

# Design of a Personalized Learning Management System: Enhancing Student Learning Preferences

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Abstract: The rapid expansion of high-speed network connectivity has brought about a significant transformation in multimedia experiences, prompting an increasing demand for e-learning as a complementary component to traditional classroom education. This thesis introduces a novel clustering method specifically tailored for user-centric functionality within LMS, leveraging the advancements in high-speed network connectivity. The proposed methodology employs a simulation-based approach to investigate its effectiveness. To ensure a focused research direction, a set of hypotheses is formulated based on the research objectives, guiding the investigation process. The study adopts the Simple K-Means algorithm as the fundamental clustering technique, while systematically configuring various parameters to drive the experimental process. Moreover, the thesis presents a postulated data preprocessing mechanism designed to cleanse and refine the data, ensuring access to high-quality datasets. Additionally, a modified user-centric framework is proposed to facilitate the implementation and serve as a comprehensive guide for future researchers. The research findings demonstrate the efficacy of the data preprocessing mechanism in accessing the appropriate datasets and highlight the potential of the modified user-centric framework for implementation in real-world LMS environments. Furthermore, the utilization of K-means clustering within learning management systems enables the effective grouping of learners with similar learning preferences, thereby resulting in improved learning outcomes. For future investigations, it is recommended to explore the integration of multiple clustering techniques to further enhance the clustering performance within LMS. Additionally, obtaining a dataset from the immediate environment of the study can provide valuable insights and strengthen the generalizability of the findings.

**Keywords:** e-learning, Learning Management Systems (LMS), clustering method, user-centric functionality, simulation methodology, data preprocessing mechanism, Simple K-Means algorithm, learning preferences, improved learning outcomes.

# INTRODUCTION

In the fast-paced twenty-first century, individuals strive to accomplish a significant amount of work efficiently. This trend is particularly evident in the manufacturing industry, where new and enhanced automobiles and mobile phones are introduced frequently, rendering previous models quickly outdated. Similarly, the education sector is also affected by this rapid progress, as it constantly seeks to adapt and provide diverse learning methods that cater to the unique needs of different student groups within the education system. (Abbad, 2021). Since the late 1990s, the rapid advancement of technology has significantly transformed the

methods of teaching and learning in educational institutions (Pishva et al., 2020). E-learning, which relies on technology, refers to the utilization of the internet and other essential technological tools to create educational materials, instruct learners, and administer courses within an organization (Andersson et al., 2020).

The Internet has emerged as a crucial avenue for accessing research and learning resources, enabling both teachers and students to share and acquire information effectively (Al-adwan, 2020). In the field of education, e-learning platforms, also referred to as Learning Management Systems (LMSs), are web-based software that facilitate instructors in managing various aspects of their courses, such as distributing materials, assigning tasks, and facilitating communication (Bradley, 2021). According to Stodel (2020), the key factors that contribute to the immense potential of e-learning as an educational technology are service, cost, quality, and speed. Evidently, e-learning enables higher education students to pursue their education while simultaneously pursuing personal goals and maintaining their careers, without the need for adherence to strict schedules and This empowerment allows them to acquire education on their own terms.

In present times, Learning Management Systems (LMSs) have become a crucial element within the educational systems of the majority of universities. Furthermore, there is growing interest in adopting hybrid approaches that combine both in-person and online activities (Pishva, 2020). The concept of LMS originates from Integrated Learning System (ILS), which encompasses features that go beyond instructional content, including management and tracking capabilities, personalized instruction, and seamless integration throughout the system (Vaughan, 2020). Jostens Learning coined the term Integrated Learning System (ILS), while the initial use of Learning Management System (LMS) referred specifically to the management component of the PLATO K-12 learning system. Originally, LMS was independent of courseware and devoid of specific content (Eke et al., 2020). However, LMS has evolved into a broad term encompassing a variety of systems that organize and facilitate access to online learning services for students, teachers, and administrators. These services typically include functions such as access control, provision of learning materials, communication tools, and the organization of user groups (Aldiab et al., 2019).

A learning management system (LMS) is a comprehensive collection of interactive web-based eservices embedded within a software application. Its purpose is to facilitate the administration, documentation, tracking, reporting, and delivery of e-learning courses (Petrov, 2020). Essentially, LMSs serve as tools for the process of teaching and learning, enabling the acquisition of new knowledge and skills. Clustering, on the other hand, is a machine learning technique that involves grouping data points together based on their similarities. In the realm of education, clustering is employed to categorize learners based on factors such as their learning behavior, performance, or preferences.

One of the primary impacts of clustering in a Learning Management System (LMS) is its positive influence on learner performance. By categorizing learners based on their similarities, the LMS can generate customized learning paths that address their individual needs, thereby enhancing learning outcomes. This effect was observed in a study conducted by Paredes-Valverde et al. (2018). It is important to note that an LMS is not designed to replace traditional classroom settings but rather serves as a supplementary tool by providing course content accessible both on-campus and online (Landry et al., 2021). While the potential benefits of incorporating an LMS alongside traditional lectures have been acknowledged and explored, there is still limited understanding regarding the reactions of students and teachers when utilizing an LMS in addition to traditional classroom instruction.

LMS data is characterized as complex and voluminous, containing numerous features. Extracting relevant data features for decision-making by administrators and students is not a straightforward task. Therefore, clustering such intricate data is necessary to provide users with personalized recommendations and preferences (Ramadan et al., 2020). However, it is crucial to acknowledge that clustering techniques can inadvertently create stereotypical assumptions about learners, potentially resulting in discrimination or bias.

For instance, if a clustering algorithm categorizes learners based on their gender, it may generate biased assumptions regarding each group's learning preferences, leading to unequal treatment or opportunities (Torres-Trevizo et al., 2021). Several proposals have been put forth regarding learning management systems. However, existing frameworks that integrate search, clustering, and classification primarily focus on intrusion detection (Bamakan et al., 2016). These frameworks will be adjusted and applied to this study.

This paper would be guided by the following specific objectives:

- i. To propose a preprocessing mechanism for cleaning data for the proposed system.
- ii. To conduct an analysis on the user centric functionality of learning Management system.
- iii. To propose a modified user centric framework for learning management system.
- iv. To evaluate the proposed system based on the existing benchmark for clustering.

# LITERATURE REVIEW

# Theoretical Framework

# **Octagonal Model of E-Learning**

When it comes to characterizing learning activities that make use of tasks, resources, and supports, the Octagonal Model of e-Learning Design Model gives an intriguing viewpoint. These formal descriptions "would provide the means to more easily guide the instructional design process and will also provide some means for institutions to provide supports and structures for teachers who wish to employ them," claim Khan et al. in Khan et al., (2021). Based on this, it could be said that the characteristics of this model are firmly rooted in the learning science perspective. It was used to explore strategies for formalizing the nature and scope of various learning designs using ICTs.

A thorough examination of all the factors and stakeholders must be taken into account from a system viewpoint point of view. This model is based on the octagonal structure for the e-learning system, which according to Khan (2021) also is grouped in the three major domains including its factors, in addition to offering comprehensive view on the relevant factors in the e-learning systems that can be used as measuring variables for e-learning effects and implementation.



# Figure 2.2: Octagonal model of e-learning (Khan, 2021).

As can be seen, this model depicts 8 aspects that must to be taken into account while developing an e-learning system. This paradigm for e-learning design is seen to be particularly suited because these elements cover all area of e-learning. It is crucial to list every element that might affect how effective e-learning is. These elements are divided into three primary categories: managerial, technical, and educational. Additionally, each of the elements can be broken down into a number of difficulties that must be resolved. The pedagogical, ethical, and assessment aspects of education make up the educational realm. Technology and interface design aspects make up the technical domain. Additionally, institutional, resource-supporting, and managerial components make up the organizational domain.

# Conceptualization

# Learning

Learning refers to the process of acquiring new knowledge, modifying or strengthening existing knowledge, developing new behaviors and skills, adopting new values, or forming preferences. This process can involve the synthesis of various types of information (Fares et al., 2011). Human learning can take place within the context of education, personal growth, formal schooling, or training. It is often directed towards achieving specific goals and can be facilitated by motivation (Andersson et al., 2020). As described by Johnson and Johnson (2021), learning refers to the process of gaining new comprehension, knowledge, behaviors, skills, values, attitudes, and preferences. This capacity to learn is observed in humans, animals, and even some machines, with evidence suggesting that certain plants also exhibit some form of learning. Based on the given definition, it can be inferred that learning involves acquiring knowledge or skills through study, experience, or instruction. The study of how learning takes place falls within the domains of educational psychology, neuropsychology, learning theory, and pedagogy.

# **E-Learning**

E-learning refers to the process of education that takes place over the Internet, a network, or on a standalone computer. It encompasses various applications and methods, such as web-based learning, computer-based learning, virtual classrooms, and digital collaboration (Kozma, 2020). E-learning involves the delivery of content through different mediums, including the Internet, intranet/extranet, audio or video tapes, satellite TV, and CD-ROM. Initially referred to as "Internet-Based Training" and later as "Web-Based Training," these terms are still used today, along with various other variations of E-learning (Kumar, 2020).

E-learning goes beyond mere training and instruction, as it also focuses on personalized learning experiences for individuals. Pishva *et al.* (2020) identified six key objectives in e-learning programs. These include building confidence and skills among practitioners, providing learners with access and choice, utilizing flexible and customizable systems and tools, establishing cost-effective technical infrastructures, implementing responsive e-learning policies and processes, and using e-learning to expand participation and offer flexible opportunities that support work-based learning within institutions.

# Learning Management System

A learning management system (LMS), alternatively referred to as a course management system (CMS) or virtual learning environment (VLE), is a web-based software that facilitates the delivery, tracking, and administration of education and training. It encompasses functionalities for distributing courses online and fostering collaboration through the Internet (Johnson and Johnson, 2021). In the present era, learning management systems (LMSs) have become highly essential in the field of education (Kartha et al., 2021). Whether it is distance education or traditional classroom-based learning, LMSs are now widely adopted by universities to enhance the learning and teaching experience (Eke et al., 2021). For instance, as of 2005, around 95% of higher education institutions in the UK were utilizing course management systems. However, due to cost concerns, there is a growing trend of organizations transitioning to open source LMSs (Gulbahar et al., 2020).

As stated by Johnson and Johnson (2021), the benefits for trainers and organizations in utilizing e-learning include cost reduction, achieved through the elimination of expenses associated with instructor salaries, meeting room rentals, and student travel, lodging, and meals. Moreover, employees can save time by participating in e-learning without needing to be away from their job for extended periods. Another advantage is the ability to ensure consistent content delivery through asynchronous, self-paced e-learning. Expert knowledge is made accessible to all students, who can access it at any time. Additionally, proof of completion and certification, crucial aspects of training initiatives, can be automated in the e-learning environment.

## **Personalized Learning Experiences**

Clustering is a technique that involves grouping data points together based on their similarities. In the context of Learning Management Systems (LMS), clustering can be utilized to group learners based on various factors such as their learning activities, interests, or preferences. By organizing

learners into clusters, LMS can provide personalized learning experiences that cater to the specific needs of each cluster. For example, if a cluster of learners shares a common interest in a particular topic, the LMS can recommend relevant courses, activities, and assessments to them.

The impact of clustering on personalized learning experiences within LMS has been investigated in several studies. Wang et al. (2020) proposed a clustering-based framework that delivers personalized and targeted learning recommendations to learners based on their assigned clusters. This approach enables the provision of learning experiences that are specifically tailored to meet the individual needs and preferences of learners. Similarly, Adel et al. (2021) conducted a study that demonstrated how clustering can identify at-risk learners by analyzing their performance patterns. This early identification allows for timely intervention and the provision of personalized support to help these learners succeed.



METHODOLOGY

# Framework

Figure 3.1: Existing framework by (Bamakan et al. 2021)



## Figure 1: Proposed framework adapted from (Bamakan et al. 2021)

## The Modified Framework

There exist numerous proposal on e-learning However, existing frameworks incorporating search, clustering and classification mainly target intrusion detection (Bamakan et al. 2021), which was used in an intrusion detection framework based on MCLP/SVM, in which he propose an effective intrusion detection framework by using a new adaptive, robust, precise optimization method, namely, time- varying chaos particle swarm optimization (TVCPSO) to simultaneously do parameter setting and feature selection for multiple criteria linear programming (MCLP) and support vector machine (SVM).

The application of intelligent methods allows systems to incorporate personalization features and tailor them to meet individual student requirements. By considering each user's preferences, multiple versions of teaching paths and materials can be created. To streamline the recommendations without losing personalization, learners can be divided into groups based on similar preferences. In the proposed architecture, the teaching path and layout are adjusted for groups of students with similar preferences using clustering techniques.

Learner models are based on dominant learning style dimensions, which reflect students' focus on different types of information and their performance in the educational process. By clustering students based on their learning styles and preferences, appropriate teaching paths can be assigned

to groups of students with similar preferences. The proposed system allows for the adjustment of learning paths and layouts according to individual student preferences, considering their dominant learning styles and usability requirements.

During the pre-processing phase, a database of learning styles and usability preferences is created for a sample group of students. Using unsupervised classification, students are divided into groups with distinct preferences. Teaching materials and information content can be adjusted to cater to the needs of each group, enabling the creation of different learning paths. When a new student joins, their learning style and usability choices are recorded, and they are assigned to the appropriate group, receiving personalized learning materials and content.

This personalized approach allows for the creation of individual learning paths and modifications to teaching materials and their presentation methods for student groups with different preferences. However, the personal content remains static for each student during a course, although it may change when starting a new one.

# **Experiment Setup**

The research choose simulation experiment to test the various ideas proposed. The experiment will comprise of clustering the LMS web log dataset in to clusters, to enable grouping of student into similar learning preferences. A simple K-means algorithm was considered, a web log data from Moodle was used. A total 150 and 100 dataset items are available in the dataset covering differing aspect of user weblog on Moodle learning management system (Stavros, 2021)., and the implementation part will involve encoding the dataset into a WEKA simulation software to conduct the experiment. The Sum of the error will be used to perform the similarity ratio of the experiment to determine the similarity index within the cluster.

The experiment will use a publicly available dataset of Moodle weblogs, consisting of 150 and 100 dataset items that cover various aspects of user weblogs on the Moodle learning management system. For the k-means algorithm, the number of clusters and clustering validity will be determined using the Pham (2021) table for select K-value in a dataset.

## K-means algorithm for learning management systems (KM)

The algorithm tries to minimize the variance functions within each cluster and maximizing variance between clusters. Initially, in order to normalize the dataset records, we calculate the variance and the mean values for each record. This would represent the x value (mean) and y value (variance) for each dataset record, respectively. Based on this generated data, K-means algorithm is used for clustering such data. By default, k-means will minimize the variance and the mean values within each cluster.

The algorithm steps could be summarized as follows:

- i. Step 1: The dataset D is divided into a number of sets S. S may depend on the number of distributed machines or number of threads to be used.
- ii. Step 2: x value (mean) and y value (variance) are computed for each dataset record.

- iii. Step 3: K-means clustering is applied to each set  $s \in S$ . K is selected either heuristically or based on the number of records in each set.
- iv. Step 4: At the global optimizers, Pareto optimality is applied to the clusters' centroids and non-dominated centroids.
- v. Step 5: for non-dominated clusters, the distance between a point x and the cluster center is computed as well as the Silhouette scores between x and the nearest cluster center. Then, the K-means algorithm is used to re-cluster those points.
- vi. Step 6: A window W is used to extract the most effective clusters based on the required points, e.g. LMS questions. Pareto optimality could be applied once more for better results.

# **RESULT PRESENTATION AND DISCUSSION**

## **Experiment Setup**

#### Summary of Parameters encoded on WEKA

The table 5 & 6, below shows the summary of the dataset encoded on weka simulation software, the relation name refer to the name of the file, the dataset has 150 and 100 instance, the dataset also have 6 attribute, the sum of the weight of the entire dataset is 150 & 100, while the simple Kmean with K=6 and K=1 value was used as the clustering method.

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Table 4.1: Summary of 150 dataset parameter encoded on weka					
Item	Value				
Relation	Lms				
Instance	150				
Attribute	6				
Sum of the weight	150				
Missing	None				
Clusterer	Simple Kmeans, K=6 and K=1				

Value
Lms
100
6
150
None
Simple Kmeans, K=6 and K=1

Source weka (2021)

# Summary of statistical result on the Dataset.

From the statistical result shown on the table 7 below, the minimum and maximum value of the dataset set is 1 and 150, the mean of the dataset is 43.445 and the standard deviation for the dataset is 17.698 of the dataset while the cluster sum of the squared errors is 17.697.

 Table 4.3: Summary of the statistical result from the dataset

Statistic	Value
Minimum	1
Maximum	150
Mean	75.5
Standard Deviation	43.445
Cluster sum of squared errors	17.697
Time taken to build Model full Training	0.08 seconds
data	
Num cluster	6

Source weka (2021)



Figure 2. Cluster instances

From the Chart 1 above, the cluster 0 have 17 clustered data representing 11%, cluster 1 have 22 clustered data representing 15%, cluster 2 have 33 clustered data representing 22%, cluster 3 have 20 clustered data representing 13%, cluster 4 have 32 clustered data representing 21% while cluster 5 have 26 clustered data representing 17% of the dataset respectively with sum of the square error of 17.697 as the distance between the clusters.

# Summary of the statistical result from the dataset

The table 8 below shows the summary of statistical result from the 150 weighted dataset with the minimum and maximum value of 1 and 150, mean of 75.5, standard deviation of 43.445, cluster sum of squared error of 49.09 while the number of cluster was 1.

Statistic	Value
Minimum	1
Maximum	150
Mean	75.5
Standard Deviation	43.445
Cluster sum of squared errors	49.09
Time taken to build Model full Training	0.01 seconds
data	
Num cluster	1
Source weka (2021)	

 Table 4.4: Summary of the statistical result from the 150 weighted dataset

# Summary of statistical result on the Dataset for the 100 Instance.

From the statistical result shown on the table 5 below, the minimum and maximum value of the dataset set is 1 and 100, the mean of the dataset is 50.5 and the standard deviation for the dataset is 29.011 of the dataset while the cluster sum of the squared errors is 14.028.

# Table 4.5: Summary of the statistical result from the dataset

Statistic	Value
Minimum	1
Maximum	100
Mean	50.5
Standard Deviation	29.011
Cluster sum of squared errors	14.028
Time taken to build Model full Training	0.01 seconds
data	
Num cluster	6



Source weka (2021)

Figure 3: Showing the 100 Clustered instances

From the Chart 1 above, the cluster 0 have 18 clustered data representing 18%, cluster 1 have 19 clustered data representing 19%, cluster 2 have 11 clustered data representing 11%, cluster 3 have 13 clustered data representing 13%, cluster 4 have 18 clustered data representing 18% while cluster 5 have 21 clustered data representing 21% of the dataset respectively.

# Summary of statistical result on the Dataset for the 100 Instance.

From the statistical result shown on the table 5 below, the minimum and maximum value of the dataset set is 1 and 100, the mean of the dataset is 50.5 and the standard deviation for the dataset is 29.011 of the dataset while the cluster sum of the squared errors is 39.934.

#### Table 4.6: Summary of the statistical result from the dataset

Statistic	Value
Minimum	1
Maximum	100
Mean	50.5
Standard Deviation	29.011
Cluster sum of squared errors	39.934
Time taken to build Model full Training	0.00 seconds
data	
Num cluster	1

Source weka (2021)

# Similarity index between Non-Clustered and Clustered instances



Figure 4: Similarity index between Non-Clustered and Clustered instances

From the experiment, the chart above combined the Two (2) various dataset of different weight to observe the similarity index of each of the dataset on the 150 dataset was classified into two namely

the clustered and the none-clustered, the clustered dataset has 6 clusters having 17.679 similarity index while the non-clustered instance have 49.09 similarity index within the instance of it cluster. The 100 weighted dataset experiment was classified into two part with are the clustered and the non-clustered the clustered dataset. The clustered was dataset has 6 clustered and 14.028 as the similarity index within the cluster compared to the non-clustered which has a high 39.934 similarity index within it instances. The cart above provide wide indication on the 2 dataset and the similarity index and was observed that the clustered instances has a low similarity index compared to the non-clustered instance will be used in delivering the right learning content to users with similar learning preferences.

# **Cluster Visualization**

The students were organized into clusters using the simple K-means Clustering method, which reveals the relationships between the students. The clusters were visualized, with vectors representing the connections between students. To be connected, students needed to have similar characteristics in terms of site visits. The clusters were created based on the attributes and classes of the students, as encoded in the initial stage. The colors used in the visualization indicate the variations among the clusters. The Figures below show the visualization of the results using the variables X (interest) and Y (interest). The blue, red, and green points represent different classes and clusters. The metrics used in the analysis contain valuable information about the courses and can differentiate them into distinct groups.



Figure 5: Clustering: Visualized simulated data based on the 6 clusters with 50% Jitter

00 149 2 Ъ 74.5 × 0 0 74.5 149

Figure 6: Visualization based on Non-clustered instance with 50% jitter.



Figure 7. Visualization based on the Non-Clustered instance with 0% Jitter **Discussion of Findings** 

In this study, the researchers aimed to group students with similar learning preferences using Moodle log data. They employed the Simple K-means algorithm in WEKA to partition the dataset into distinct clusters. Two datasets were used: one with 150 weighted instances and another with 100 weighted instances.

For the 150-instance dataset, the experiment was conducted in two phases: clustered and nonclustered. The clustered dataset had a sum of weights of 150, a mean of 75.5, and a standard deviation of 43.45. By applying K-means with a value of 6, 6 clusters were formed. The distribution of instances within each cluster varied, with cluster sizes ranging from 11% to 22%. The sum of square error for the clustered dataset was 17.697, indicating similarity within the clusters. In contrast, the non-clustered dataset exhibited a higher sum of square error of 49.09, suggesting dissimilarity.

In the second experiment with the 100-weight dataset, K-means was again employed with K=6. The dataset had a mean of 50.5 and a standard deviation of 29.011. The resulting clusters had varying sizes, ranging from 11% to 21%. The low similarity index within the clusters was 14.028, and the non-clustered dataset had a higher sum of square error (39.934), indicating dissimilarity.

The researchers visually represented the dissimilarity within the clustered and non-clustered datasets in Figure 4.3. The figure showed that the non-clustered dataset had a higher sum of square error, while the clustered dataset exhibited a lower sum of square error, indicating similarity within the clusters. The visualization of the results using interest as the X and Y axes demonstrated that the metrics used contain valuable information about the students, allowing for differentiation into distinct groups.

This research provides evidence that clustering can effectively group students based on their learning preferences, reducing dissimilarity within the clusters. The study emphasizes the significance of metrics in distinguishing students and highlights the importance of visualizations in analyzing the results.

# **Result Validation**

In this research, K-means clustering was employed to identify similar learner preferences among students (Wang et al., 2020). The experiment consisted of two phases with two datasets and was classified into four phases, each containing two subphases. The validation of the results was based on the objectives, as outlined by the researchers.

The existing learning management system (LMS) was analyzed through a literature review. Wang et al. (2020) emphasized the need for a user-centric approach in LMS that utilizes clustering techniques to group learners based on their characteristics and preferences. As the number of online learners in LMS increases, it becomes challenging to provide personalized learning experiences that cater to their diverse needs. Thus, there is a demand for an effective user-centric approach that utilizes clustering techniques to group learners based on their characteristics, preferences, and behavior, in order to provide personalized and targeted learning experiences.

LMS data is considered complex and voluminous, making it challenging to extract meaningful features for decision-making (Ramadan et al., 2020). Therefore, clustering is required to group

such complex data and provide users with preferences. However, it is important to be cautious about the potential creation of stereotypical assumptions or biases through clustering techniques, as they can lead to discrimination or unequal treatment (Torres-Trevizo et al., 2021).

The proposed modified framework, based on the work of Bamakan et al. (2019), focused on clustering to enhance learning preferences by dividing learners into groups with similar preferences. Preprocessing of web log data involved filtering and computation of values using established metrics. The index value computation for the UniquePCSession and enrichment metrics were adapted from the framework proposed by Kazanidis et al. (2021), while the disappointment and interest metrics were introduced by Binali et al. (2021) and Valsamidis et al. (2010a) respectively.

Although the K-means algorithm is popular for data clustering, it requires the specification of the number of clusters (K) before application. The selection of the number of clusters and the assessment of cluster validity for the K-means algorithm were done using the table provided by Pham (2021) indicating the number of clusters used in different studies. Milos et al. (2022) applied K-means clustering with K=6 to group students based on their cognitive learning style, demonstrating positive results in improving cognitive learning experience. Similarly, Mohammed (2019) employed a simple K-means clustering algorithm with K=4 to improve graduate student performance, indicating positive results with a low sum of square error.

Several studies have demonstrated the effectiveness of K-means clustering in grouping learners based on similar learning preferences. Dake and Gyimah (2019) used K-means clustering to determine learners' typologies for project-based learning, while Herlina et al. (2021) implemented K-means clustering to classify student learning activities in an e-learning model. Both studies highlighted the success of K-means clustering in grouping students with similar learning preferences. The performance of the proposed method was evaluated by examining the quality of obtained clusters, considering student learning styles. The number of instances with different preferences assigned to the same clusters and the sum of square error were used as measures of quality, similarity index, and distance from different points to the clusters.

## **CONCLUSION AND RECOMMENDATIONS**

The aim of this study was to address the problem of the user centric functionality in learning management system, objectives where proposed to address the problem by clustering students with the aim of grouping students exhibiting similar learning preferences. A framework was adapted with main focus on the database layer with specific interest in clustering students into individual learning preferences with the teaching materials as well as the information content adjusted to the needs of every group with different learning path also created through this means. A number of proposal existed on learning management system however, a framework was adapted with main focus on clustering students into individual learning preferences enabling teaching materials as well as information content to be adjusted to the needs of every group with similar learning style. A preprocessing mechanism was proposed to enable cleaning of that obtained from the weblog that contains noise such as missing values as well as the value computation metrics.

The preprocessing mechanism filter the data and the value computation metrics was used on the filtered data to provide a valid results. The evaluation of the result was done based on exiting bench mark for clustering, the Sum of the square error was used to measure the performance of the clusters and similarity index within the clusters, which measure the distance from each point of the cluster to the centroids. The sum of square error has also been used by authors in there clustering validity. While existing research has failed to address the issue of user centric functionality with core focus on providing learning preference and user weblog on their LMS design, this research has filled the gap by integrating user activity log to the learning management system.

The study recommended that similar experiment can be conducted using a dataset from the immediate environment of the study. Dataset from public Moodle LMS are traditionally unclean and should be subject to appropriate cleaning and value computation matric during the data preprocessing stage as I have proposed. A combination of multiply clustering algorithm such as X-means and Density based clustering can be employed to archive better result.

# References

- Abbad, M. M. (2021). Using the UTAUT model to understand students' usage of e-learning systems in developing countries. *Education and Information Technologies*, 26(6), 7205-7224.
- Adel, A., & Dayan, J. (2021). Towards an intelligent blended system of learning activities model for New Zealand institutions: an investigative approach. *Humanities and Social Sciences Communications*, 8(1), 1-14.
- Al-Adwan, A. S. (2020). Investigating the drivers and barriers to MOOCs adoption: The perspective of TAM. *Education and information technologies*, 25(6), 5771-5795.
- Bamakan, S. M. H., Faregh, N., & ZareRavasan, A. (2021). Di-ANFIS: an integrated blockchain– IoT–big data-enabled framework for evaluating service supply chain performance. *Journal* of Computational Design and Engineering, 8(2), 676-690.
- Bamakan, S. M. H., Faregh, N., & ZareRavasan, A. (2021). Di-ANFIS: an integrated blockchain– IoT–big data-enabled framework for evaluating service supply chain performance. *Journal* of Computational Design and Engineering, 8(2), 676-690.
- Bamakan, S. M. H., Nurgaliev, I., & Qu, Q. (2019). Opinion leader detection: A methodological review. *Expert Systems with Applications*, *115*, 200-222.
- Bamakan, S. M. H., Nurgaliev, I., & Qu, Q. (2019). Opinion leader detection: A methodological review. *Expert Systems with Applications*, 115, 200-222.
- Binali, T., Tsai, C. C., & Chang, H. Y. (2021). University students' profiles of online learning and their relation to online metacognitive regulation and internet-specific epistemic justification. *Computers & Education*, 175, 104315.
- Bradley, V. M. (2021). Learning Management System (LMS) use with online instruction. *International Journal of Technology in Education*, 4(1), 68-92.
- Dake, D. K., & Gyimah, E. (2019). Using K-Means to determine learner typologies for projectbased learning: A case study of the University of Education, Winneba. *International Journal of Computer Applications*, 178(43), 29-34.

- Eke, H., Petrovski, A., & Ahriz, H. (2020). Handling minority class problem in threats detection based on heterogeneous ensemble learning approach. *International Journal of Systems and Software Security and Protection (IJSSSP)*, 11(2), 13-37.
- Fares, J., Chung, K. S. K., & Abbasi, A. (2021). Stakeholder theory and management: Understanding longitudinal collaboration networks. *Plos one*, *16*(10), e0255658.
- Gulbahar, Y. (2020). Integrating computational thinking into social studies. *The Social Studies*, 111(5), 234-248.
- Johnson, D. W., & Johnson, R. T. (2021). Learning together and alone: the history of our involvement in cooperative learning. In *Pioneering perspectives in cooperative learning* (pp. 44-62). Routledge.
- Kazanidis, I., Pellas, N., & Christopoulos, A. (2021). A learning analytics conceptual framework for augmented reality-supported educational case studies. *Multimodal Technologies and Interaction*, 5(3), 9.
- Khan, A., & Ghosh, S. K. (2021). Student performance analysis and prediction in classroom learning: A review of educational data mining studies. *Education and information technologies*, *26*, 205-240.
- Kozma, R. B. (2020). Use of multiple representations by experts and novices. *Handbook of learning from multiple representations and perspectives*, 33-47.
- Kumar, S. (2020). Impact of e-learning technologies in higher education. *Journal of Ideal Review*, 21(2), 12-18.
- Landry, C. A., Richard, J. M., & Layou, K. M. (2022). Turning the page: The importance of faculty-led book clubs. *New Directions for Community Colleges*, 2022(199), 163-172.
- Landry, S. H., Zucker, T. A., Montroy, J. J., Hsu, H. Y., Assel, M. A., Varghese, C., ... & Feil, E. G. (2021). Replication of combined school readiness interventions for teachers and parents of head start pre-kindergarteners using remote delivery. *Early Childhood Research Quarterly*, 56, 149-166.
- Pham, T. D. (2021). From raw pixels to recurrence image for deep learning of benign and malignant Mediastinal Lymph Nodes on Computed Tomography. *IEEE Access*, *9*, 96267-96278.
- Pishva, S., Mohammadian, M., Ghiasy, P., & Beiraghipanah, E. (2020). Evaluation of the Realization of the Management and Leadership Axis in the National Accreditation Standards Program in Shiraz Hospitals, Iran, 2017. *Health Management & Information Science*, 7(3), 142-148.
- Ramadan, S. Z. (2020). Methods used in computer-aided diagnosis for breast cancer detection using mammograms: a review. *Journal of healthcare engineering*, 2020.
- Ramadan, S. Z. (2020). Methods used in computer-aided diagnosis for breast cancer detection using mammograms: a review. *Journal of healthcare engineering*, 2020.
- Stavros, E. N. (2021). Wicked Problems Need WKID Innovation: Innovation as a Process to Develop a Disruptive Technology Product This article describes WKID Innovation, a framework to tackle wicked problems and a process for strategic, systematic change management. *Research-Technology Management*, 65(1), 39-47.
- Stodel, C. (2020). Methods of targets' characterization. In *EPJ Web of Conferences* (Vol. 229, p. 02001). EDP Sciences.



# Work-Life Balance and Organizational Sustainability of Female Staff in Deposit Money Banks in Anambra State

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**Abstract:** The study looked at how women working in Anambra states deposit money banks' organizational sustainability in relation to work-life balance. The study looked at how the work atmosphere, employee assistance, flexible scheduling, and leave policies affected the performance of female employees. Review of pertinent theoretical and empirical literatures. The study's foundation was Border Theory. Data were gathered for the study from both primary and secondary sources. The study's sample included 953 women from selected deposit money institutions. 92% of the 873 copies of the questionnaires that were properly completed and submitted were returned. Utilizing ANOVA, hypotheses were evaluated. According to the data, the leave policy has a considerable positive impact on the organizational sustainability of female employees at deposit money institutions in the state of Anambra. Flexible scheduling significantly improves the organizational sustainability of female employees at deposit money banks. According on the findings, the study made this recommendation. It is advisable to promote a dynamic and consistent leave policy because studies show that it lowers employee churn. Compressed work weeks and other forms of flexible scheduling are essential for more effective and efficient service delivery. Organization management should sit down with the employee to discuss how and when to get the best service possible from them in order to improve service delivery.

Keywords: Leave policy, flexible scheduling, employee assistance, organizational sustainability.

# INTRODUCTION

Work-life balance is currently a topic that worries both employers and employees in the majority of firms more and more. Recently, there has been a rise in discussion on the importance of employment in both employees' and families' lives. Thus, the scenario has sparked much research on people's work-life balance in the workplace, particularly in today's global business climate where the lines between work roles and personal roles are blurred.Due to technological improvements, a high level of competitiveness, and the need to provide exceptional customer service, work is no longer only done in offices. As a result, the impact of work on an employee's personal life is typically very significant (Uzoechi & Babatunde, 2019).

As a result, most people find it difficult to achieve work-life balance in this period of rapid globalization and competition as well as to strike a balance between their professional and personal lives (Sivatte, Gordon, Rojo, & Olmos, 2017). In the Nigerian context, demographic changes, an increase in the number of women in the workforce, dual career couples, an increase in the number

of single parents, and employees' growing reluctance to accept a culture of long hours at work are all contributing to the burden of work roles on employee family roles (Ogechi & Nwaeke, 2019).

Work-family imbalance occurs from Nigerian employees having to prioritize between work and non-work responsibilities. Employee performance is affected by factors such as higher stress levels, rising drug addiction rates, decreasing productivity, rising absenteeism and turnover rates, lower job satisfaction, etc. 2018 (Mmakwe & Ojiabo). Instead of the aforementioned, this paper investigates the connection between female employee performance at the Anambra State deposit money bank and work-life balance.

Work-life balance is a significant topic that worries many people in the public and commercial sectors. It extends beyond setting aside time for one's family and self. Additionally, it has an impact on a person's social, psychological, economic, and emotional health. All of these are mirrored in an individual's output, which over time has an impact on how well they do at work. Work-life balance affects employees' attitudes, behaviors, and wellbeing as well as the effectiveness of the organization.

The banking industry in Nigeria is renowned for its lengthy work hours and heavy staff workload, according to Epie (2017). First Bank of Nigeria Plc, Zenith Bank Plc, and United Bank for Africa Plc are not free from this culture. Due to the nature of the workplace, they are most prone to struggle with the problem of work-life balance. Although there exist policies on work-life balance, there are problems with their execution that need to be investigated.

The management of these banks' capacity to uphold work-life balance-promoting policies may help to ensure efficient customer service delivery. Commercial banks now need to have a capital base of at least 25 billion naira to continue operating as a result of the banking sector reform. Commercial banks were forced to form strategic alliances with other banks through mergers and acquisitions.

The employees' attempt to satisfy the banks' objectives will most certainly result in a misallocation of priority of interests, which could have an impact on their personal lives. Therefore, it is essential to analyze work-life balance and employee performance. For workers of commercial banks, the dual demands of work and family commitments have become more relevant in recent years.

Over the past few decades, the strain at work has increased for those who are employed. Advances in information technology, the volume of information, the requirement for quick responses, the value placed on providing excellent customer service and the necessity for ongoing availability, as well as the rate of change, all demand our time and can put us under strain.

Today in Nigeria, Employees are juggling greater duties outside of work as a result of the breakdown of the traditional family, the rise in dual-career couples, and the number of single parents. Due to its significance, work-life balance has begun to worry businesses and households. It has an impact on a variety of industries as well as employees, which in turn has an impact on businesses.

Through mixed findings, authors like Azeem and Akhtar (2014) explored the influence of work-life balance and job satisfaction on organization commitment of health care employees. Several academics have conducted research on creative management and sustainable growth. Work-life balance, job happiness, and organizational dedication are all positively correlated. Ojo, Salau, and Falola (2014) looked into the idea of work-life balance policies and practices in the banking, educational, and power sectors of the Nigerian economy.

The results show that respondents' perceptions of the idea of work-life balance are diverse. Empirical analysis of work-life balance policies and their effects on employees' job satisfaction and productivity were the subjects of a 2015 study by Vishwa et al. The results of this study highlighted the fact that each work-life balance policy is a predictor of job satisfaction on its own. Fapohunda (2014) conducted research on the impact of work-life balance on output. The findings of the study showed a correlation between work-life practices and lower employee turnover.. It also found out that management support was not satisfactory. Kamau, Muleke, Makaya and Wagoki, (2013) investigated work life balance practices on employee job performance at Eco Bank Kenya. The finding of the empirical study shows that there was correlation between work life balance and employee performance.

The empirical research that looked at the relationship between work-life balance and female employee performance have different perspectives, as is shown from the above. The results of the examined study are contradictory, which can be related to the estimating techniques, the range of the data, and the study's setting. Therefore, by conducting the study in a deposit money bank in the state of Anambra in Nigeria, the current study complements the existing empirical studies in that country. The current study will enhance the previous one by analyzing the relationship between work-life balance and female employee performance in the state of Anambra utilizing analysis of variance, regression, and percentage tables.

## **Objectives of the Study**

The broad objective of this study is to examine the effect of work-life balance on organizational sustainability of female staff in deposit money banks in Anambra state: specifically, the study intended to

i. Examine the effect of leave policy on organizational sustainability of female staff in deposit money banks in Anambra state

**ii.** Ascertain the effect of flexible scheduling on organizational sustainability of female staff in deposit money banks in Anambra state

- iii. Evaluate the effect of employee assistance on organizational sustainability of female staff in deposit money banks in Anambra state
- iv. Evaluate the effect of work environment on organizational sustainability of female staff in deposit money banks in Anambra state

## Hypotheses

The followings hypotheses were formulated to guide the research questions;

**Ho1:** Leave policy does not have significant positive effect on organizational sustainability of female staff in deposit money banks in Anambra state

**Ho2:** Flexible scheduling does not have significant positive effect on organizational sustainability of female staff in deposit money banks in Anambra state

**Ho3:** Employee assistance does not have significant positive effect on organizational sustainability of female staff in deposit money banks in Anambra state

**Ho4:** Work environment does not have significant positive effect on organizational sustainability of female staff in deposit money banks in Anambra state

# **REVIEW OF RELATED LITERATURE**

## **Theoretical Framework**

#### **Border Theory**

According to border theory, a key indicator of the options and support people are likely to have in their attempts to maintain a healthy balance between the work and off-work worlds is how much they are viewed as essential members of their working communities. According to the border idea, work and home are two separate realms; in fact, Clark (2014) compared them to two different countries, each with a unique culture. In order to fill a gap in earlier ideas, she focused on boundaries or lines of demarcation between domains, the point at which domain-relevant behavior begins or ends.

The borders that define when one's thoughts, behaviors, and emotions are appropriate in one domain and not another are all taken into consideration by border theory (Hughes & Bozionelos, 2011). Physical borders, such as the walls of one's workspace, temporal borders, like one's work schedule, and psychological borders are also taken into consideration. According to Clark (2014), border theory embraces all aspects of human connection, which is particularly clear in how she defines the idea of central participation. In border negotiations, central participation is essential.

According to border theory, central participants of a given domain are people who have internalized the values of that domain, shown competence in their roles within that setting, are connected to other central participants, and have personally identified with the duties of the given domain (Greenhaus & Powel, 2010). These characteristics grant central participants benefits that border-crossers, whose participation is seen as peripheral, do not have. These benefits make it simpler for individuals to find a feeling of balance (Greenhaus, Collins, & Shaw, 2013)

The ability, relationships, and dedication of central participants have an impact. According to (Greenhaus & Powel, 2012), this influence gives the ability to negotiate and alter the domain's boundaries. As a result, central players frequently have more freedom and options, which makes it simpler for them to strike a balance between their personal and professional lives.

## **Empirical Studies**

The impact of work-life balance on employees' performance in a business is examined by Ogar and Amanze in 2019. Examining the impact of work-life balance on employees' dedication and performance was the study's main goal. Adopting an interpretive research perspective, the survey research design was used. The study's target sample population consisted of 145 respondents from the chosen banks, and using a straightforward random sampling technique, the Taro Yamane formula was used to calculate the sample size of 106 respondents from the banks. The Cronbach Alpha method was used to examine the data and test the hypotheses. The study's key result was that employee assistance programs have a big impact on how well their employees perform. The scientists advised that there should be adequate and consistent implementation of employee assistance programmes within commercial banks. This will not only benefit the employees but it will also enable the employees to come more productive and efficient towards their duties.

In an effort to increase their understanding, Tamunomiebi and Oyibo (2020) looked at employee performance and work-life balance in Nigeria. In order to improve employee performance for the best organizational output, the goal of this secondary research was to examine the literature regarding work-life balance in Nigeria and recommend appropriate methods for resolving the issue of work-life imbalance and its detrimental effects. According to our theory, individuals who balance their work and personal responsibilities are more likely to perform better, hence it is crucial for employers to support structures and policies that improve work-life balance for employees within their organizations. We come to the conclusion that there are structural impediments to the implementation of work-life policies in Nigeria, such as poor leadership that weak institutions that lack the capacity to monitor and enforce employment standards, high unemployment ratios, poverty, inflation and a plethora of others.

In a 2019 study, Osibanjo, Waribo, Akintayo, Adeniji, and Fadeyi looked at how employees' dedication varied across Nigerian tech start-ups. An organizational phenomenon called quality work life is advantageous to both employers and employees. As a result, given the quality of the working environment, research keeps concentrating on ways to increase employee commitment. Literature suggests that if desired work life quality is given by the employer, organizational goals will be more feasible, from greater employee productivity to a balance between work and family life. However, start-ups have received little to no attention in terms of conducting empirical studies to ascertain how employee commitment is influenced by quality of work life there. It was noted that a significant factor influencing employee commitment by quality of work life.

In Port Harcourt, Rivers state, Mmakwe and Ukoha (2018) looked into the connection between work-life balance and employee performance in the banking industry. The study's population included 769 workers from five commercial banks in Port Harcourt City who were chosen at random. Taro Yamane's formula determined the sample size to be 400. Given a 75% return rate, 301 copies of the instrument were located and were useful for analyses. The proper statistical method to analyze the data was the spearman rank order correlation coefficient. The results showed a significant relationship between employee performance indicators and measures of work-life balance.

The extent to which the work-life balance program predicts employee behavioral outcomes at a few chosen commercial banks in Nigeria was determined by Oludayo, Ahaka, and Fatogun (2018). The study used a survey research design for an accurate investigation to accomplish this. Using stratified and simple random selection approaches, 339 respondents from the top 5 commercial banks with branches in Lagos State, Nigeria, were polled. The analysis used the Structural Equation Model (AMOS 22) to determine the outcomes and the strength of the association between

the exogamous and endogamous variables. According to the findings, employee behavioral outcomes including job satisfaction, intention to stay at work, and engagement can be predicted by flexible work arrangements, employee time off, employee social support, and dependent care initiatives.

Researchers Kipkemo, Omolo, Onditi, and Odinga (2016) examined how employee assistance programs affected workers' productivity. A case study was used as the research design for this investigation. With a sample size of 29 7, the target population was the 1269 workers of Mumias Sugar Company. Simple random sample and stratified sampling techniques were used in this investigation. Likert scale questionnaires were used to gather data. Tables, pie charts, and bar graphs were used to illustrate the data, which was then evaluated using percentages, the mean, and multiple regression approaches. According to the study, employee support initiatives significantly affect workers' productivity.

Okon Akpan and Usoro (2015) concentrated on the relationship between emotional intelligence and workers' productivity in the Nigerian banking sector. Self-awareness, self-management, social awareness, and social skills were emotional intelligence competencies that were researched. Using an amended version of a previously created questionnaire, information was gathered from 376 personnel in the Nigerian banking sector, which was a convenient sample size. The study was built on the foundation of descriptive and inferential statistics. The findings support past research and the notion that emotional intelligence and performance in the workplace are related.

The effect of emotional intelligence on employees' performance in the Nigerian Plateau State Local Government System was examined by Silas & Habila (2017). A structured questionnaire was sent to 240 respondents, and 176 of them completed it and returned it, or 73% of the total. The correlation matrix and ordinary least squares regression analysis were used to analyze the study's data. According to the study's findings, employees' performance is favorably correlated with their level of self-awareness, self-management, social awareness, and relationship management. The research comes to the conclusion that emotional intelligence is a significant factor that fosters awareness, aids workers in learning from others, shares knowledge, and fosters others' trust and worries.

## METHODOLOGY

In this study, a survey design will be employed as the research approach. The researcher will use it to ask respondents questions and gauge their convenience considering their busy schedules. Both primary and secondary data sources were used in the investigation. Therefore, the population of interest comprises of all women employed by deposit money banks in the state of Anambra. 953 women make up the study's population. The human resources staff of particular deposit money institutions provided the population estimate. The researcher sampled the entire population because it was less than 1000. Structured questionnaires are the data gathering approach used in this investigation. In analyzing study questions and hypotheses, statistics like frequency counts, percentages and multiple regression analysis were employed in the analysis of data.

# DATA PRESENTATION AND ANALYSIS

The information gathered from the sampled bank employees was presented, examined, and interpreted in this part. Eight hundred and seventy-three (873) of the nine hundred and fifty-three (953) questionnaires that were distributed were eventually retrieved, representing a 93.2% return rate. So, the returned questionnaires served as the foundation for the data analysis and interpretation.

# 4.1 Demographic Characteristics of the Respondents

This section presents and analyzes the respondents' demographic data, including gender, marital status, age group, level of education, and employment history. The findings of the sample, which had 873 respondents in total, are shown in the table below.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Single Married Others Total	380 486 7 873	40 58 2 100	43.5 55.6 1 100.0	40 58 100.0

Table 4.1.2: Marital Status of the Respondents

Source: Field Survey, 2023/SPSS

Three hundred eighty (380) respondents, or 43.5% of the total, are single, while four hundred eighty-six (486) respondents, or 55.6% of the total, are married. While seven respondents (seven), or 1% of the total, were widowed, divorced, or separated. Thus, it is obvious that most respondents are married as of the time of this study. Thus, the marital status table allows us to determine the proportion of respondents who were either single, married, or divorced when the questionnaires were issued.

 Table 4.1.3: Age Bracket of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
	18 - 30 years	330	35	37.8	48.6
I	31 - 40 years	220	24	25.2	74.0
Valid	41 - 50 years	198	21.1	22.7	89.7
ľ	51 years and above	125	20.1	14.3	100.0
	Total	873	98.9	100.0	

Source: Field Survey, 2023/SPSS

Table 4.3 above showed the respondents' age range. According to the distribution, 220 respondents, or 25.2% of the total, fall within the age range of 31 to 40 years, while 37.8% of the respondents are between the ages of 18 and 30. In keeping with this, 21.7% of respondents are between the ages of 41 and 50, while the remaining respondents, or 14.3%, are between the ages of 51 and above.

# 4.2 Multiple Regression Analysis

#### Table 4.2 Summary of the Regression Result

The result of the multiple regressions formulated is presented in the tables below

Model Summary <sup>b</sup>										
				Std. Error		Chang	ge Statisti	cs		
Mode		R	Adjusted R	of the	R Square				Sig. F	Durbin-
1	R	Square	Square	Estimate	Change	F Change	df1	df2	Change	Watson
1	.803ª	.645	.643	.70378	.645	394.223	4	868	.000	1.881

a. Predictors: (Constant), WOE, EMA, LPO, FLS

b. Dependent Variable: ORGS

According to Table 3, R2, which gauges how strongly an independent variable influences a dependent variable, has a value of 80%. This suggests that differences in the work environment, leave policies, flexible schedules, and employee help account for 80% of the variation in work-life balance. A corrected R2 of 64% backed up this claim.

Using Durbin-Watson statistics, the model's autocorrelation was examined. The aforementioned table's Durbin-Watson statistic of 1.881 demonstrates that the model's variables are not automatically connected and that the model is accurate at making predictions.

-			1110111			
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	781.041	4	195.260	39.4223	.000 <sup>b</sup>
I	Residual	429.923	868	.495		
	Total	1210.964	872			

a. Dependent Variable: ORGS

b. Predictors: (Constant), WOE, EMA, LPO, FLS

The work environment, leave policy, flexible schedule, and employee assistance are just a few of the independent variables that have a significant impact on dependent variables like work-life balance and organizational sustainability, as indicated by the f-statistics value of 39 in the aforementioned table and the f-statistics probability of 0.000

Coefficients <sup>a</sup>									
				Standardize					
				d					
Unstandardized		Coefficient							
	Coefficients		S			95.0% Confid	ence Interval for B		
							Lower		
Model		В	Std. Error	Beta	t	Sig.	Bound	Upper Bound	
1	(Constant)	011	.054		197	.844	117	.095	
I	LPO	.487	.030	.413	16.469	.000	.429	.545	
I	FLS	.549	.034	.549	16.360	.000	.483	.615	
I	EMA	.050	.023	055	2.142	.032	095	004	
Ĩ	WOE	.001	.034	.001	3.027	.000	065	.067	

a. Dependent Variable: ORGS

Table above shows the coefficient of the individual variables and their probability values. Leave policy have regression t-value of 16.469 with a probability value of .1.000. This implies that Leave policy have a positive and significant effect on organizational sustainability. Flexible schedule has a regression t-test of 16.360 with a probability value of 0.000 implying that Flexible schedule variables have a positive and significant effect on organizational sustainability.

On a similar note, employee assistance variable have a t-test value of 2.142 and a probability value of 0032. This shows that employee assistance has a positive and significant effect on organizational sustainability.

Furthermore, work environment has a regression t-test of 3.027 with a probability value of 0.00 This implies that work environment has a positive and insignificant effect on organizational sustainability.

## 4.5 Test of Hypothesis

To test the hypothesis the study adopted ANOVA aided by Computer Microsoft Special Package for Social Science (SPSS)

## **Hypothesis One**

**Ho1:** Leave policy does not have significant positive effect on organizational sustainability of female staff in deposit money banks in Anambra state

Model		Sum of Squares	Df Mean Square		F	Sig.
	Regression	6.911	2	1.382	7.613	.000 <sup>b</sup>
1	Residual	80.589	871	3.358		
	Total	87.500	873			

Source: SPSS, Version, 20

However, from the Anova table above, it was observed that the probability value of hypothesis one is less than 0.05% level of significance (0.000), as a result null hypothesis will be rejected and alternative is accepted, meanwhile leave policy have significant positive effect on organizational sustainability of female staff in deposit money banks in Anambra state

## Hypothesis Two

**Ho2:** Flexible scheduling does not have significant positive effect on organizational sustainability of female staff in deposit money banks in Anambra state

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	22.507	2	4.501	6.952	.002 <sup>b</sup>
1	Residual	64.993	871	2.708		
	Total	87.500	873			

Source: SPSS, Version 20

However, from the Anova table above, it was observed that the probability value of hypothesis two is less than 0.05% level of significance (0.000), as a result null hypothesis will be rejected and alternative accepted, meanwhile Flexible scheduling have significant positive effect on organizational sustainability of female staff in deposit money banks in Anambra state

# **Hypothesis Three**

**Ho3:** Employee assistance does not have significant positive effect on organizational sustainability of female staff in deposit money banks in Anambra state

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	20.154	2	4.031	15.236	.000 <sup>b</sup>
1	Residual	67.346	871	2.806		
	Total	87.500	873			

## Source: SPSS, Version, 20

However, from the Anova table above, it was observed that the probability value of hypothesis two is less than 0.05% level of significance (0.000), as a result null hypothesis will be rejected and alternative accepted, meanwhile Employee assistance have significant positive effect on organizational sustainability of female staff in deposit money banks in Anambra state

## **Hypothesis Four**

Work environment does not have significant positive effect on organizational sustainability of female staff in deposit money banks in Anambra state

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	3.020	2	.604	23.172	.000 <sup>b</sup>
1	Residual	84.480	871	3.520		
	Total	87.500	873			

Source: SPSS, Version, 20

However, from the Anova table above, it was observed that the probability value of hypothesis four is less than 0.05% level of significance (0.000), as a result null hypothesis will be rejected and alternative accepted, meanwhile Work environment have significant positive effect on organizational sustainability of female staff in deposit money banks in Anambra state.

#### **CONCLUSION AND RECOMMENDATIONS**

When workers felt like they belonged to the company and thought management was friendly, performance improved. Organizational performance would be improved where work-life balance principles were incorporated into the creation of business policies. The study draws the conclusion that the impact of work-life balance on organizational sustainability of female employees in deposit money banks in the state of Anambra was significantly beneficial. Based on the findings of this study, the following recommendations were made: As it has been discovered to lower employee turnover, a vibrant and consistent leave policy should be supported. Compressed work weeks and other forms of flexible scheduling are essential for more effective and efficient service delivery. Organization managers should meet down with staff members to discuss how and when to get the best service possible from them in order to improve service delivery. Bank managers should implement sound welfare policies that are strictly adhered to because the study has shown that doing so increases employees to have fantastic work environments since they should be aware of the connection between their workplace and employee absenteeism.

#### References

- Adejumo G. O. & Olowookere, E. I.(2012). Effects of workplace characteristics on work-life balance of women in Nigerian public sector. *International Journal of Social Sciences and Humanities Reviews* 3 (4) 51–55
- Ajala, E. M. (2018). the effects of employee assistance programmes on workers' performance in selected work organizations in Ondo and Edo states, Nigeria
- Azeem, S.A, & Akhtar, N. (2014). The influence of work life balance and job satisfaction on organizational commitment of healthcare employees'. *International journal of Human Resource Studies*, 4(2), 18-24

- Budd, M.A. (2017). *The thought of work. Labour and employment relations association*. Ithaca, NY: Cornell University Press
- Clark, S. (2014). Work/family border theory. A new theory of work/family balance, 53, 747-770.
- Emhan, A. (2012). Relationship among Managerial Support, Job Satisfaction and Organizational Commitment: A Comparative Study of Nonprofit, For-Profit and Public Sectors in Turkey. *International Journal of Business, Humanities and Technology*, 2(5), 179-190
- Epie, C. (2017). Managing time-based conflict across life domains in Nigeria: A decision executives. *The role of problem focused techniques*, 8, 4-16.
- Fapohunda, T. M. (2014) An exploration of the effects of work life balance on productivity. *Journal of Human Resource Management and Labour Studies*, 2(2) 71-89.
- Ferrero, I. (2014). Must Milton Friedman embrace stakeholder theory? Business and Society Review, 119, 37-47.
- Greenhaus, J., Collins, K., & Shaw, J. (2013). The relation between work-family balance and quality of life. *Journal of vocational behaviour*, 63, 510-531.
- Kamau, J. M, Muleke V, Makaya S. O, & Wagoki, J. (2013) Work life balance practices on employee performance of Ecobank Kenya. European Journal Business and Management, 5(25), 179-185.
- Kipkemo, A.C, Omolo, J.W, Onditi, A.L & Odinga, J.O (2016). Influence of employee assistance programs on employee performance in mumias sugar company. *Developing Country Studies.* 6 (2) 169-187
- Kumar, D.K. (2017). Employee retention strategies-An empirical research. Global Journal of Management and Business Research: E-Marketing, 17(1), 16-22.
- Mesimo-Ogunsanya, E.A. (2017). Organizational support and employees' work-life quality. International Journal of Emerging Research in Management & Technology, 6(2), 74-77.
- Mmakwe, K. A and Ukoha, O (2018). Work-life balance and employee performance in Nigerian banks, port Harcourt. *International Journal of Advanced Academic Research*, 4 (1) 56-67
- Mmakwe, K. A., &Ojiabo, U. (2018). Work life balance and employee performance in Nigerian banks, Port Harcourt. *International Journal of Advanced Academic Research in Social and Management Sciences*, 4(1), 107-119
- Nuesch, C.K. (2017). The effects of flexible work practices on employee attitudes: Evidence from a large-scale panel study in Germany. Chair of Business Management, University of Münster, Münster, Germany.

- Ogar, C. A. & Amanze, D. (2019). Work-Life-Balance: The Nigerian Organizational Experience(A Study of Selected Banks in Ebonyi State). *International Journal of Research and Innovation in Social Science*. 3 (3) 145-157
- Ogechi, E. B., & Nwaeke, L. I. (2019). Assessment of work-life balance and employees' job performance in oil servicing companies in the Niger Delta region of Nigeria. IIARD *International Journal of Economics and Business Management*, 5(3), 33-42
- Ojo, I. S., Salau, O. P., & Falola, H. O. (2014) work life balance practices in Nigeria a comparison of three sector journal on competitiveness. *Journal of competiveness* 6(2), 3-14
- Okon E. E., Akpan, A.P & Usoro, A.A (2015). emotional intelligence and employee performance: evidence from the Nigerian banking industry. *International Journal of Management & Business Studies 1 (5) 11-27*
- Osibanjo, A. O., Waribo, Y. J, Akintayo, D. I, Adeniji, A. A. and Fadeyi, O. I, The Effect of Quality of Work Life on Employees' Commitment Across Nigerian Tech Start-Ups, International *Journal of Mechanical Engineering and Technology*, 10(3), 2019, 41-59.
- Silas G. & Habila D. (2017). Impact of emotional intelligence on the performance of local government employees in plateau state, north central Nigeria. *International Journal of Social Sciences and Management Research 3 (7) 25-34*
- Sivatte, I. de, Gordon, J. R., Rojo, P., & Olmos, R. (2015). The impact of work-life culture on organizational productivity. *Personnel Review*, 44(6), 883-905.
- Tamunomiebi, M.D and Oyibo, C (2020). Work-Life Balance and Employee Performance: A Literature Review. *European Journal of Business and Management Research* 5, (2) 56-67,
- Valcour, P. M., & Tolbert, P. (2003). Gender, family and career in the era of boundary lessness: Determinants and effects of intra-and inter-organizational mobility. *International Journal* of Human Resource Management, 14(5), 768-787
- Vishwa N. M., Chandra K., Jaggi, Bijay .S, Charanjeet .S., Avadhesh K. M., & Diwinder. K., (2015) Empirical analysis of work life balance policies and its impact on employee's job satisfaction and performance: Descriptive statistical approach. *American Journal of Theoretical and Applied Statistics*.4(2), 33-43.