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Evaluation of Database Management Practices and Operating System Resource Utilization at Fully Booked

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Abstract

This study evaluates the effectiveness of database management practices and operating system resource utilization at Fully Booked. It focuses on key database aspects such as data organization, accessibility, security, and maintenance, as well as system performance indicators including CPU, memory, and storage usage. A mixed-method approach was used, combining quantitative data from system monitoring and surveys with qualitative insights from IT personnel.

Findings indicate that database management practices are highly effective, particularly in maintaining organized, accessible, and well-maintained data. However, operating system resource utilization is only effective, with reported issues such as system lagging, freezing, and instability during peak operations. IT personnel also identified challenges including high resource consumption, slow query execution, and system maintenance difficulties.

The study further reveals a significant relationship between database management practices and system performance, where efficient database operations contribute to better resource utilization, while inefficiencies lead to performance issues. Based on these findings, improvements in resource monitoring, database optimization, and system upgrades are recommended. Overall, the organization demonstrates strong database practices but requires enhanced resource management to achieve optimal system performance.

Keywords: Database Management; Operating System; Resource Utilization; System Performance; DBMS; CPU Usage; Memory Usage; Storage Utilization

1. Introduction

The use of information systems in day-to-day operations, decision-making, and the provision of customer care is increasingly becoming crucial in modern organizations. A fundamental system is the database management system (DBMS), which has the task of organizing, storing, and accessing huge amounts of data efficiently. An efficient DBMS would be able to keep data accurate, consistent, and easily accessible to its authorized users. Mercy (2022) mentions that database management systems play a vital role in making access to information resources and the usage of the same information resources simpler by facilitating a systematic way to store and manipulate the data. For efficient and competitive business operations in transaction and inventory-related data-intensive businesses (e.g., businesses in the retail industry), they must practice effective database management.

The other area where there is significant demand on a computer system is through the operating system. The OS serves as an interface between hardware and software and controls functions such as memory allocation, CPU scheduling, and storage. The use of resources is essential in avoiding overloading of the system, reducing downtime, and ensuring the smooth running of the system. Shammar and Zahary (2020) underlined that contemporary operating systems are

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tailored to meet more advanced workloads where interconnected technologies and enterprise-level applications are involved. In the absence of effective management of the resources, systems can degrade their performance, and this may adversely affect the productivity of the organization.

Database management practices and operating system performance are very interrelated, and system resources controlled by the operating system are instrumental to database operations like query execution and data retrieval. Resource waste may occur due to inefficient database use; these include non-optimal indexes and non-optimal data storage by means of duplicated information, thus affecting system performance overall. On the other hand, the operating system could be inefficient, and thus it will not allocate resources efficiently, leading to slow database operations. According to Ashiq et al. (2022), a good data management process could be responsible for the improvement of system performance and decision-making in an organization. This relationship implies that both factors are inseparable.

The latest technological developments have only added more weight to the importance of effective database and system performance. With the development of modern database systems, such as vector databases, there have arisen new challenges in the management of large and complex data. Taipalus (2024) elaborated that modern database systems need resource management strategies that are sophisticated to accommodate high-performance computing environments. Moreover, embedded systems and operating system architectures have brought innovations in computing systems that have increased modern computing capabilities (Marwedel, 2021). These changes underscore the escalating complexity of IT infrastructure management in organizations, where evaluation studies are gaining relevance.

Since database systems and operating systems play a critical role in organizational success, there is a need to evaluate the management and use of these components in the real-world environment. This paper will assess database management and utilization of the operating system resources at Fully Booked, a retail organization whose operations are highly dependent on the information systems. The study is based on the mixed-method approach, whereby quantitative data about system performance are combined with qualitative data about IT personnel. This overall assessment aims to help determine strong and weak points and possible ways to improve them and eventually lead to an increased efficiency of the system and organizational performance.

Objective of the Study

This research is mainly aimed at examining the effectiveness of database management practices and the efficiency of resource utilization of operating systems at Fully Booked. Specifically, the aim of the present study is to test some performance indicators of the system, such as the CPU and memory load, storage load, and database load. Such quantitative measures give an objective evaluation of the system performance in normal conditions of operation. Through these measures, the research aims to establish whether the systems that are in place within the organization are running optimally or need upgrading.

Other than evaluating quantity, the research will further investigate the experiences, practices, and difficulties confronted by IT professionals in dealing with the management of database systems and operating systems. Using a qualitative approach, such as an interview and survey, will demonstrate useful knowledge on the realities of the practices and the way they are executed in decision-making. Quantitative and qualitative data can be integrated to gain a more in-depth view of the IT infrastructure of the organization. Finally, the research seeks to make evidence-based recommendations that will be useful in streamlining the performance of the system and optimizing resources and efficiency for the organization.

1.1. Statement of the Problem

This study aims to evaluate the database management practices and operating system resource utilization at Fully Booked. Specifically, it seeks to answer the following questions:

- How effective are the database management practices implemented in terms of:
    - Data Organization
    - Data Accessibility
    - Data Security
    - Data Maintenance
- What is the level of operating system resource utilization in terms of:
    - 2.1 CPU Usage
    - 2.2 Memory Usage
    - 2.3 Storage Utilization

- What challenges are encountered by IT personnel in managing database systems and operating system resources?
- Is there a significant relationship between database management practices and operating system performance?
- What recommendations can be proposed to improve database management practices and system resource utilization?

1.2. Assumptions of the Study

It is assumed in this study that all individuals who will participate in the research will give true, honest, and fair information about database management practices and performance of the operating systems. Another assumption is that the system monitoring tools applied in the research can effectively measure the resource utilization of metrics like CPU usage, memory consumption, and storage usage. Moreover, the researchers are assuming that the chosen participants, especially IT workers, are knowledgeable and experienced enough to contribute valuable information about the systems in the organization. Finally, the assumption is that the environment surrounding the data collection is representative of the usual environment of the organization, and the results are representative of what happens in the real system.

1.3. Scope and Limitations

This research aims to review the practices of database management and resource usage of the operating system at Fully Booked. It involves monitoring the performance indexes of the system, including CPU, memory, and storage utilization, and examining the database management procedures in terms of structure, accessibility, security, and maintenance. Qualitative insights of IT personnel are also included in the study to enrich the understanding of practices and challenges involved in the management of such systems. The study is narrowed down to the existing systems and procedures in place in the organization.

However, studying has several limitations. It does not cover other areas of information technology like network infrastructure, cybersecurity provisions, and software development procedures. The outcome is limited to the selected individuals and does not cover all organizations or industries. There could be some limitations due to the limited time to investigate the systems and the failure to acquire all data for the systems. Despite these shortcomings, the research offers important information on how to enhance the performance of the database and systems in the organization.

1.4. Significance of the study

- **IT Staff.** The study will assist the IT staff to have a better idea of the impact of database management practices and operating system performance on the efficiency of the entire system. It gives them an understanding of areas that need to be corrected so that they can put in place better strategies for managing their data and resources. The results can also be used as a reference in the optimization of the system performance and in avoiding possible problems.
- **Management.** The findings of this study will help the management to determine the efficiency of their existing IT infrastructure. It offers evidence-based facts that may be used to make decisions regarding system upgrades and resource allocation. Better performance of the system can lead to better productivity and efficiency.
- **Employees.** The performance of the systems will be enhanced and may result in an increase in the speed of the system and a decrease in the delays experienced in day-to-day operations. Effective systems enable employees to work more efficiently and with minimal interruptions. This helps towards a more productive and efficient working environment.
- **Organization (Fully Booked).** The organization will also obtain a detailed analysis of the database and operations system practices of the organization. The research will also determine weak and strong points, and therefore, the company can carry out the required changes. This can also lead to the improvement of the overall performance of operations and customer satisfaction.
- **Future Researchers.** This study can be used by future researchers to provide a reference for carrying out similar research pertaining to database management and system performance. It offers a systematic framework and methodology that can be implemented or adapted elsewhere. It also provides the possibility of pursuing further studies through investigating more variables or applying them to other industries.

2. Methodology

2.1. Research Design

The research design applied in this study is a mixed-method research design, which integrates the quantitative and the qualitative research methods to have a more in-depth view of the research problem (Nagpal et al.,2021). The quantitative part is aimed at quantifying the use of operating system resources with system monitoring tools. The main indicators that are collected and analyzed are CPU usage, memory consumption, and storage utilization, using statistical techniques. This method will enable the researcher to get objective and measurable information about the performance of the systems.

Conversely, the qualitative aspect entails the collection of information by the IT staff by conducting interviews and survey questionnaires. This will help identify actual database management practices, strategies, and issues faced in the organization. The combination of quantitative and qualitative data will provide a more comprehensive analysis of the practices of database management and performance of the operating system. Mixed-method design enhances the validity of the findings by enabling data triangulation and more analysis.

2.2. Locale of Study

The study will be conducted in Fully Booked, which is an old, established bookstore company in the Philippines. Fully Booked has a vast array of books and retail products. The information system is essential in running the day-to-day activities of the company, like inventory management, sales, and customer details. Such processes need effective database systems and the proper functioning of the operating system to provide smooth and continuous services.

This location has been chosen considering its reliance on database management systems and operating system resources in executing business processes. The assessment of the database management practices of the organization and the use of system resources would be a relevant and realistic context for the study. Also, the availability of IT staff and the data in the system makes it possible to collect quantitative and qualitative data that is needed to conduct a complete analysis.

2.3. Participants of the Study

In this study, the participants include IT staff, system administrators, and employees directly involved with fully booked management of both database systems and operating system resources will be involved in this research. The reason for selecting this group is the fact that they know the information, experiences, skills, and knowledge they need in relation to the research, and that the information is needed in the investigation of the research. Their work within the organization allows them to give true and sound data about the functioning of the systems and the practices in the management.

Participants will be selected through a purposive sampling method since they must fit the criteria of direct involvement in database and system management. This makes sure that the data obtained is pertinent to the study objectives. This will involve the number of respondents based on the availability of qualified respondents in the organization, and enough data will be obtained to conduct both quantitative and qualitative analysis.

2.4. Procedure for Gathering Information

The data collection process will commence with the preparation of documents required to carry out the study, including a formal request letter to get permission to carry out the study in the organization. Once approved, the researcher will arrange with the management and IT department to arrange data collection activities. The participants will be informed about ethical issues like informed consent and confidentiality before the study is conducted.

In the qualitative aspect, the researcher will interview and give questionnaires in structured forms to IT staff. Interview questions will be based on practices of database management, the challenges of the system, and the strategies of the system to maximize performance. The questionnaires will be structured in a way that will enable them to obtain similar and consistent answers. All answers shall be noted, tabulated, and ready to be analyzed.

In the quantitative part, there will be the use of system monitoring tools to gather information on the use of resources in the operating system. Measures like CPU utilization, memory utilization, and storage utilization will be charted in a given period to be accurate and reliable. The data collected will be tabulated and analyzed using relevant statistical

tools. This combination of data collection methods ensures that the overall performance of the system and management practice is thoroughly assessed.

2.5. Analytical Framework

In the study, quantitative and qualitative analytical tools are applied to the data collected to give an interpretation. Descriptive statistics like frequency, percentage, and weighted mean will be used to analyze quantitative data obtained as a result of system monitoring tools. These statistical values will aid in establishing the extent of operating system resource usage and system performance. Also, the correlation analysis will be applied to investigate the correlation between the database management practices and the system performance indicators.

In the case of qualitative data, thematic analysis will be used to determine patterns, themes, and insights of the responses of IT personnel. The researcher will organize responses around some common themes like challenges, strategies, and best practices in database management. By combining both quantitative and qualitative results, a more comprehensive insight into the research issue will be gained and help to create evidence-based recommendations.

3. Statistical Treatment

The quantitative data analysis in the study will involve the following statistical tools:

3.1. Frequency and Percentage

The distribution of the responses of the participants will be summarized and described using these. It assists in displaying facts in an easy and comprehensible manner.

3.2. Weighted Mean

The average level of the responses about database management practices and systems performance indicators will be determined using this. It gives a foundation upon which the overall analysis of every variable is based.

3.3. Correlation Analysis

This will be employed to establish the correlation between database management practices and the number of resources in the operating system used. It assists in determining the relationship between the improvements of a variable and the changes of another variable.

3.4. Ethical Considerations

In carrying out the study, the researcher will uphold the principles of ethics to the letter. Before the data is collected, the participants will be informed about the purpose, objectives, and procedures of the research. To do the participation voluntary, informed consent will be obtained. The participants will also be assured that the responses will remain confidential and will not be utilized in any other way than academically.

The researcher will also make sure that the participants are not subjected to any harm, discomfort, or danger during the study. No personal information and sensitive data will be disclosed without permission. The participants will be allowed to leave the study at their own will without repercussions. The ethical considerations make the research process credible and ethical.

4. Results

4.1. Respondent Profile

A total of **15 respondents** participated in the study. The respondents were composed of IT staff, system administrators, managers, and technical support personnel with varying years of experience in information technology. This diversity provided a comprehensive perspective on database management practices and operating system resource utilization at Fully Booked.

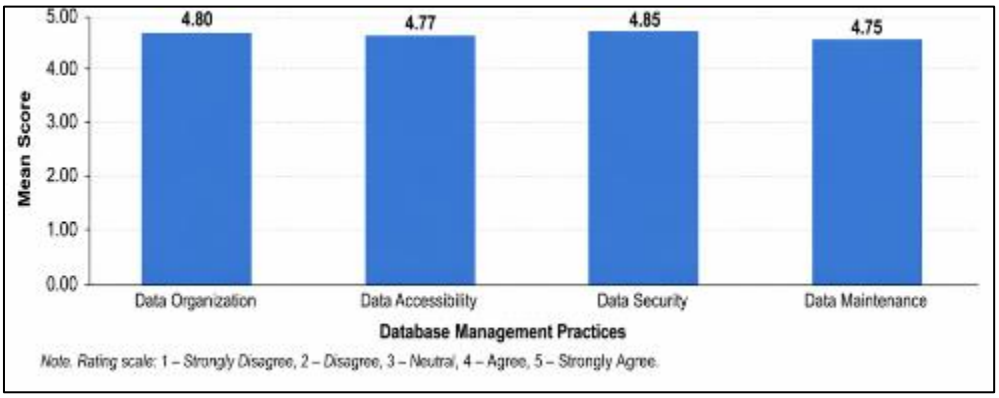
4.2. Database Management Practices

Table 1 Mean Scores for Database Management Practices

Indicator	Mean	Verbal Interpretation
Data Organization	4.80	Strongly Agree
Data Accessibility	4.77	Strongly Agree
Data Security	4.85	Strongly Agree
Data Maintenance	4.75	Strongly Agree
Overall Mean	**4.79**	**Strongly Agree**

4.2.1. Explanation

Table 1 presents the mean ratings for database management practices. All indicators obtained mean scores above **4.50**, indicating that respondents **strongly agree** that database management practices at Fully Booked are effective. The highest mean was observed in **Data Security**, suggesting strong confidence in access controls, backups, and protection against unauthorized intrusion.



Source: Survey Results (2026)

Figure 1 Mean Scores of Database Management Practices

This illustrates the mean scores of the four dimensions of database management practices. Data Security recorded the highest mean, followed closely by Data Organization and Data Accessibility, while Data Maintenance also showed a consistently high rating.

4.2.2. Discussion

The results imply that the organization prioritizes structured databases, standardized formats, and strong security mechanisms. These findings support the notion that well-managed databases contribute to system reliability and operational efficiency. However, despite high ratings, some respondents still reported system lag and freezing, indicating that strong database practices alone may not fully mitigate performance issues.

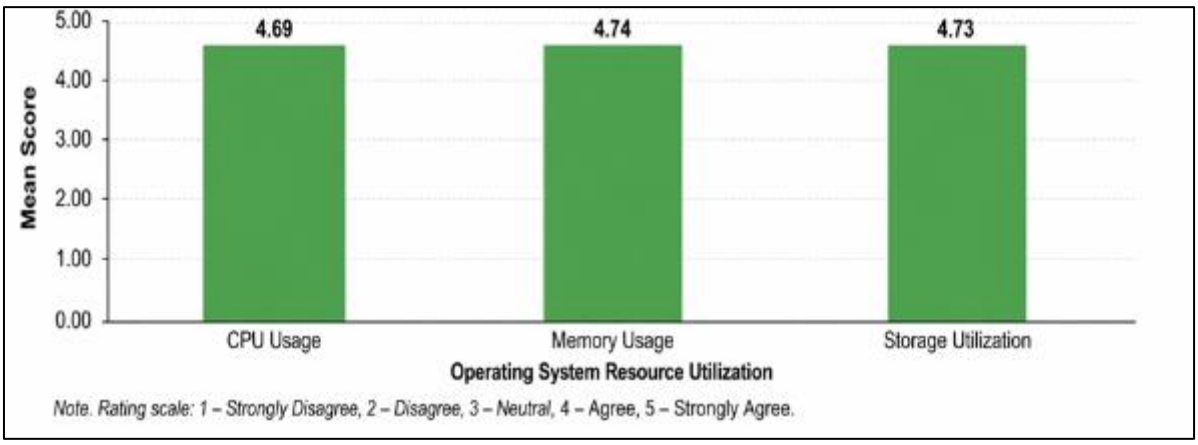
4.3. Operating System Resource Utilization

Table 2 Mean Scores for Operating System Resource Utilization

Indicator	Mean	Verbal Interpretation
CPU Usage	4.69	Strongly Agree
Memory Usage	4.74	Strongly Agree
Storage Utilization	4.73	Strongly Agree
Overall Mean	4.72	Strongly Agree

4.3.1. Explanation

Table 2 shows that all operating system resource utilization indicators were rated **Strongly Agree**, indicating effective management of CPU, memory, and storage resources. CPU usage received the lowest mean among the three, particularly during peak operations.



Source: Survey Results (2026)

Figure 2 Mean Scores of Operating System Resource Utilization

This presents a comparison of CPU, memory, and storage utilization. Memory usage obtained the highest mean, suggesting efficient RAM allocation, while CPU usage received relatively lower ratings, indicating occasional strain during heavy workloads.

4.3.2. Discussion

Although respondents perceived overall resource utilization as effective, qualitative responses revealed recurring issues such as system lagging, freezing, and instability during peak hours. These findings suggest that while resource management policies exist, real-time workload demands may exceed current system capacity, especially in CPU-intensive processes.

4.4. Challenges Encountered

Qualitative analysis of open-ended responses revealed recurring themes:

- System lagging and freezing
- CPU and memory overload during peak usage
- Database performance issues such as slow queries and locking
- Difficulty balancing performance, security, and reliability

These challenges indicate that despite strong management practices, **resource constraints and workload spikes** continue to affect system performance.

5. Discussion of Findings

The results demonstrate that Fully Booked exhibits **strong database management practices and effective operating system resource utilization**, as evidenced by consistently high mean scores. However, the persistence of performance issues suggests a gap between system design and real-world operational demands. This highlights the need for:

- Enhanced monitoring tools
- Load balancing strategies
- Hardware upgrades
- Automated maintenance and optimization

The findings align with the respondents' recommendations emphasizing regular updates, performance tuning, and proactive system management to sustain long-term reliability and efficiency.

6. Conclusion

Based on the findings of the study, the database management practices at Fully Booked are generally effective, particularly in terms of data organization, accessibility, security, and maintenance. The responses show that the organization follows structured database procedures, applies proper access controls, and performs regular maintenance such as backups, updates, and error correction. These practices contribute to the reliability and usability of the organization's information systems.

In terms of operating system resource utilization, the results indicate that CPU, memory, and storage resources are generally well-managed, but not without issues. While respondents acknowledged that system resources are used efficiently under normal conditions, recurring problems such as system lagging, freezing, and performance instability were reported during peak usage. This suggests that although the system is functional, it is still vulnerable to performance bottlenecks when workload increases.

Furthermore, the study confirms that there is a significant relationship between database management practices and operating system performance. Efficient database design and maintenance help improve system performance, while inefficient resource handling contributes to delays, slow processing, and system instability. This supports the idea that database systems and operating systems must work together to ensure optimal performance.

Overall, the study concludes that Fully Booked's IT infrastructure is functional but requires further optimization, especially in terms of resource management and system performance enhancement.

Recommendations

Based on the results and findings of the study, the following recommendations are proposed:

- **Improve System Performance Optimization**

The organization should enhance system performance by identifying and removing bottlenecks in CPU, memory, and storage usage. Regular performance tuning and workload balancing should be implemented to prevent system slowdowns during peak operations.

- **Strengthen Resource Monitoring and Management**

Real-time monitoring tools should be implemented to continuously track CPU, memory, and disk usage. This will help IT personnel quickly identify performance issues and respond before system failure occurs.

- **Upgrade Hardware and System Infrastructure**

To address recurring issues such as lagging and freezing, the organization may consider upgrading hardware components such as RAM, storage systems (e.g., SSD), and processors to support higher workloads.

- **Optimize Database Design and Queries**

Database structures should be reviewed and optimized regularly. This includes improving indexing strategies, eliminating redundant data, and optimizing query performance to reduce system load.

- **Schedule Regular Maintenance and Updates**

System updates, patching, and maintenance activities should be scheduled during off-peak hours to avoid disruptions in daily operations. This ensures system stability while maintaining security and performance.

- **Enhance Backup and Recovery Systems**

A more robust backup and disaster recovery plan should be implemented to minimize downtime and prevent data loss during system failures.

- **Provide Continuous Training for IT Personnel**

IT staff should undergo continuous training on database optimization, operating system management, and modern system monitoring tools to improve their technical capabilities.

- **Implement Automation Tools**

Automation in system monitoring, alerting, and maintenance processes is recommended to reduce manual workload and improve response time to system issues.

Compliance with ethical standards

Statement of ethical approval

The study was conducted in accordance with established ethical standards. Permission to conduct the research was obtained from the management of Fully Booked. The research did not involve any clinical or experimental procedures on human or animal subjects.

Statement of informed consent

"Informed consent was obtained from all individual participants included in the study."

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