass	Lighting and ventilation.	
Gates types and materials	Steel grills	Steel	Security.	
Ceilings finishes	Concrete crete and timber finish	PVC floor tiles, concrete slab and timber and paint	Security.	
Conveniences	Water System and pit latrine	Ceramic and Sandcrete/ concrete	To easy and making good of the body.	
Rooms	About 85 rooms	Sandcrete block wall and cement mortar plaster	Sleeping and relaxation.	
Hall type and functions	Igbejo		Sandcrete walls, timber ceiling	For receiving large visitors, holding of family meeting and mini-court to settle disputes among family and neighbours.
Roof	Hip roof and concrete roof slab (roof gutter) /deck and semi-circular arches.		Corrugated iron sheets with concrete facial, concrete roof slab with gutter.	Security, shield from weather elements and protection.

Source: Authors' analysis and interpretation (2017)

The walls of buildings are basically used to divide and enclose spaces, for protection and privacy. The walls of Adebisi Giwa was made up of sandcrete blocks concrete blocks finished with plaster and rendered with emulsion paints. The walls are also used to divide the buildings in to apartments or

rooms and defined the space outside and inside the building structure in terms of fence walls. The walls also provide supports to doctenant kind of loads (dead, life and wind loads). The doors and windows are majority of timber/wood material. The major functions of doors and windows are to act shield or barrier to seeing through, add aesthetics value to the building, and providing lighting and ventilation in a building. The windows are also used to enhance visibility from the building which is reflective in the use of glass with wooden frames a most of the windows in Giwa Adebisi Idikan residential buildings. While windows and doors also emphasis the design of the building, the door also serves as access and easy circulation from spaces to spaces in the building. The roof of a building is the envelop for the entire building. The of the building is Hipped type roof with concrete slab gutters round the four sides of the main building through which the drainage gutter were embedded and water drains off from the roof to the ground surface gutter and channelled out of the building, to the main drainage water channel outside the building. The material for the roof is majorly corrugated iron sheets and concrete slab. The entrance gate was made-up of iron grills (Steel material) and serves as check for visitors, and as a means of security to the whole compound. The gate houses are two in number. The ceiling finishes are made up of timber and concrete slab and serves as security and support to upper floor. It also protects the roof materials/ structures and serves as aesthetical value for the building.

The rooms are about 85 rooms in member and are used for relaxation, sleeping and for private activities. The Hall (Igbejo) is made up of sandcrete walls and timber ceiling materials. It is used for receiving visitors; family members; meetings and mini-court which was used by Adebisi Giwa to settle disputes among family members and neighbours.

The conveniences in the main building (toilets and bathroom) are majorly of water system type while those used by other family members are pit latrines located at the extreme back of the family compound.

CONCLUSION AND RECOMMENDATION

It has been shown from the foregoing that the building of Sanusi Adebisi Giwa is one of the most symbolic creative architectural landmark in Ibadan in the early twentieth century. The ninety year old building is typified as mixture of Neo-classical and Afro-Brazillian mansion in style, design and outlook with an infusion of traditional elements and philosophy. The house is regarded as one of the most celebrated aspects of the material culture of Ibadan people and it prides itself as one not to be found anywhere else in the Yoruba country. With a proportional mix of colonial influence, Afro-Brazilianism and the traditional impluvium-courtyard style, the building has stood the test of time since its completion in 1927 as no major or serious repairs have been carried out on the building. The House of Sanusi Adebisi Giwa of Idi-Kan is indeed and architectural heritage that carry historical value and must be preserved. The conservation and the preservation of the building by family members welcome a visual relief for passers-by, visitors and researchers to the family compound. The continued maintenance of the structure must however receive attention from the heritage agency of the Federal government of Nigeria as in no other building in Ibadan is there to be seen the culmination of a heritage infused together as a symbiotic hybrid as one will see in the Adebisi mansion.

DECLARATIONS

Authors' Contributions

Dr A.D. Oluwaseyi is the lead author of the manuscript. She visited the building, conducted oral interviews with the occupants of the building and provided a sketch plan of the building. Dr A. Adeyemi provided the analytical interpretation of the designed plan of the building, the building material and the functional utility of space in the building. Dr O. Abiodun Akeem wrote the section on the biography and discussed the personality of the owner of the house, Chief Sanusi Adebis Giwa of Idikan. All the authors directly participated in the planning, execution and analysis of this study, and have read and approved the final version submitted.

Competing interests

The authors declare that they have no competing interests.

REFERENCES

[1]. Watson R. (1998). Change in the Symbolic Meaning of Mapo Hall, 1925-1945 in G. O. Ogunremi (ed.) A Historical Cultural and Socio-Economic Study of An African City, Ibadan: Oluyole club: 84- 103.

[2]. Osasuna C.O and Ewemade F.O. (2011). Ile Timi: The Interface between Traditional and Vernacular Architecture in Ile-Ife. Structural Repairs and Maintenance of Heritage Architecture XII, 99 WIT

Transactions on the Built Environment, 118: pp 99-114. DOI: https://doi.org/10.2495/STR110091 ; Google Scholar

[3]. Adesina O.C. (1998). "Adebisi Giwa of Idikan: The Legend and Life of an Entrepreneur." In G.O.Ogunremi (ed.) A Historical Cultural and Socio-Economic Study of An African City. Ibadan: Oluyole club: 448-460. Google Scholar

[4]. Odunjo J. F. (2010). Alawiye Iwe- Kefa. Atunse Kerin. Fifth edition, Ikeja: Longman. 3: 85. Google Scholar

[5]. Park E., Taffy Jones, The first Ibadan Engineer. Nigerian Field. 28: 103-114.

[6]. Ajai S. A. (1999). Bower's Tower: A Historical Monument in Ibadan. In G.O. Ogunremi (ed.) A Historical Cultural and Socio-Economic Study of an African City. Ibadan: Oluyole Club: 69-83. Google Scholar

[7]. Home R. (2013). Of Planting and Planning: The Making of British Colonial Cities. New York: Routledge. 63. Google Scholar

[8]. Home R. (1974). The influence of colonial Government upon Nigerian urbanization. PhD Thesis, University of London. P. 181. Google Scholar

[9]. Adebisi B. on the 7th December, 2017. 55 years old.

[10]. Vanguard (2016). Sanusi Adebisi Idikan- (1882 – 1838) first Ibadan notable entrepreneur and philanthropist. https://www.vanguardngr.com/2016/07/sanusi-adebisi-idikan-1882-1838-first-ibadan-notable-entrepreneur-philanthropist/

Instructions for Authors

JAAS EndNote Style
Manuscript Template (MS Word)
Sample Articles
Declaration form
Policies and Publication Ethics

Manuscripts as Original Research Paper, Short Communication, Case Reports and Review or Mini-Review are considered for peer-review publishing in *Journal of Art and Architecture studies* (ISSN: 2383-1553), irregularly on the internet. The journal focuses on all aspects of art and architecture... view full aims and scope...

Submission

The manuscript and other correspondence should preferentially be submit online. Please embed all figures and tables in the manuscript to become one single file for submission. Once submission is complete, the system will generate a manuscript ID and will send an email regarding your submission. Meanwhile, the authors can submit or track articles via jaas@science-line.com or jaaseditors@gmail.com. All manuscripts must be checked (by English native speaker) and submitted in English for evaluation (in totally confidential and impartial way).

Supplementary information

The online submission form allows supplementary information to be submitted together with the main manuscript file and covering letter. If you have more than one supplementary files, you can submit the extra ones by email after the initial submission. Author guidelines are specific for each journal. Our Word template can assist you by modifying your page layout, text formatting, headings, title page, image placement, and citations/references such that they agree with the guidelines of journal. If you believe your article is fully edited per journal style, please use our MS Word template before submission. **Supplementary materials** may include figures, tables, methods, videos, and other materials. They are available online linked to the original published article. Supplementary tables and figures should be labeled with a "S", e.g. "Table S1" and "Figure S1". The maximum file size for supplementary materials is 10MB each. Please keep the files as small possible to avoid the frustrations experienced by readers with downloading large files.

Submission to the Journal is on the understanding that

1.The article has not been previously published in any other form and is not under consideration for publication elsewhere;
2.All authors have approved the submission and have obtained permission for publish work.

Graphical Abstract

Authors should provide a graphical abstract (a beautifully designed feature figure) to represent the paper aiming to catch the attention and interest of readers. Graphical abstract will be published online in the table of content. The graphical abstract should be colored, and kept within an area of 12 cm (width) x 6 cm (height) or with similar format. Image should have a minimum resolution of 300 dpi and line art 1200dpi. Note: Height of the image should be no more than the width. Please avoid putting too much information into the graphical abstract as it occupies only a small space. Authors can provide the graphical abstract in the format of PDF, Word, PowerPoint, jpg, or png, after a manuscript is accepted for publication. See more sample graphical abstracts in **archive**.

Presentation of the article

Main Format

First page of the manuscripts must be properly identified by the title and the name(s) of the author(s). It should be typed in Times New Roman (font sizes: 17pt in capitalization for the title, 10pt for the section headings in the body of the text and the main text, double spaced, in A4 format with 2cm margins (both doc./docx formats). All pages and lines of the main text should be numbered consecutively throughout the manuscript. Abbreviations in the article title are not allowed. Manuscripts should be arranged in the following order:

1. TITLE (brief, attractive and targeted);
2. Name(s) and Affiliation(s) of author(s) (including post code and corresponding Email);
3. ABSTRACT;
4. Key words (separate by semicolons; or comma,);
5. Abbreviations (those used throughout the manuscript);
6. INTRODUCTION (clear statement of the problem, the relevant literature on the subject, and the proposed approach or solution);
7. METHODOLOGY (should be complete enough to allow experiments to be reproduced);
8. RESULTS;
9. DISCUSSION;
10. CONCLUSION;
11. DECLARATIONS (Acknowledgements, Consent to publish, Competing interests, Authors' contributions, and Availability of data etc.)
12. REFERENCES;
13. Tables;
14. Figures;
15. Graphs
Results and Discussion can be presented jointly.
Discussion and Conclusion can be presented jointly.

Article Sections Format

Title should be a brief phrase describing the contents of the paper. The first letter of each word in title should use upper case. The Title Page should include the author(s)'s full names and affiliations, the name of the corresponding author along with phone and e-mail information. Present address (es) of author(s) should appear as a footnote.
Abstract should be informative and completely self-explanatory, briefly present the topic, state the scope of the experiments, indicate significant data, and point out major findings and conclusions. The abstract should be 150 to 300 words in length. Complete sentences, active verbs, and the third person should be used, and the abstract should be written in the past tense. Standard nomenclature should be used and abbreviations should be avoided. No literature should be cited.
Following the abstract, about 3 to 8 key words that will provide indexing references should be listed.
Introduction should provide a clear statement of the problem, the relevant literature on the subject, and the proposed approach or solution. It should be understandable to colleagues from a broad range of scientific disciplines.
Methodology should be complete enough to allow experiments to be reproduced. However, only truly new procedures should be described in detail; previously published procedures should be cited, and important modifications of published procedures should be mentioned briefly. Capitalize trade names and include the manufacturer's name and address. Subheadings should be used. Methods in general use need not be described in detail.
Results should be presented with clarity and precision. The results should be written in the past tense when describing findings in the author(s)'s experiments. Previously published findings should be written in the present tense. Results should be explained, but largely without referring to the literature.
Discussion should interpret the findings in view of the results obtained in this and in past studies on this topic. State the conclusions in a few sentences at the end of the paper. The Results and Discussion sections can include subheadings, and when appropriate, both sections can be combined.
Conclusion should be brief and tight about the importance of the work or suggest the potential applications and extensions. This section should not be similar to the Abstract content.
Declarations including Acknowledgements, Authors' contributions, Competing interests, Consent to publish, and Availability of data etc.
Tables should be kept to a minimum and be designed to be as simple as possible. Tables are to be typed double-spaced throughout, including headings and footnotes. Each table should be on a separate page, numbered consecutively in Arabic numerals and supplied with a heading and a legend. Tables should be self-explanatory without reference to the text. The details of the methods used in the experiments should preferably be described in the legend instead of in the text. The same data should not be presented in both table and graph forms or repeated in the text.
Figure legends should be typed in numerical order on a separate sheet. Graphics should be prepared using applications capable of generating high resolution GIF, TIFF, JPEG or PowerPoint before pasting in the Microsoft Word manuscript file. Use Arabic numerals to designate figures and upper case letters for their parts (Figure 1). Begin each legend with a title and include sufficient description so that the figure is understandable without reading the text of the manuscript. Information given in legends should not be repeated in the text.

Declarations

Please ensure that the sections: Ethics (and consent to participate, if any), Acknowledgements, Authors' contributions, Competing interests, Consent to publish, Availability of data and materials are included at the end of your manuscript in a Declarations section**.**

Acknowledgements

We encourage authors to include an Acknowledgements section. Please acknowledge anyone who contributed towards the study by making substantial contributions to conception, design, acquisition of data, or analysis and interpretation of data, or who was involved in drafting the manuscript or revising it critically for important intellectual content, but who does not meet the criteria for authorship. Please also include their source(s) of funding. Please also acknowledge anyone who contributed materials essential for the study. Authors should obtain permission to acknowledge from all those mentioned in the Acknowledgements. Please list the source(s) of funding for the study, for each author, and for the manuscript preparation in the acknowledgements section. Authors must describe the role of the funding body, if any, in study design; in the collection, analysis, and interpretation of data; in the writing of the manuscript; and in the decision to submit the manuscript for publication.

Authors' Contributions

For manuscripts with more than one author, JAAS require an Authors' Contributions section to be placed after the Acknowledgement section.
An 'author' is generally considered to be someone who has made substantive intellectual contributions to a published study. To qualify as an author one should 1) have made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; 2) have been involved in drafting the manuscript or revising it critically for important intellectual content; and 3) have given final approval of the version to be published. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content. Acquisition of funding, collection of data, or general supervision of the research group, alone, does not justify authorship.
We suggest the following format/example (please use initials to refer to each author's contribution): AB carried out the case studies, participated in the designing and drafted the manuscript. JY carried out the architectural drawing. MT participated in the design of the study and performed the statistical analysis. FG conceived of the study, and participated in its design and coordination and helped to draft the manuscript. All authors read and approved the final manuscript.
For authors that equally participated in a study please write 'All/Both authors contributed equally to this work.'
Contributors who do not meet the criteria for authorship should be listed in an acknowledgements section.

Competing Interests

Competing interests that might interfere with the objective presentation of the research findings contained in the manuscript should be declared in a paragraph heading "Competing interests" (after Acknowledgment or Authors' Contributions sections).
Examples of competing interests are ownership of stock in a company, commercial grants, board membership, etc. If there is no competing interest, please use the statement "The authors declare that they have no competing interests.".

Consent to Publish

Please include a 'Consent for publication' section in your manuscript. If your manuscript contains any individual person's data in any form (including individual details, images or videos), consent to publish must be obtained from that person, or in the case of children, their parent or legal guardian. All presentations of case reports must have consent to publish. You can use your

institutional consent form or our consent form if you prefer. You should not send the form to us on submission, but we may request to see a copy at any stage (including after publication). If your manuscript does not contain any individual persons data, please state "Not applicable" in this section.

Change in authorship
We do not allow any change in authorship after provisional acceptance. We cannot allow any addition, deletion or change in sequence of author name. We have this policy to prevent the fraud.

Data Deposition
In computational studies where the information is unacceptable for inclusion in databases because of lack of experimental validation, the information can be published as an additional file with the article.

REFERENCES

A reference style for **EndNote** may be found **here**. References should be numbered consecutively and cited in the text by number in square brackets [1, 2] (not by author and date). References should not be formatted as footnotes. Avoid putting personal communications and unpublished observations as references. All the cited papers in the text must be listed in References. All the papers in References must be cited in the text. Where available, URLs for the references should be provided.

Examples (at the text):
Smit [1] ...; Smit and Janak [2]…; Nurai et al. [3] reported that ; ... [1], --- [2, 3], --- [3-7].
The references at the end of this document are in the preferred referencing style. Give all authors' names; do not use "et al." unless there are six authors or more. Use a space after authors' initials. Papers that have not been published should be cited as "unpublished". Papers that have been accepted for publication, but not yet specified for an issue should be cited as "to be published". Papers that have been submitted for publication should be cited as "submitted for publication". Capitalize only the first word in a paper title, except for proper nouns and element symbols. For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation.

Examples (at References section):
For Journals:
[1] Hooshyar L, Barugh H (2014). The Role of Tourism in Sustainable Urban Development (Random Sample: Sarein), J Art Arch Stud. 3 (2): 95-101.
[2] Popovici, Donici Mihai, Corneliu (2016). Aesthetics of the Main Types of Structures. J Art Arch Stud. 5 (1): 13-16.
For In press manuscripts (maximum 2):
Niroumand Shishvan S. (2016). Recognition of Arg-e Ali Shah, Also known as Arg-e Tabriz (Altar of Jama Masjid of Tabriz built in Ilkhanate period I). *J Art Arch Stud*. In press.
For Conference:
Hira A. and Mendis P. (1995). Wind Design of Tall Buildings. Conference on High-rise Buildings in Vietnam. Hanoi, Vietnam. http://archnet.org/library/files/one_file.jsp?file_id=108. Site accessed 3 March 2009.
For Book:
Tavassoli M, Bonyadi N (2007). Design of urban space: urban spaces and their position in life and the image of the city, Second edition, Tehran: Shahidi Press.
For Website:
Bhatti SA and Firkins JT. (2008). http://www.ohioline.osu.edu/sc1156_27.hmtl.
See at http://www.forbesindia.com/printcontent/41571

Review / Decisions / Processing / Policy

Firstly, all manuscripts will be checked by Docol©c, a plagiarism finding tool. A single blind reviewing model is used by JAAS for non-plagiarized papers. The manuscript is edited and reviewed by the English language editor and three reviewers selected by section editor of JAAS respectively. Also, a reviewer result form is filled by reviewer to guide authors. Possible decisions are: accept as is, minor revision, major revision, or reject. Authors should submit back their revisions within 14 days (if minor or moderate revision), or 30 days (if major revision).

To submit a revision please sign in here, fill out the form, and mark "Revised", attach the revision (MS word) and submit the revised article. After review and editing the article, a final formatted proof is sent to the corresponding author once again to apply all suggested corrections during the article process. The editor who received the final revisions from the corresponding authors shall not be hold responsible for any mistakes shown in the final publication. Manuscripts with significant results are typically reviewed and published at the highest priority.

Plagiarism: There is a zero-tolerance policy towards plagiarism (including self-plagiarism) in our journals. Manuscripts are screened for plagiarism by Docol©c a plagiarism finding tool, before or during publication, and if found they will be rejected at any stage of processing.

Declaration
After the manuscript accepted for publication, a declaration form will be sent to the corresponding author who that is responsible to coauthors' agreements to publication of submitted work in JAAS after any amendments arising from the peer review.

Date of issue
The articles will be published as soon as the final revision received and approved by editorial assistant or EiC.

The Waiver policy
The submission fee will be waived for invited authors, authors of hot papers, and corresponding authors who are editorial board members of the *Journal of Art and Architecture studies* (JAAS). The Journal will consider requests to waive the fee for cases of financial hardship (for high quality manuscripts and upon acceptance for publication). Requests for waiver of the submission fee must be submitted via individual cover letter by the corresponding author and cosigned by an appropriate institutional official to verify that no institutional or grant funds are available for the payment of the fee. Letters including the manuscript title and manuscript ID number should be sent to: jaas [at] science-line.com or jaaseditors [at] gmail.com. It is expected that waiver requests will be processed and authors will be notified within 72h.

The OA policy

Journal of World's Poultry Research is an open access journal which means that all content is freely available without charge to the user or his/her institution. Users are allowed to read, download, copy, distribute, print, search, or link to the full texts of the articles, or use them for any other lawful purpose, without asking prior permission from the publisher or the author. This is in accordance with the *BOAI definition of Open Access*.

Scienceline Language Editing Services

We suggest that authors whose first language is not English have their manuscripts checked by a native English speaker before submission. This is optional, but will help to ensure that any submissions that reach peer review can be judged exclusively on academic merit. We offer a Scienceline service, and suggest that authors contact as appropriate. Please note that use of language editing services is voluntary, and at the author's own expense. Use of these services does not guarantee that the manuscript will be accepted for publication, nor does it restrict the author to submitting to Scienceline journals. You can send the article/s to the following Email: daryoushbabazadeh@gmail.com

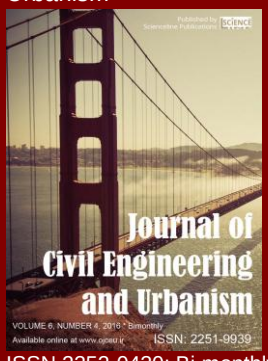
SCIENCELINE PUBLISHING CORPORATION

Scienceline Publication Ltd is a limited liability non-profit non-stock corporation incorporated in Turkey, and also is registered in Iran. Scienceline journals that concurrently belong to many societies, universities and research institutes, publishes internationally peer-reviewed open access articles and believe in sharing of new scientific knowledge and vital research in the fields of life and natural sciences, animal sciences, engineering, art, linguistic, management, social and economic sciences all over the world. Scienceline journals include:

Online Journal of Animal and Feed Research

ISSN 2228-7701; Bi-monthly
View Journal I Editorial Board
Email: editors@ojafr.ir
Submit Online >>

Journal of Civil Engineering and Urbanism



ISSN 2252-0430; Bi-monthly
View Journal I Editorial Board
Email: ojceu@ojceu.ir
Submit Online >>

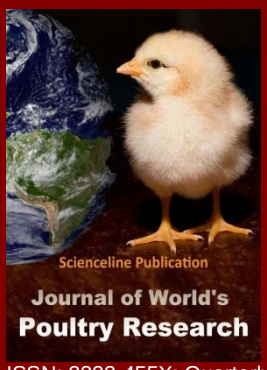
Journal of Life Sciences and Biomedicine

ISSN: 2251-9939; Bi-monthly
View Journal I Editorial Board
Email: editors@jlsb.science-line.com
Submit Online >>

Asian Journal of Medical and Pharmaceutical Researches

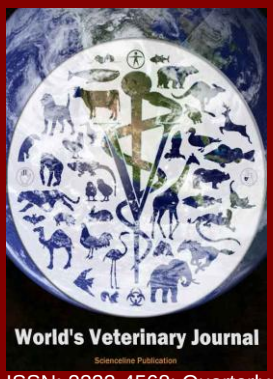
ISSN: 2322-4789; Quarterly
View Journal I Editorial Board
Email: editor@ajmpr.science-line.com
Submit Online >>

Journal of World's Poultry Research



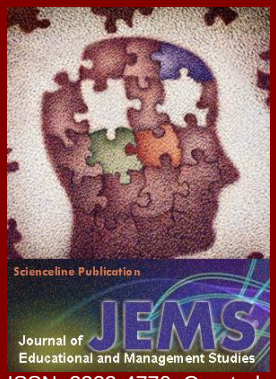
ISSN: 2322-455X; Quarterly
View Journal I Editorial Board
Email: editor@jwpr.science-line.com
Submit Online >>

World's Veterinary Journal



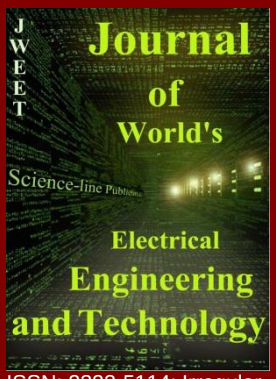
ISSN: 2322-4568; Quarterly
View Journal I Editorial Board
Email: editor@wvj.science-line.com
Submit Online >>

Journal of Educational and Management Studies



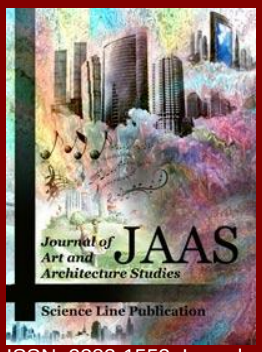
ISSN: 2322-4770; Quarterly
View Journal I Editorial Board
Email: info@jems.science-line.com
Submit Online >>

Journal of World's Electrical Engineering and Technology



ISSN: 2322-5114; Irregular
View Journal I Editorial Board
Email: editor@jweet.science-line.com
Submit Online >>

Journal of Art and Architecture Studies



ISSN: 2383-1553; Irregular
View Journal I Editorial Board
Email: jaas@science-line.com
Submit Online >>

Asian Journal of Social and Economic Sciences

ISSN: 2383-0948; Quarterly
View Journal I Editorial Board
Email: ajses@science-line.com
Submit Online >>

Journal of Applied Business and Finance Researches

ISSN: 2382-9907; Quarterly
View Journal I Editorial Board
Email: jabfr@science-line.com
Submit Online >>

Scientific Journal of Mechanical and Industrial Engineering

ISSN: 2383-0980; Quarterly
View Journal I Editorial Board
Email: sjmie@science-line.com
Submit Online >>