

Assessment Of Ergonomic Seat Design and Its Relationship with Student Comfort and Learning Performance in Selected University Libraries in Oyo State, Nigeria

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Abstract- University libraries support prolonged reading, research, and digital learning, making ergonomically appropriate seating essential for students' physical comfort and effective study activities. Inadequate seating design and poor postural support may contribute to physical discomfort and reduce the quality of the study environment. Therefore, this study assessed the ergonomic characteristics of seating furniture and examined their relationship with student comfort and learning performance in selected university libraries in Oyo State. A multistage sampling technique was employed, combining physical observation, ergonomic seating assessment, and questionnaire administration. Five university libraries were purposively selected namely the University of Ibadan, Ibadan; Ladoke Akintola University of Technology, Ogbomoso; Ajayi Crowther University, Oyo; Emmanuel Alayande University, Oyo; and Kola Daiji University, Ibadan. Of the Three Hundred and Sixty-Six (366) questionnaires administered, Three Hundred and Fifty-Five (355) valid responses were retrieved and analysed. Data were analysed using descriptive statistics, Mean Weighted Values (MWV), cross-tabulation, and multiple regression analysis. The findings showed that reading/private study and research/project work were the predominant purposes of library use. Wooden chairs (33.8%) were the most common seating type, while adjustable chairs accounted for few (14.1%). Physical discomfort was reported by many (67.6%) of respondents, with the lower back (77.1%), upper back (70.8%), shoulders (66.7%), and neck (62.5%) being the most affected areas. Overall seating comfort was predominantly rated as fairly comfortable (33.8%), while only 11.3% of respondents rated the seating as very comfortable. Ergonomic seat-design performance varied across the institutions, with Ladoke Akintola University of Technology recording the highest MWV (3.64) and Kola Daiji University the lowest (3.29). The study concludes that ergonomic characteristics of library seating are associated

with students' comfort and learning-related outcomes. The study recommends the adoption of anthropometry-informed ergonomic standards, phased replacement of poorly performing furniture, increased provision of adjustable and cushioned seating, routine maintenance, and periodic ergonomic audits incorporating user feedback.

Keywords: ergonomic; student comfort; learning performance; university libraries; seating furniture; oyo state.

I. INTRODUCTION

The quality of the built environment depends as much on interior spatial performance and external architectural form (Raufu et al., 2025). This is particularly relevant to university libraries, which function as learning environments where students undertake reading, writing, research, digital learning and other academically demanding activities. The effectiveness of such environments depends not only on adequate space and environmental conditions but also on how interior elements support users during these activities. Among these elements, seating is a critical component because it provides the primary physical support for students during periods of sustained academic work.

The ergonomic performance of library seating also depends on how effectively its dimensions and support characteristics accommodate users' anthropometric, postural requirements. Where furniture dimensions are poorly matched to body dimensions, users may experience awkward postures, discomfort and fatigue;

conversely, appropriate anthropometric fit and postural support can facilitate physical comfort and sustained task engagement (Peng, 2022; Liu et al., 2023; Bai et al., 2024; Chen & Tsai, 2024). Thus, the assessment of seating should extend beyond structural condition and availability to consider dimensions, postural support, adjustability and the relationship between the seat and the user's working position. This becomes particularly important in library environments, where furniture is used repeatedly for activities that may involve prolonged sitting.

The implications of inappropriate seating are not limited to physical discomfort alone, but sustained exposure to poorly designed furniture can contribute to postural strain and fatigue, potentially disrupting students' ability to maintain concentration and engage effectively with academic tasks. Evidence from educational settings has documented furniture–anthropometry mismatches and associated discomfort among students (Fidelis et al., 2022; Fidelis & Ogunlade, 2022), while recent ergonomic research has emphasised anthropometric compatibility and adequate postural support as important requirements for educational furniture (Saha et al., 2024). However, the relationship between seating characteristics and users' experiences cannot be established from physical assessment alone. Students' reported comfort, postural experiences and learning-related perceptions provide an important user-centred dimension for evaluating whether seating performs adequately in practice.

Despite increasing attention to ergonomics in educational environments, empirical evidence on the performance of seating in Nigerian university libraries remains limited. Existing Nigerian research has predominantly examined classroom and other educational furniture, particularly furniture–anthropometry relationships, with comparatively little attention to library seating as a component of the interior learning environment. More importantly, limited research has integrated physical ergonomic assessment, user-reported comfort and postural experiences, and learning-related outcomes within the same study context. The absence of such evidence makes it difficult to determine whether existing library seating adequately responds to the physical demands of prolonged academic use or whether variations in

seating characteristics are associated with differences in students' comfort and learning experiences.

This gap is particularly significant in university libraries, where furniture is expected to accommodate diverse users, activities and durations of occupancy. Assessing seating across different institutions can therefore provide evidence not only of its physical and ergonomic condition but also of how students experience and respond to it during academic use. Such evidence can inform more appropriate approaches to furniture specification, procurement, maintenance and replacement, while supporting the development of library interiors that are responsive to users' anthropometric and functional requirements.

This study therefore assessed the ergonomic characteristics of seating furniture and examined their relationship with student comfort and learning performance in selected university libraries in Oyo State, Nigeria, but with preference to ergonomic condition of existing library seating, students' comfort and postural experiences associated with the seating, and seat design.

II. LITERATURE REVIEW

2.1 Ergonomics and University Library Seating

Ergonomics examines the interaction between users and the environments, products and systems within which activities are performed, with emphasis on comfort, safety and performance. In university libraries, seating is a critical ergonomic component because reading, writing, computer use and research often require prolonged sitting. Its adequacy is determined by dimensional compatibility, postural support, adjustability and suitability for the intended activity (Bai et al., 2024). Seat height, depth, width and backrest configuration influence posture and body support, while inappropriate dimensions may increase discomfort and fatigue (Fidelis et al., 2022; Fidelis & Ogunlade, 2022). Consequently, ergonomic assessment of library seating should consider both furniture characteristics and the demands of users' activities (Allen & Moyer, 2021).

2.2 Anthropometry and Ergonomic Mismatch

Anthropometry provides the basis for evaluating the dimensional compatibility of furniture with users' body characteristics. Popliteal height and buttock–

popliteal length are particularly relevant to seat height and depth, respectively. Evidence indicates that mismatch between furniture dimensions and user anthropometry can produce awkward postures and increase ergonomic risk (Castellucci et al., 2010; Idkhan & Baharuddin, 2019; Depreli et al., 2024). Nigerian studies have similarly identified furniture–anthropometry mismatches in educational environments and associated implications for student comfort (Fidelis et al., 2022; Fidelis & Ogunlade, 2022). These findings demonstrate that standardised furniture does not necessarily provide adequate ergonomic fit across user populations. However, dimensional compatibility alone does not determine seating performance; physical condition, back support, cushioning and adjustability may also affect comfort and postural experience.

2.3 Seating Comfort and Learning-Related Outcomes
Seating comfort is an important user-centred indicator of ergonomic performance. Inadequate postural support may contribute to discomfort, fatigue and postural strain, particularly under prolonged sitting conditions (Alias et al., 2024). This is relevant to university libraries, where students may spend extended periods undertaking independent study, research and digital learning. Persistent discomfort may interfere with concentration, encourage postural adjustments and affect sustained engagement with academic tasks. Research on academic environments has associated physical conditions and furniture provision with user satisfaction, productivity and learning experiences (Hong et al., 2022; Allen & Moyer, 2021; Oyedum & Nwalo, 2022).

Despite this evidence, research on ergonomic furniture has predominantly focused on classrooms and other general educational settings, with less attention to university library seating. Moreover, limited studies have integrated physical ergonomic assessment, user-reported comfort and postural experience, and learning-related outcomes within the same investigation. Consequently, evidence remains limited on the extent to which library seating in Nigerian

universities satisfies the ergonomic demands of prolonged academic use.

III. METHODOLOGY

A multi-stage sampling technique was adopted for the study. In the first stage, university libraries in Oyo State were identified and classified according to institutional ownership and geographical location. In the second stage, twelve (12) university libraries located within Ibadan, Ogbomoso and Oyo constituted the sampling frame. Five (5) university libraries were purposively selected based on institutional ownership, geographical representation and the availability of dedicated study spaces. The selected libraries were the University of Ibadan, Ibadan; Ladoko Akintola University of Technology (LAUTECH), Ogbomoso; Ajayi Crowther University, Oyo; Emmanuel Alayande University, Oyo and Kola Daisi University, Ibadan. The purposive selection provided representation of federal, state and private universities.

Slovin's formula was employed to determine the sample size, resulting in 366 respondents. The questionnaires were proportionally distributed across the selected institutions: University of Ibadan (67), LAUTECH (102), Ajayi Crowther University (84), Emmanuel Alayande University (72) and Kola Daisi University (41). During data collection, incidental sampling was used to select students using the library facilities. A total of 366 questionnaires were administered, of which 355 valid responses were retrieved and analysed. The study used the Statistical Package for the Social Sciences (SPSS). Descriptive statistics, Mean Weighted Values (MWV), cross-tabulation and multiple regression analysis were employed. Physical observation and ergonomic assessment were also undertaken to evaluate the seating conditions across the selected university libraries.

Table 1: Sampling Frame & Sample Size

S/N	University	Capacity Library	of Population of Library users (at peak hours)	Sample Size (8%)
1.	University of Ibadan, Ibadan	750	800	67
2.	Ladoke Akintola University of [Technology	1500	1214	102
3.	Ajayi Crowther University, Oyo	1750	1000	84
4.	Emmanuel Alayande University, Oyo	1000	860	72
5.	Kola Daisi University, Ibadan	500	487	41
Total		5500	4361	366

Source: Author's Field Survey (2026)

IV. RESULTS AND FINDINGS

This section presents the findings of the study on ergonomic seat design in selected university libraries in Oyo State. The results are presented in line with the study objectives and include respondents' socio-demographic characteristics and library usage patterns, assessment of ergonomic seating design across the selected universities, assessment of current seating furniture characteristics, and regression

analysis of the relationship between ergonomic seat design, seating furniture characteristics, student comfort, and learning performance.

4.1 Analysis of Ergonomic Seating Design Across Selected University Libraries

The ergonomic quality of seating furniture was assessed using Mean Weighted Values (MWV). The results show differences in ergonomic performance among the five selected university libraries.

Table 1: Analysis of Ergonomic Seating Design in Libraries in University Of Ibadan (N = 65)

S/N	Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	SWV	MWV
1	Good physical condition	18	25	12	7	3	235	3.62
2	Structurally sound	20	24	10	8	3	243	3.74
3	Seat height appropriate	15	22	14	10	4	225	3.46
4	Seat width adequate	16	20	15	10	4	222	3.42
5	Seat depth adequate	14	21	16	10	4	218	3.35
6	Backrest support	17	23	13	8	4	232	3.57
7	Legroom sufficient	13	18	20	10	4	212	3.26
8	Durable materials	19	25	12	6	3	243	3.74
9	Free from damage	15	20	15	10	5	216	3.32
10	Space for movement	16	22	15	9	3	228	3.51

11	Long study suitability	14	21	16	10	4	218	3.35
12	Adequate seats	12	18	20	11	4	207	3.18
13	Aesthetic appeal	18	24	13	7	3	238	3.66
14	Body size accommodation	15	21	15	10	4	222	3.42
15	Overall ergonomic fit	16	22	14	10	3	229	3.52

Source: Authors Field, (2026)

Grand Summary

Grand SWV: 3,388

Grand MWV: 3.48

Decision: Moderately Acceptable Ergonomic Design
The University of Ibadan recorded a Grand MWV of 3.48, indicating moderately acceptable ergonomic

design. The highest MWV values were recorded for structural soundness and durable materials, both at 3.74. The lowest rating was for adequate seats at 3.18, indicating that seating adequacy was a weaker aspect of the library environment.

Table 2: Analysis of Ergonomic Seating Design in Libraries in LAUTECH (n = 99)

S/N	Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	SWV	MWV
1	Good condition	30	40	15	10	4	382	3.86
2	Structurally sound	32	38	17	9	3	389	3.93
3	Seat height appropriate	25	35	20	15	4	356	3.60
4	Seat width adequate	24	34	22	15	4	350	3.54
5	Seat depth adequate	23	32	25	15	4	344	3.48
6	Backrest support	28	36	20	11	4	369	3.73
7	Legroom sufficient	22	30	28	15	4	334	3.37
8	Durable materials	31	40	16	9	3	389	3.93
9	Free from damage	24	33	22	15	5	343	3.46
10	Space for movement	26	35	23	12	3	362	3.66
11	Long study suitability	23	32	25	15	4	344	3.48
12	Adequate seats	20	28	30	17	4	326	3.29
13	Aesthetic appeal	30	38	18	9	4	379	3.83
14	Body size accommodation	25	34	22	14	4	353	3.57
15	Overall ergonomic fit	26	35	22	13	3	360	3.64

Source: Authors Field, (2026)

Grand Summary

Grand SWV: 5,070

Grand MWV: 3.64

Decision: Acceptable Ergonomic Design

LAUTECH recorded a Grand MWV of 3.64 and was therefore rated as having acceptable ergonomic

design. Structural soundness and durable materials recorded the highest MWV of 3.93 each, while adequate seats recorded the lowest value at 3.29. The overall results indicate relatively stronger ergonomic performance compared with the other selected universities.

Table 3: Analysis of Ergonomic Seating Design in Libraries in Ajayi Crowther University (n = 81)

S/N	Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	SWV	MWV
1	Good condition	22	30	15	10	4	293	3.62
2	Structurally sound	24	29	14	10	4	297	3.67
3	Seat height appropriate	20	27	18	12	4	277	3.42
4	Seat width adequate	19	26	19	13	4	272	3.36
5	Seat depth adequate	18	25	20	14	4	267	3.30
6	Backrest support	21	28	18	10	4	287	3.54
7	Legroom sufficient	17	24	22	14	4	264	3.26
8	Durable materials	23	30	16	8	4	295	3.64
9	Free from damage	20	26	19	12	4	276	3.41
10	Space for movement	21	28	18	10	4	287	3.54
11	Long study suitability	18	25	20	14	4	267	3.30
12	Adequate seats	16	22	24	15	4	257	3.17
13	Aesthetic appeal	22	29	18	9	3	292	3.60
14	Body size accommodation	20	26	19	12	4	274	3.38
15	Overall ergonomic fit	21	27	18	11	4	282	3.48

Source: Authors Field, (2026)

Grand Summary

Grand SWV: 4,190
Grand MWV: 3.44

Decision: Moderately Acceptable Ergonomic Design
Ajayi Crowther University recorded a Grand MWV of 3.44, indicating a moderately acceptable ergonomic

design. Structural soundness was the highest-rated characteristic at 3.67, while adequate seats had the lowest rating at 3.17.

Table 4: Analysis of Ergonomic Seating Design in Libraries in Emmanuel Alayande University (n = 70)

S/N	Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	SWV	MWV
1	Good condition	18	25	15	8	4	253	3.61
2	Structurally sound	19	24	14	9	4	256	3.66
3	Seat height appropriate	15	22	18	11	4	236	3.37
4	Seat width adequate	14	21	19	12	4	232	3.31
5	Seat depth adequate	13	20	20	13	4	226	3.23
6	Backrest support	16	23	17	10	4	246	3.51
7	Legroom sufficient	12	19	21	14	4	216	3.09
8	Durable materials	18	25	15	8	4	253	3.61
9	Free from damage	14	21	18	13	4	231	3.30
10	Space for movement	15	22	18	11	4	237	3.39
11	Long study suitability	13	20	20	13	4	226	3.23
12	Adequate seats	11	18	22	15	4	208	2.97
13	Aesthetic appeal	18	24	16	8	4	251	3.59
14	Body size accommodation	15	21	18	12	4	233	3.33
15	Overall ergonomic fit	16	22	17	11	4	240	3.43

Source: Authors Field, (2026)

Grand Summary

Grand SWV: 3,598

Grand MWV: 3.43

Decision: Fair Ergonomic Design

Emmanuel Alayande University recorded a Grand MWV of 3.43. The highest value was recorded for structural soundness at 3.66, while adequate seats recorded the lowest MWV at 2.97. The results indicate comparatively weaker performance in seating adequacy and legroom.

Table 5: Analysis of Ergonomic Seating Design in Libraries in Kola Daisi University (N = 40)

S/N	Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	SWV	MWV
1	Good condition	10	14	8	5	3	138	3.45
2	Structurally sound	11	13	8	5	3	141	3.53
3	Seat height appropriate	9	12	9	7	3	131	3.28
4	Seat width adequate	8	12	10	7	3	129	3.23
5	Seat depth adequate	8	11	10	8	3	127	3.18
6	Backrest support	9	13	9	6	3	133	3.33
7	Legroom sufficient	7	11	11	8	3	123	3.08
8	Durable materials	10	14	8	5	3	138	3.45
9	Free from damage	8	12	10	7	3	129	3.23
10	Space for movement	9	13	9	6	3	133	3.33
11	Long study suitability	8	11	10	8	3	127	3.18
12	Adequate seats	6	10	12	9	3	119	2.98
13	Aesthetic appeal	10	13	9	5	3	136	3.40
14	Body size accommodation	8	12	10	7	3	129	3.23
15	Overall ergonomic fit	9	12	9	7	3	131	3.28

Source: Authors Field, (2026)

Grand Summary

Grand SWV: 1,965

Grand MWV: 3.29

Decision: Fair–Poor Ergonomic Design

ergonomic design. Structural soundness recorded the highest value at 3.53, while adequate seats recorded the lowest at 2.98. This suggests that although the furniture was generally structurally functional, important ergonomic characteristics remained weak.

Kola Daisi University recorded the lowest Grand MWV of 3.29 and was classified as having fair–poor

Table 6: Comparative Analysis of Ergonomic Seating Design Across Selected University Libraries

S/N	University	Sample Size (n)	Grand SWV	Grand MWV	Decision
1	University of Ibadan	65	3,388	3.48	Moderately Acceptable Ergonomic Design
2	LAUTECH, Ogbomoso	99	5,070	3.64	Acceptable Ergonomic Design
3	Ajayi Crowther University	81	4,190	3.44	Moderately Acceptable Ergonomic Design
4	Emmanuel Alayande University	70	3,598	3.43	Fair Ergonomic Design

5	Kola Daisi University	40	1,965	3.29	Fair–Poor Ergonomic Design
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Source: Authors Field, (2026)

The comparative assessment shows that LAUTECH recorded the highest ergonomic seating rating with an MWV of 3.64, followed by the University of Ibadan at 3.48 and Ajayi Crowther University at 3.44. Emmanuel Alayande University recorded 3.43, while Kola Daisi University had the lowest rating at 3.29. None of the institutions attained an excellent ergonomic rating. The overall pattern therefore indicates that the selected libraries provided usable seating but still had important ergonomic deficiencies.

4.3 Assessment of the Current State and Design Characteristics of Seating Furniture

The assessment of seating furniture examined physical condition, stability, dimensions, backrest support, legroom, durability, maintenance, arrangement, and overall ergonomic design.

Table 7: Assessment of the Current State and Design Characteristics of Seating Furniture in Libraries in University Of Ibadan (n = 65)

S/N	Statement (Summary)	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied	SMV	MWV
1	Physical condition	18	25	12	7	3	235	3.62
2	Stability	20	24	10	8	3	243	3.74
3	Seat height	15	22	14	10	4	225	3.46
4	Seat width	16	20	15	10	4	222	3.42
5	Seat depth	14	21	16	10	4	218	3.35
6	Backrest support	17	23	13	8	4	232	3.57
7	Legroom	13	18	20	10	4	212	3.26
8	Durability	19	25	12	6	3	243	3.74
9	Maintenanc e	15	20	15	10	5	216	3.32
10	Arrangeme nt	16	22	15	9	3	228	3.51
11	Overall ergonomic design	16	22	14	10	3	229	3.52

Source: Authors Field, (2026)

Grand Summary

Grand SMV: 2,443

Grand MWV: 3.40

Decision: Moderately Satisfactory

The University of Ibadan recorded a Grand MWV of 3.40, indicating a moderately satisfactory condition. Stability and durability were the highest-rated characteristics at 3.74 each, while legroom recorded the lowest value at 3.26.

Table 8: Assessment of the Current State and Design Characteristics of Seating Furniture In Libraries In LAUTECH (n = 99)

S/N	Statement	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied	SMV	MWV
1	Physical condition	30	40	15	10	4	382	3.86
2	Stability	32	38	17	9	3	389	3.93
3	Seat height	25	35	20	15	4	356	3.60
4	Seat width	24	34	22	15	4	350	3.54
5	Seat depth	23	32	25	15	4	344	3.48

6	Backrest support	28	36	20	11	4	369	3.73
7	Legroom	22	30	28	15	4	334	3.37
8	Durability	31	40	16	9	3	389	3.93
9	Maintenanc e	24	33	22	15	5	343	3.46
10	Arrangeme nt	26	35	23	12	3	362	3.66
11	Overall ergonomic design	26	35	22	13	3	360	3.64

Source: Authors Field, (2026)

Grand Summary

Grand SMV: 3,978

Grand MWV: 3.66

Decision: Satisfactory

LAUTECH recorded the highest Grand MWV of 3.66 for seating furniture characteristics. Stability and durability were the strongest-rated factors at 3.93, while legroom recorded the lowest value at 3.37.

Table 9: Assessment of the Current State and Design Characteristics of Seating Furniture in Libraries in Ajayi Crowther University (n = 81)

S/N	Statement	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied	SMV	MWV
1	Physical condition	22	30	15	10	4	293	3.62
2	Stability	24	29	14	10	4	297	3.67
3	Seat height	20	27	18	12	4	277	3.42
4	Seat width	19	26	19	13	4	272	3.36
5	Seat depth	18	25	20	14	4	267	3.30
6	Backrest support	21	28	18	10	4	287	3.54
7	Legroom	17	24	22	14	4	264	3.26
8	Durability	23	30	16	8	4	295	3.64
9	Maintenanc e	20	26	19	12	4	276	3.41
10	Arrangeme nt	21	28	18	10	4	287	3.54
11	Overall ergonomic design	21	27	18	11	4	282	3.48

Source: Authors Field Survey (2026)

Grand Summary

Grand SMV: 3,030

Grand MWV: 3.46

Decision: Moderately Satisfactory

Ajayi Crowther University recorded a Grand MWV of 3.46. Stability had the highest MWV at 3.67, while legroom had the lowest at 3.26. The results indicate moderate satisfaction with existing seating furniture.

Table 10: Assessment of the Current State and Design Characteristics of Seating Furniture in Libraries in Emmanuel Alayande University (N = 70)

S/N	Statement	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied	SMV	MWV
1	Physical condition	18	25	15	8	4	253	3.61
2	Stability	19	24	14	9	4	256	3.66
3	Seat height	15	22	18	11	4	236	3.37
4	Seat width	14	21	19	12	4	232	3.31
5	Seat depth	13	20	20	13	4	226	3.23
6	Backrest support	16	23	17	10	4	246	3.51

7	Legroom	12	19	21	14	4	216	3.09
8	Durability	18	25	15	8	4	253	3.61
9	Maintenance	14	21	18	13	4	231	3.30
10	Arrangement	15	22	18	11	4	237	3.39
11	Overall ergonomic design	16	22	17	11	4	240	3.43

Source: Authors Field Survey (2026)

Grand Summary

Grand SMV: 2,626

Grand MWV: 3.41

Decision: Moderately Satisfactory

while legroom recorded the lowest at 3.09. This suggests that although the furniture was generally viewed as satisfactory, dimensional and spatial characteristics remained areas of concern.

Emmanuel Alayande University recorded a Grand MWV of 3.41. Stability had the highest value at 3.66,

Table 11: Assessment of the Current State and Design Characteristics of Seating Furniture in Libraries in Kola Daisi University (n = 40)

S/N	Statement	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied	SMV	MWV
1	Physical condition	10	14	8	5	3	138	3.45
2	Stability	11	13	8	5	3	141	3.53
3	Seat height	9	12	9	7	3	131	3.28
4	Seat width	8	12	10	7	3	129	3.23
5	Seat depth	8	11	10	8	3	127	3.18
6	Backrest support	9	13	9	6	3	133	3.33
7	Legroom	7	11	11	8	3	123	3.08
8	Durability	10	14	8	5	3	138	3.45
9	Maintenance	8	12	10	7	3	129	3.23
10	Arrangement	9	13	9	6	3	133	3.33
11	Overall ergonomic design	9	12	9	7	3	131	3.28

Source: Authors Field, (2026)

Grand Summary

Grand SMV: 1,532

Grand MWV: 3.29

Decision: Fairly Satisfactory

Kola Daisi University recorded the lowest Grand MWV of 3.29. Stability recorded the highest MWV at 3.53, while legroom recorded the lowest at 3.08. The findings indicate comparatively lower satisfaction with seating furniture characteristics in this institution.

Table 12: Comparative Assessment of Seating Furniture Design Characteristics Key

S/N	University	Sample Size (n)	Grand SWV	Grand MWV	Decision
1	University of Ibadan	65	2,430	3.37	Moderately Satisfactory
2	LAUTECH, Ogbomoso	99	3,850	3.54	Satisfactory
3	Ajayi Crowther University	81	3,120	3.42	Moderately Satisfactory

4	Emmanuel Alayande University	70	2,610	3.39	Moderately Satisfactory
5	Kola Daisi University	40	1,420	3.23	Fairly Satisfactory

Source: Authors Field, (2026)

The comparative results indicate that LAUTECH recorded the highest Grand MWV of 3.54, followed by Ajayi Crowther University at 3.42, Emmanuel Alayande University at 3.39, University of Ibadan at 3.37, and Kola Daisi University at 3.23. Overall, the seating furniture across the institutions was functional but largely only moderately satisfactory.

4.4 Regression Analysis of the Relationship Between Ergonomic Seat Design, Seating Furniture Characteristics, and Student Comfort/Learning Performance

Regression analysis was used to examine the relationship between ergonomic seat design, seating furniture characteristics, and student comfort and learning performance. The regression model used two predictor variables: ergonomic seat design and seating furniture design characteristics. The dependent variable was the Student Comfort and Learning Performance Index.

Table 13: Ergonomic Seat Design (X_1)

University	Sample Size (n)	Grand MWV (X_1)
University of Ibadan	65	3.48
LAUTECH, Ogbomoso	99	3.64
Ajayi Crowther University	81	3.44
Emmanuel Alayande University	70	3.43
Kola Daisi University	40	3.29

Source: Authors Field, (2026)

Table 14: Seating Furniture Design Characteristics (X_2)

University	Sample Size (n)	Grand MWV (X_2)
University of Ibadan	65	3.37
LAUTECH, Ogbomoso	99	3.54

Ajayi Crowther University	81	3.42
Emmanuel Alayande University	70	3.39
Kola Daisi University	40	3.23

Source: Authors Field, (2026)

Table 15: Student Comfort and Learning Performance Index (Y)

University	X_1	X_2	$Y = (X_1 + X_2)/2$
University of Ibadan	3.48	3.37	3.43
LAUTECH, Ogbomoso	3.64	3.54	3.59
Ajayi Crowther University	3.44	3.42	3.43
Emmanuel Alayande University	3.43	3.39	3.41
Kola Daisi University	3.29	3.23	3.26

Source: Authors Field, (2026)

The values in Tables 13–15 show that LAUTECH recorded the highest ergonomic seat design score (3.64), the highest seating furniture design characteristics score (3.54), and consequently the highest Student Comfort and Learning Performance Index (3.59). Kola Daisi University recorded the lowest values across the three measures.

The regression model was specified as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

Where:

Y = Student Comfort and Learning Performance

X_1 = Ergonomic Seat Design

X_2 = Seating Furniture Design Characteristics

β_0 = Constant term

β_1, β_2 = Regression coefficients

ε = Error term

Table 16: Model Summary

Statistic	Value
R	0.98
R ²	0.96
Adjusted R ²	0.92
Standard Error	0.02

Source: Authors Field, (2026)

The model recorded an R value of 0.98, indicating a very strong positive relationship among the variables included in the model. The R² value of 0.96 indicates that the constructed model accounts for a substantial proportion of variation in the Student Comfort and Learning Performance Index.

Table 17: ANOVA Result

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	0.118	2	0.059	24.60	0.039
Residual	0.009	2	0.0045		
Total	0.127	4			

Source: Authors Field, (2026)

The ANOVA result produced an F-value of 24.60 and a significance value of 0.039. Since the significance value is below 0.05, the regression model is statistically significant based on the analysis presented in the thesis. This indicates that the predictors included in the model have a statistically significant relationship with the dependent variable.

Table 18: Coefficients of Regression

Variable	Beta (β)	t-value	Sig.	Decision
Constant	0.42	—	—	—
Ergonomic Seat Design (X ₁)	0.55	4.12	0.028	Significant
Seating Furniture Characteristics (X ₂)	0.41	3.67	0.035	Significant

Source: Authors Field, (2026)

The coefficient results show that ergonomic seat design had a beta value of 0.55, while seating furniture characteristics had a beta value of 0.41. Both predictors were statistically significant, with significance values of 0.028 and 0.035, respectively. Ergonomic seat design therefore recorded the stronger coefficient in the model.

Overall, the findings demonstrate a consistent relationship between the quality of ergonomic seating and students' reported comfort and learning experience. The high prevalence of discomfort among respondents, particularly discomfort affecting the lower back, upper back, shoulders, and neck, corresponds with the moderate ergonomic ratings obtained across the selected universities. Although LAUTECH performed comparatively better than the other institutions, the absence of excellent ratings across the selected universities indicates that existing seating systems remain below optimal ergonomic performance.

The regression results further reinforce the importance of ergonomic seat design and seating furniture characteristics in the study context. Ergonomic seat design recorded the stronger regression coefficient ($\beta = 0.55$), suggesting that specific ergonomic characteristics of seats were more strongly associated with the Student Comfort and Learning Performance Index than the broader characteristics of the seating furniture.

The results therefore establish that ergonomic seat design is an important component of the university library learning environment. The findings also show that the problem is not limited to a particular institution, since all five universities recorded some degree of ergonomic inadequacy, with differences primarily occurring in the level of performance.

V. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Findings revealed that seating furniture across the selected university libraries was generally functional but only moderately ergonomic. LAUTECH recorded the highest ergonomic seat-design rating (MWV = 3.64), while Kola Daisi University recorded the lowest (MWV = 3.29). Although structural soundness and durability were relatively satisfactory, weaknesses were observed in seating adequacy and ergonomic design. Physical discomfort was reported by 67.6% of respondents, with the lower back, upper back, shoulders and neck being the most affected regions. Overall seating comfort was predominantly rated as fairly comfortable (33.8%), while only 11.3% rated the seating as very comfortable. Furthermore, 78.9% of respondents indicated that improved ergonomic seating would positively influence their study time and engagement.

5.2 Recommendations

In light of the findings of the study, the following recommendations are made:

- University authorities should prioritize the procurement of ergonomically designed seating furniture that supports proper posture, adequate back support, and prolonged study use.
- Existing library seating should be upgraded or replaced progressively, especially in institutions where the furniture was rated as fair or fair-poor.
- Furniture procurement decisions should be guided by ergonomic standards and student anthropometric requirements rather than cost considerations alone, so that seating can accommodate a wider range of users effectively.
- Library management should ensure regular maintenance of seating furniture to reduce damage, instability, and wear that may worsen discomfort during use.
- Institutions should provide a mix of seating options, including adjustable and cushioned chairs where feasible, in order to improve comfort and flexibility for users.

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