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Article

Building sustainable libraries by embracing diversity and inclusion in Digital Era

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Abstract: This study explores the dynamic relationship between sustainability, diversity, and inclusion within library contexts amidst the Digital Era. Conducted in May 2024 across various schools in Anambra State, Nigeria, the research targeted library users to assess their perspectives on sustainable practices and diversity strategies. Utilizing an easily accessible questionnaire deployed via Google Forms, data on sustainable initiatives and diversity measures were collected. Analysis conducted using SPSS included descriptive statistics, Pearson correlation, ANOVA, and the Tukey post hoc test. Results reveal significant demographic variations in the effectiveness of diversity enhancement strategies, emphasizing the pivotal role of age, occupation, educational background, and gender in shaping library practices. The findings underscore the necessity of tailored interventions to promote sustainability and inclusivity in libraries, especially in the digital age where diverse perspectives and equitable access to information are crucial. Understanding the nuanced interplay between demographic factors and strategic initiatives allows libraries to better address the evolving needs of their communities, fostering environments that are both sustainable and inclusive.

Keywords: sustainability; diversity; inclusion; libraries; Digital Era

1. Introduction

Building sustainable libraries in the Digital Era requires a deliberate focus on embracing diversity and inclusion. The literature on this topic emphasizes that sustainable libraries are those that integrate diverse perspectives and inclusive practices, ensuring that they cater to the needs of all users in a digital environment. Sustainable libraries play a crucial role in fostering resilient and adaptable communities [1]. They are essential in promoting environmental stewardship, social equity, and economic viability. Socially, sustainable libraries are inclusive spaces that cater to diverse populations, ensuring equal access to information and resources. They actively address social inequalities by providing programs and services that support education, literacy, and lifelong learning [2]. Libraries also serve as safe havens and community hubs where individuals can connect, share knowledge, and engage in cultural activities, fostering a sense of community and belonging.

Economically, sustainable libraries contribute to local economies by providing free access to resources that can enhance job skills, support small businesses, and foster innovation. They also attract visitors and partnerships, boosting local economic development. By focusing on long-term viability, sustainable libraries ensure they remain relevant and valuable in the Digital Era, continually adapting to meet the

evolving needs of their communities [3,4]. This holistic approach underscores their importance as pillars of diversity and community well-being. Diversity in libraries refers to the inclusion and representation of various demographic groups and perspectives within library staff, collections, services, and programming. This encompasses differences in race, ethnicity, gender, sexual orientation, ability, age, socioeconomic status, and cultural backgrounds [5]. A diverse library aims to reflect and serve its entire community by providing equitable access to resources, fostering a welcoming environment, and addressing the unique needs of all users.

Diversity is a critical component of sustainability in libraries. According to Walters [6], diversity in libraries encompasses various dimensions, including race, ethnicity, gender, sexual orientation, and ability. Libraries that embrace diversity are better equipped to serve a broader range of users and meet the diverse needs of their communities. Diversity is crucial to the sustainability of libraries because it ensures that libraries remain relevant and responsive to the needs of their diverse communities [7]. By embracing diversity, libraries can create inclusive environments where all individuals feel welcomed and valued, fostering a sense of belonging and community engagement. This inclusivity extends to the collection development process, where diverse materials reflect the myriad experiences and perspectives of the community, enhancing cultural awareness and understanding [8].

Moreover, diverse staffing in libraries brings a variety of perspectives and ideas, enriching decision-making processes and service delivery. Staff from varied backgrounds can better relate to and serve a broader spectrum of users, thereby improving user satisfaction and community support. In the Digital Era, diversity enhances the accessibility and relevance of digital resources and services [9]. Libraries that prioritize diverse and inclusive digital collections and services are better equipped to meet the needs of users with different cultural, linguistic, and technological backgrounds. This adaptability not only broadens the user base but also promotes lifelong learning across all demographics in Digital Era [10]. The Digital Era refers to the period characterized by the widespread adoption of digital technologies and the internet, transforming how information is created, shared, and accessed. This era emphasizes connectivity, data-driven decision-making, and the integration of digital tools into daily life, impacting communication, work, and social interactions [11,12].

The Digital Era has transformed how libraries operate, providing new opportunities for promoting diversity and inclusion. Digital technologies enable libraries to offer remote access to resources, which is particularly beneficial for users who may face physical or socio-economic barriers to accessing traditional library services [13]. Moreover, digital collections can be more easily updated to include materials that represent diverse voices and perspectives [14]. Libraries have also embraced digital platforms to engage with users through social media, virtual events, and online learning modules. These platforms allow libraries to reach a wider audience and provide more flexible and inclusive services [15]. For example, virtual book clubs and webinars can accommodate users with different schedules and geographic locations, making library services more accessible to all [16].

To build sustainable libraries that embrace diversity and inclusion, several strategies have been identified in the literature. One effective approach is developing policies and practices that explicitly promote diversity and inclusion. For instance,

libraries can implement diversity training for staff to raise awareness and develop skills for interacting with diverse populations [17]. Additionally, libraries can establish diversity committees to oversee the development and implementation of inclusive initiatives [18]. Another strategy is to create inclusive physical and digital spaces. This involves ensuring that library facilities are accessible to users with disabilities and that digital platforms are designed with accessibility features [19,20]. Inclusive design principles, such as providing screen readers and alternative text for images, can help make digital content accessible to all users, including those with visual impairments [21].

The transformation of libraries in the Digital Era presents both opportunities and challenges. While digital technologies have enhanced access to information, they have also highlighted existing disparities in how libraries serve diverse communities. The central problem is that many libraries, despite their efforts, struggle to fully integrate diversity and inclusion into their digital strategies, leading to gaps in service provision and inequitable access to resources [22]. This problem is exacerbated by the rapid pace of technological change, which can outstrip the ability of libraries to adapt inclusively and sustainably. Also, as libraries transition into the Digital Era, there is a critical need to ensure that all community members, regardless of their background, can benefit equally from these advancements. Studies indicate that marginalized groups, including racial and ethnic minorities, people with disabilities, and those from lower socio-economic backgrounds, often face significant barriers to accessing digital resources [1,23]. This digital divide undermines the role of libraries as equitable spaces for learning and engagement.

Addressing this problem is crucial for several reasons. First, libraries have the mandate to serve their entire communities equitably. Failing to embrace diversity and inclusion in digital initiatives not only marginalizes vulnerable populations but also weakens the societal role of libraries as inclusive public institutions. Second, sustainable libraries that effectively integrate diversity and inclusion are better positioned to foster community resilience and adaptability in the face of social and technological changes. Current research on library sustainability in the Digital Era often overlooks the intersectionality of digital access and inclusivity. While there is significant literature on digital libraries and on diversity and inclusion separately, there is a conspicuous gap in studies that comprehensively address how these elements can be integrated to build sustainable library models. Moreover, there is a lack of practical frameworks and guidelines for libraries to follow in achieving these goals. Existing studies tend to be descriptive rather than prescriptive, highlighting the need for actionable strategies and policies [2,3].

Furthermore, the rapid advancement of technology means that many libraries lack the resources or expertise to keep up with the latest developments, which can exacerbate existing inequalities. Research is needed to explore the effectiveness of sustainable practice implementation among libraries adopting different strategies in the Digital Era and to evaluate the effectiveness of diversity enhancement strategies employed by libraries. This will ensure that libraries can leverage emerging technologies to enhance inclusivity and sustainability, ensuring that no community member is left behind.

Research hypotheses

1) There is no significant difference in the effectiveness of sustainable practice implementation among libraries adopting different strategies in the Digital Era.
2) There is no significant difference in the effectiveness of diversity enhancement strategies employed by libraries in the Digital Era.

2. Methods

The survey was conducted in May 2024 among library users in various schools across Anambra State, Nigeria. An easily understandable questionnaire was utilized to collect data on sustainable practice implementation and diversity enhancement strategy effectiveness in libraries during the Digital Era. Data collection was done via a structured questionnaire on Google Forms, shared randomly through social media platforms and personal contacts. The questionnaire included background information, eligibility criteria, confidentiality assurances, and informed consent. Cronbach's alpha for the questionnaire was 0.89, indicating its reliability. Completed questionnaires were cleaned and coded in Microsoft Excel 2016 before analysis in SPSS version 25. Descriptive statistics and Pearson correlation analysis were used to explore associations between variables. ANOVA and Tukey post hoc tests were employed to examine differences in strategy effectiveness across demographic groups while controlling for Type I errors.

3. Results

Table 1 provides demographic information about 90 library users. The age distribution shows the majority are between 35–54 years (58.9%), with the largest group being 45–54 (32.2%). Most users are librarians/library staff (42.2%) and students (30%). Regarding educational background, half have a Master's degree (50%), while others hold Bachelor's (22.2%) and Doctoral degrees (21.1%). Gender distribution is skewed, with females representing 68.9% and males 31.1%. This demographic data offers insight into the library's user base, highlighting a well-educated, predominantly female population with a significant proportion of professional library staff and students.

The Pearson correlation analysis in **Table 2** reveals insightful relationships between demographic factors and sustainable practices. Sustainable practices exhibit a notable positive correlation with age ($r = 0.678$, $p < 0.01$) and educational background ($r = 0.310$, $p < 0.01$), indicating that older individuals and those with higher education tend to engage more in sustainable behaviors. Additionally, there is a modest positive correlation with gender ($r = 0.265$, $p < 0.05$), suggesting some gender disparities in sustainable practices. Age itself demonstrates strong associations with other demographic variables. It correlates significantly with occupation ($r = 0.741$, $p < 0.01$) and educational background ($r = 0.731$, $p < 0.01$), indicating that older individuals are more likely to hold higher occupational roles and possess higher educational achievements. Furthermore, there is a positive correlation between age and gender ($r = 0.376$, $p < 0.01$), suggesting age differences across genders.

Table 1. Demographic information.

Category	Subcategory	Frequency	Percent	Valid percent	Cumulative percent
Age	18–24	7	7.8	7.8	7.8
	25–34	20	22.2	22.2	30.0
	35–44	24	26.7	26.7	56.7
	45–54	29	32.2	32.2	88.9
	55–64	10	11.1	11.1	100.0
	Total	**90**	**100.0**	**100.0**	**100.0**
Occupation	Student	27	30.0	30.0	30.0
	Educator/teacher	9	10.0	10.0	40.0
	Librarian/library staff	38	42.2	42.2	82.2
	Administrative/managerial	16	17.8	17.8	100.0
	Total	**90**	**100.0**	**100.0**	**100.0**
Educational background	High school	6	6.7	6.7	6.7
	Bachelor's degree	20	22.2	22.2	28.9
	Master's degree	45	50.0	50.0	78.9
	Doctoral degree	19	21.1	21.1	100.0
	Total	**90**	**100.0**	**100.0**	**100.0**
Gender	Male	28	31.1	31.1	31.1
	Female	62	68.9	68.9	100.0
	Total	**90**	**100.0**	**100.0**	**100.0**

Table 2. Correlation between sustainable practices and the age, occupation, educational background, and gender of library users.

		Sustainable practices	Age	Occupation	Educational background	Gender
Sustainable practices	Pearson correlation	1	0.678**	0.145	0.310**	0.265*
	Sig. (2-tailed)		0.000	0.174	0.003	0.012
	N	90	90	90	90	90
Age	Pearson correlation	0.678**	1	0.741**	0.731**	0.376**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000
	N	90	90	90	90	90
Occupation	Pearson correlation	0.145	0.741**	1	0.492**	0.302**
	Sig. (2-tailed)	0.174	0.000		0.000	0.004
	N	90	90	90	90	90
Educational background	Pearson correlation	0.310**	0.731**	0.492**	1	0.261*
	Sig. (2-tailed)	0.003	0.000	0.000		0.013
	N	90	90	90	90	90
Gender	Pearson correlation	0.265*	0.376**	0.302**	0.261*	1
	Sig. (2-tailed)	0.012	0.000	0.004	0.013	
	N	90	90	90	90	90

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Regarding occupation, it correlates significantly with educational background (*r*

= 0.492, $p < 0.01$) and gender ($r = 0.302$, $p < 0.01$). This implies that certain occupations are associated with higher educational qualifications and that gender disparities exist in occupational distribution. Lastly, educational background demonstrates a positive correlation with gender ($r = 0.261$, $p < 0.05$), indicating differences in educational attainment between genders. These findings emphasize the intricate interplay between demographic factors and sustainable practices, with age and educational background emerging as influential predictors.

The Pearson correlation analysis in **Table 3** reveals significant relationships between demographic factors and diversity. Age exhibits strong positive correlations with both occupation ($r = 0.741$, $p < 0.01$) and educational background ($r = 0.731$, $p < 0.01$), indicating that older individuals tend to have higher occupational roles and more advanced education. Additionally, there's a moderate positive correlation with gender ($r = 0.376$, $p < 0.01$), suggesting some age differences between genders. Occupation is positively correlated with educational background ($r = 0.492$, $p < 0.01$), indicating that certain occupations are associated with higher educational qualifications. There's also a moderate positive correlation with gender ($r = 0.302$, $p < 0.01$), suggesting differences in occupational distribution based on gender.

Table 3. Correlation between diversity enhancement and the age, occupation, educational background, and gender of library users.

		Age	**Occupation**	**Educational background**	**Gender**	**Enhancing diversity**
Age	Pearson correlation	1	0.741**	0.731**	0.376**	0.621**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000
	N	90	90	90	90	90
Occupation	Pearson correlation	0.741**	1	0.492**	0.302**	0.305**
	Sig. (2-tailed)	0.000		0.000	0.004	0.003
	N	90	90	90	90	90
Educational background	Pearson correlation	0.731**	0.492**	1	0.261*	0.378**
	Sig. (2-tailed)	0.000	0.000		0.013	0.000
	N	90	90	90	90	90
Gender	Pearson correlation	0.376**	0.302**	0.261*	1	0.486**
	Sig. (2-tailed)	0.000	0.004	0.013		0.000
	N	90	90	90	90	90
Enhancing diversity	Pearson correlation	0.621**	0.305**	0.378**	0.486**	1
	Sig. (2-tailed)	0.000	0.003	0.000	0.000	
	N	90	90	90	90	90

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Educational background exhibits a positive correlation with gender ($r = 0.261$, $p < 0.05$), indicating differences in educational attainment between genders. Gender shows a moderate positive correlation with enhancing diversity ($r = 0.486$, $p < 0.01$), suggesting that gender may play a role in initiatives aimed at enhancing diversity. Lastly, enhancing diversity demonstrates strong positive correlations with age ($r = 0.621$, $p < 0.01$), occupation ($r = 0.305$, $p < 0.01$), educational background ($r = 0.378$,

$p < 0.01$), and gender ($r = 0.486$, $p < 0.01$). This indicates that individuals who are older, hold higher occupational roles, have advanced education, and belong to certain gender groups are more likely to be involved in activities aimed at enhancing diversity. Overall, these correlations shed light on the complex relationships between demographic factors and efforts to enhance diversity, highlighting potential avenues for targeted interventions and strategies.

Hypothesis one: There is no significant difference in the effectiveness of sustainable practice implementation among libraries adopting different strategies in the Digital Era.

The ANOVA results in **Table 4** indicate significant differences in sustainable practice implementation effectiveness across various strategies. Age ($F(6, 83) = 78.742$, $p < 0.001$), occupation ($F(6, 83) = 17.519$, $p < 0.001$), educational background ($F(6, 83) = 35.785$, $p < 0.001$), and gender ($F(6, 83) = 262.526$, $p < 0.001$) all show significant between-group variation. Thus, the null hypothesis of no significant difference in effectiveness among libraries adopting different strategies in the Digital Era is rejected. These findings suggest that strategy choice significantly impacts the efficacy of sustainable practice implementation in libraries during the Digital Era.

Table 4. ANOVA on difference in the effectiveness of sustainable practice implementation among libraries adopting different strategies in the Digital Era.

		Sum of squares	**df**	**Mean square**	***F***	**Sig.**
Age	Between groups	97.390	6	16.232	78.742	0.000
	Within groups	17.110	83	0.206		
	Total	114.500	89			
Occupation	Between groups	144.444	6	24.074	17.519	0.000
	Within groups	114.056	83	1.374		
	Total	258.500	89			
Educational background	Between groups	44.082	6	7.347	35.785	0.000
	Within groups	17.041	83	0.205		
	Total	61.122	89			
Gender	Between groups	18.323	6	3.054	262.526	0.000
	Within groups	0.966	83	0.012		
	Total	19.289	89			

The Tukey post hoc test unveils notable variations in sustainable practice implementation across demographic groups ($\alpha = 0.05$). Age groups demonstrate distinct mean scores ($p < 0.05$), with subsets 4 and 5 exhibiting significantly higher mean scores ($M = 3.25$, $M = 4.00$) compared to subsets 1, 2, and 3 ($M = 2.63$, $M = 3.38$, $M = 3.13$). Occupational subsets also reveal significant differences ($p < 0.05$), particularly between subsets 1 and 6 ($M = 2.63$, $M = 3.88$). Educational backgrounds exhibit variations ($p < 0.05$) across subsets 1, 2, and 3 ($M = 3.38$, $M = 2.63$, $M = 3.13$) compared to subsets 4 and 5 ($M = 3.25$, $M = 4.00$). Gender subsets present significant disparities ($p < 0.05$), notably between subsets 1 and 2 ($M = 3.13$, $M = 2.63$). These findings highlight the nuanced demographic influences on sustainable practice engagement in the Digital Era.

Hypothesis two: There is no significant difference in the effectiveness of diversity enhancement strategies employed by libraries in the Digital Era.

The ANOVA results in **Table 5** indicate significant differences in diversity enhancement strategies effectiveness across demographic groups. Age ($F(6, 83) = 202.932$, $p < 0.001$), occupation ($F(6, 83) = 35.282$, $p < 0.001$), educational background ($F(6, 83) = 60.255$, $p < 0.001$), and gender ($F(6, 83) = 51.164$, $p < 0.001$) all show significant between-group variation. Therefore, the null hypothesis, suggesting no significant difference in the effectiveness of diversity enhancement strategies among libraries in the Digital Era, is rejected. These findings indicate that diversity enhancement strategies' efficacy significantly varies across different demographic groups within library contexts in the Digital Era.

Table 5. ANOVA on difference in the effectiveness of diversity enhancement strategies employed by libraries in the Digital Era.

		Sum of squares	**df**	**Mean square**	***F***	**Sig.**
Age	Between groups	107.193	6	17.865	202.932	0.000
	Within groups	7.307	83	0.088		
	Total	114.500	89			
Occupation	Between groups	185.693	6	30.949	35.282	0.000
	Within groups	72.807	83	0.877		
	Total	258.500	89			
Educational background	Between groups	49.710	6	8.285	60.255	0.000
	Within groups	11.412	83	0.137		
	Total	61.122	89			
Gender	Between groups	15.184	6	2.531	51.164	0.000
	Within groups	4.105	83	0.049		
	Total	19.289	89			

4. Discussion

The Pearson correlation analysis reveals insightful relationships between demographic factors and sustainable practices. Sustainable practices exhibit a notable positive correlation with age and educational background, indicating that older individuals and those with higher education tend to engage more in sustainable behaviors. This finding agrees with Spoelstra et al. [20], who reported that older adults are more likely to adopt sustainable practices due to greater environmental awareness accumulated over time. In contrast, Wiernik et al. [21] found no significant correlation between age and sustainable behaviors, suggesting variability in environmental engagement across different populations. Additionally, there is a modest positive correlation with gender, suggesting some gender disparities in sustainable practices. This is supported by a related study by Trelohan [24], which highlighted that women are generally more engaged in sustainability efforts compared to men. However, contrary findings were presented by Shrestha et al. [25], who found minimal gender differences in sustainable behavior.

Age itself demonstrates strong associations with other demographic variables,

correlating significantly with occupation and educational background. This implies that older individuals are more likely to hold higher occupational roles and possess higher educational achievements, aligning with findings by Patton and McMahon [26], who observed that professional advancement often coincides with age and educational attainment. Furthermore, occupation correlates significantly with educational background and gender. This implies that certain occupations are associated with higher educational qualifications and that gender disparities exist in occupational distribution.

The Pearson correlation analysis reveals significant relationships between demographic factors and diversity in library operations. Age exhibits strong positive correlations with both occupation and educational background, indicating that older individuals in library settings tend to hold higher occupational roles and possess more advanced education. This finding aligns with Tavitiyaman et al. [27], who reported that age is a key factor in achieving senior positions and advanced educational qualifications in various fields. In contrast, a study by Zacher et al. [28] found that age had less influence on occupational roles, suggesting variability in career progression patterns within libraries as well. Additionally, there is a moderate positive correlation between age and gender, suggesting age differences across genders in library contexts. Rudolph et al. [29] observed that these age differences often reflect broader societal trends in gender roles and career paths.

Occupation is positively correlated with educational background, indicating that higher educational qualifications are linked to certain occupations within libraries. This is supported by Langowitz et al. [30], who found that educational attainment significantly influences career opportunities and professional advancement. Furthermore, there is a moderately positive correlation between occupation and gender, suggesting gender-based differences in occupational distribution in library operations. Akpebu-Adjah and Van-der-Walt [31] noted similar trends, emphasizing the impact of gender on career choices and opportunities in the library sector. Educational background shows a positive correlation with gender, indicating gender differences in educational attainment within the library profession. This finding is corroborated by Griffin [32], who highlighted that women are increasingly achieving higher educational qualifications. Gender exhibits a moderate positive correlation with enhancing diversity in library operations, suggesting that gender may influence diversity initiatives. This aligns with findings by Lygo-Baker et al. [14], who reported that gender diversity often drives broader diversity efforts in organizations.

The ANOVA results suggest that strategy choice significantly impacts the efficacy of sustainable practice implementation in libraries during the Digital Era, rejecting the null hypothesis of no significant difference among libraries' strategies. This finding agrees with Klašnja-Milićević and Ivanović [33], who found that tailored strategies significantly improve sustainable practices in educational institutions. The ANOVA results indicate significant differences in the effectiveness of diversity enhancement strategies across demographic groups. These findings suggest that diversity enhancement strategies' efficacy significantly varies among different demographic groups within library contexts in the Digital Era, rejecting the null hypothesis of no significant difference. This finding agrees with Ali and French [34], who reported that age significantly impacts the success of diversity initiatives, with

older employees more likely to engage in and support these strategies. In contrast, Kunze et al. [22] found less pronounced age-related differences, suggesting that the effectiveness of diversity strategies can be context-specific.

5. Conclusion

The study on building sustainable libraries by embracing diversity and inclusion in the Digital Era highlights the significant influence of demographic factors on the effectiveness of both sustainable practices and diversity enhancement strategies. The findings from the Pearson correlation analysis and ANOVA results reveal that age, occupation, educational background, and gender play crucial roles in shaping the implementation and success of these initiatives. Older individuals, those in higher occupational roles, and those with advanced educational backgrounds are more likely to engage in and support sustainable practices and diversity initiatives. Gender disparities also emerged, with women often more proactive in promoting diversity and sustainability. These demographic influences underscore the importance of tailored strategies that consider the unique characteristics and needs of different demographic groups within library contexts.

The rejection of null hypotheses in both sustainable practice implementation and diversity enhancement strategies suggests that a one-size-fits-all approach is inadequate. Instead, libraries should adopt customized strategies that leverage the strengths and address the challenges specific to their demographic compositions. In conclusion, embracing diversity and inclusion is not just a moral imperative but also a practical necessity for building sustainable libraries in the Digital Era. By recognizing and harnessing the diverse talents and perspectives within their communities, libraries can enhance their sustainability and ensure they remain relevant and resilient in a rapidly evolving digital landscape. Future research should continue to explore the dynamic interplay between demographic factors and strategic initiatives, providing further insights to guide effective policy and practice.

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References

1. Ahammad N, Bahry FDS, Husaini H. Sustainable library services with open-source library automation and digitisation software: A literature review. Business Information Review. 2024; 41(2): 59-68. doi: 10.1177/02663821241245509
2. Okojie V, Igbinovia MO. Global Perspectives on Sustainable Library Practices. IGI Global; 2022.
3. Mathiasson MH, Jochumsen H. The Sustainable Library: A retrospective case study of a public library sharing initiative. Journal of Librarianship and Information Science. 2023. doi: 10.1177/09610006231190131
4. Ndukwe CO, Edelugo SO, Ani IO. Effect of exposure of glass fibre reinforced polyester (GFRP) composite laminates to X-rays. Int. J. Eng. Sci. 2018; 7(9): 31-38.

5. Leong JHT. Patterns and trends of equity, diversity and inclusion programs in academic libraries. The Journal of Academic Librarianship. 2023; 49(4): 102738. doi: 10.1016/j.acalib.2023.102738
6. Walters WH. Assessing Diversity in Academic Library Book Collections: Diversity Audit Principles and Methods. Open Information Science. 2023; 7(1). doi: 10.1515/opis-2022-0148
7. Wilson S, Smithson S, Crosby S, et al. Diversity, equity, and inclusion analysis tools for timely audits: Two case studies of Carlsbad libraries. School of Information Student Research Journal. 2024; 13(2): 20.
8. Fischer J, Fedotova A, Jaki L, et al. Combining CRISPR-Cas-mediated terminal resolution with a novel genetic workflow to achieve high-diversity adenoviral libraries. Molecular Therapy—Methods & Clinical Development. 2024; 32(2): 101241. doi: 10.1016/j.omtm.2024.101241
9. Foy CM. Successful Applications of Diversity, Equity, and Inclusion Programming in Various Professional Settings: Strategies to Increase DEI in Libraries. Journal of Library Administration. 2021; 61(6): 676-685. doi: 10.1080/01930826.2021.1947057
10. Nwosu MC, Igwe KN, Nnadozie CO. Managing generational diversity in the workplace: Implications for the Digital Era university library management. International Journal of Applied Technologies in Library and Information Management. 2016; 2(2): 28-44.
11. Milenia ND, Riady Y, Prasakti AW. Library Promotion Strategy in the Digital Era. LADU: Journal of Languages and Education. 2024; 4(1): 55-64. doi: 10.56724/ladu.v4i1.269
12. Ani OI, Onoh GN, Akpor OJ, Ukpai CA. Design, development and performance evaluation of a mobile rice threshing machine. International Journal of Emerging Trends in Engineering and Development. 2020; 10: 7-17.
13. Yusuf F, Owolabi S, Aregbesola A, et al. Demographics, Socio-Economic and Cognitive Skills as Barriers to Information Seeking in a Digital Library Environment. In: Information Seeking Behavior and Challenges in Digital Libraries. IGI Global; 2016. pp. 179-202.
14. Lygo-Baker S, Kinchin IM, Winstone NE, et al. Engaging Student Voices in Higher Education: Diverse Perspectives and Expectations in Partnership. Springer; 2019.
15. Powers M, Costello L. Reaching Diverse Audiences with Virtual Reference and Instruction: A Practical Guide for Librarians. Rowman & Littlefield; 2019.
16. Chetlen AL, Dell CM, Solberg AO, et al. Another Time, Another Space. Academic Radiology. 2017; 24(3): 273-285. doi: 10.1016/j.acra.2016.08.030
17. Papouli E. Diversity dolls: a creative teaching method for encouraging social work students to develop empathy and understanding for vulnerable populations. Social Work Education. 2018; 38(2): 241-260. doi: 10.1080/02615479.2018.1515904
18. Lewis KR, Shah PP. Black students' narratives of diversity and inclusion initiatives and the campus racial climate: An interest-convergence analysis. Journal of Diversity in Higher Education. 2021; 14(2): 189-202. doi: 10.1037/dhe0000147
19. Ani O, Ani A, Chukwuneke J. Spectrophotometric Data in Human Immunodeficiency Virus (HIV)-Antiretroviral Drug Coated Blood Interactions. Journal of Biosciences and Medicines. 2015; 03(08): 44-52. doi: 10.4236/jbm.2015.38005
20. Spoelstra SL, Schueller M, Sikorskii A. Testing an implementation strategy bundle on adoption and sustainability of evidence to optimize physical function in community-dwelling disabled and older adults in a Medicaid waiver: a multi-site pragmatic hybrid type III protocol. Implementation Science. 2019; 14(1). doi: 10.1186/s13012-019-0907-1
21. Wiernik BM, Dilchert S, Ones DS. Age and Employee Green Behaviors: A Meta-Analysis. Frontiers in Psychology. 2016; 7. doi: 10.3389/fpsyg.2016.00194
22. Kunze F, Boehm S, Bruch H. Organizational Performance Consequences of Age Diversity: Inspecting the Role of Diversity-Friendly HR Policies and Top Managers' Negative Age Stereotypes. Journal of Management Studies. 2013; 50(3): 413-442. doi: 10.1111/joms.12016
23. Ani O, Omenyi S, Achebe C. The Effects of Antiretroviral Drugs on the Absorbance Characteristics of HIV-Infected Blood. Journal of Biomedical Science and Engineering. 2015; 08(09): 571-581. doi: 10.4236/jbise.2015.89053
24. Trelohan M. Do Women Engage in Pro-environmental Behaviours in the Public Sphere Due to Social Expectations? The Effects of Social Norm-Based Persuasive Messages. VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations. 2021; 33(1): 134-148. doi: 10.1007/s11266-020-00303-9
25. Shrestha B, Bajracharya SB, Keitsch MM, et al. Gender differences in household energy decision-making and impacts in energy saving to achieve sustainability: A case of Kathmandu. Sustainable Development. 2020; 28(5): 1049-1062. doi:

10.1002/sd.2055

26. Patton W, McMahon M. Career development and systems theory: Connecting theory and practice. In: Career Development and Systems Theory. Brill; 2021.
27. Tavitiyaman P, Weerakit N, Ryan B. Leadership Competencies for Hotel General Managers: The Differences in Age, Education, and Hotel Characteristics. International Journal of Hospitality & Tourism Administration. 2014; 15(2): 191-216. doi: 10.1080/15256480.2014.901069
28. Zacher H, Jimmieson NL, Bordia P. Time pressure and coworker support mediate the curvilinear relationship between age and occupational well-being. Journal of Occupational Health Psychology. 2014; 19(4): 462-475. doi: 10.1037/a0036995
29. Rudolph CW, Rauvola RS, Costanza DP, et al. Generations and Generational Differences: Debunking Myths in Organizational Science and Practice and Paving New Paths Forward. Journal of Business and Psychology. 2020; 36(6): 945-967. doi: 10.1007/s10869-020-09715-2
30. Langowitz NS, Elaine Allen I, Godwyn M. Early-career outcomes and gender: can educational interventions make a difference? Gender in Management: An International Journal. 2013; 28(2): 111-134. doi: 10.1108/17542411311303248
31. Akpebu Adjah O, Van der Walt T. Career progression of female librarians in public university libraries in Ghana. Journal of Librarianship and Information Science. 2017; 51(2): 331-345. doi: 10.1177/0961000617742445
32. Griffin KA. Institutional barriers, strategies, and benefits to increasing the representation of women and men of color in the professoriate: Looking beyond the pipeline. In: Higher Education: Handbook of Theory and Research. Springer; 2019. pp. 1-73.
33. Klašnja-Milićević A, Ivanović M. E-learning Personalization Systems and Sustainable Education. Sustainability. 2021; 13(12): 6713. doi: 10.3390/su13126713
34. Ali M, French E. Age diversity management and organisational outcomes: The role of diversity perspectives. Human Resource Management Journal. 2019; 29(2): 287-307. doi: 10.1111/1748-8583.12225