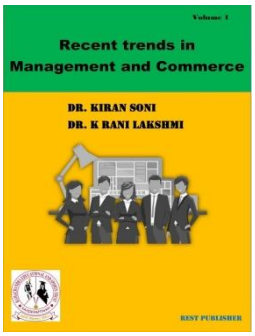
Recent trends in Management and Commerce

Vol: 4(2), 2023

REST Publisher; ISBN No: 978-81-936097-6-7

Website: http://restpublisher.com/book-series/rmc/

DOI: https://doi.org/10.46632/rmc/4/2/22



Assessing Laptop Performance: A Comprehensive Evaluation and Analysis

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Abstract: *Determining a laptop's aptitude for various tasks, such as gaming, multimedia editing, programming, or just general productivity, requires doing a performance evaluation. Users can choose a laptop that meets their unique needs by carefully examining the essential elements and characteristics that affect a laptop's performance. In the evaluation process, elements including the processor, RAM, storage, graphics capabilities, display quality, battery life, and general build quality are taken into account. Each of these elements is essential in deciding how well a laptop performs in various circumstances and applications. Researching laptop options before making a purchase is crucial for a variety of reasons. It first helps you identify the features and specifications that are essential for your specific needs. This ensures that the laptop you select will satisfy your requirements, regardless of whether you need it for work, gaming, multimedia, or daily use. Additionally, research gives you the opportunity to evaluate various brands, models, and prices in order to find the best bargain. You may ensure that you make an informed decision by reading reviews, customer comments, and expert opinions to learn more about the functionality, dependability, and durability of various laptops. Additionally, research enables you to stay current on laptop market trends and technological advancements. With this knowledge, you may prepare for the future. In the realm of decision-making, individuals and organizations often face complex situations where multiple criteria need to be considered before arriving at the best possible option. To aid in this process, various decision-making techniques and methodologies have been developed. One such method is the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS). Alternate Parameters: Laptop 2, Laptop 3, Laptop 4, Laptop 5. Evaluation Parameters: Processor Speed (GHz), Cache (MB), RAM (GB), Battery Life (Hour), Hard Disk Capacity (GB). Result: LAPTOP 2 got first rank and LAPTOP 7 got last rank. We've demonstrated a revolutionary portable laptop control experiment that doesn't need the room or money that normal undergraduate control laboratories do. All of the concepts needed for an introduction course in controls, as well as experiment, are covered in interactive experiments. Three findings can be motivating to proponents of e-learning in dental schools. First, compared to upperclassmen, freshmen had much more favourable opinions about the frequency of use, cost-effectiveness, educational value, and general quality of laptops and included software. Second, even though the cost-effectiveness of the computers and software was appraised by students at vendor-supplied schools. Zone-making had a favourable effect on the classroom atmosphere and students' attitudes, even if it had little effect on total student performance. Even though zoned laptop users spent more time off-task, this wasn't linked to a decline in performance.*

Keywords: *Processor Speed (GHz), Cache (MB), RAM (GB), Battery Life (Hour), Hard Disk Capacity (GB)*

1. INTRODUCTION

In today's modern era, laptops have become an essential part of our daily lives, serving as versatile tools for work, communication, entertainment, and more. As technology continues to advance, laptops are constantly enhancing their performance capabilities, offering faster processors, larger memory capacities, improved graphics capabilities, and extended battery life. However, with the vast array of options available in the market, evaluating and comparing the performance of different laptop models can be a daunting endeavor. The evaluation of laptop performance plays a critical role in determining its suitability for specific tasks and requirements. Whether you are a student in need of a laptop for research and assignments, a professional seeking high processing power for complex tasks, or a gamer desiring a seamless and immersive gaming experience,

understanding and assessing the performance aspects of a laptop is of utmost importance. The evaluation process involves a comprehensive examination of key components and features that contribute to a laptop's overall performance. These components include the central processing unit (CPU), random access memory (RAM), storage options (hard disk drive or solid-state drive), graphics processing unit (GPU), display quality, battery life, and overall build quality. Each of these elements significantly influences the laptop's performance in various applications and scenarios. The CPU serves as the laptop's "brain," executing instructions and handling tasks. A faster processor with multiple cores enhances multitasking capabilities, improves speed, and boosts overall performance. On the other hand, RAM determines the laptop's ability to handle multiple programs simultaneously, impacting its responsiveness and smoothness of operation. Storage is essential for storing data, files, and applications. Solid-state drives (SSDs) provide faster read and write speeds compared to traditional hard disk drives (HDDs), resulting in quicker boot times and improved file access. The GPU is responsible for managing graphic-intensive tasks such as gaming, video editing, and graphic design. Having a dedicated GPU can significantly enhance performance in these demanding applications. Display quality, encompassing factors like resolution, color accuracy, and refresh rate, directly influences the visual experience of the laptop, particularly for multimedia and gaming purposes. Battery life is a crucial consideration for users who require portability, ensuring that the laptop can operate for extended periods without frequent charging. Moreover, the overall build quality and design of a laptop impact its durability, reliability, and user comfort. Factors such as weight, keyboard ergonomics, and cooling mechanisms also contribute to the overall user experience. By thoroughly evaluating these performance aspects, individuals can make informed decisions and select a laptop that aligns with their specific needs and preferences. Whether it's a high-performance gaming laptop, a lightweight and portable ultra book, or a productivity-focused work machine, understanding the intricacies of laptop performance evaluation empowers users to choose the most suitable device for their intended usage scenario. By carefully evaluating these performance aspects, individuals and organizations can make well-informed decisions when selecting a laptop that matches their specific needs and preferences. Whether it's a high-performance gaming laptop, a lightweight and portable ultra book, or a productivity-focused work machine, understanding the intricacies of laptop performance evaluation empowers users to choose the most suitable device for their intended use. In this comprehensive guide, we will explore the various components and features that impact laptop performance, providing a deep understanding of how to evaluate and compare different models effectively. We will delve into benchmarks, performance metrics, and considerations specific to different use cases, enabling you to navigate the vast landscape of laptops and make confident decisions based on your requirements. As the use of computers continues to grow and play a significant role in our lives, it is crucial to determine whether they enhance or hinder student performance. The effects of computer use on student productivity are not yet fully understood, despite the widespread use of computers in classrooms and the implementation of computer policies. Therefore, it is essential to explore the impact of computer use on student outcomes and identify regulations that can lead to better educational results. Information and communication technology (ICT) has become an integral part of modern classrooms, involving the use of technology for information exchange, collection, and communication. In order to ensure that students in Trinidad and Tobago develop 21st-century skills and meet the demands of a growing economy, the Ministry of Education has been actively incorporating ICT into schools through initiatives such as the establishment of computer labs and the government-led laptop project. The introduction of the government-issued laptop project in 2010 further advanced ICT development in schools, providing each new secondary school student with a laptop for use both at home and in the classroom. To assess the impact of this initiative, a national survey was conducted to examine secondary school students' use of government-issued laptops in Trinidad and Tobago. As technology continues to evolve, the number of computer user’s increases, and new computer models and features are constantly introduced. This study aims to contribute to the resolution of the laptop selection dilemma, whether from an individual or institutional perspective, in the context of the global demand for laptops. The study will identify and evaluate the most significant aspects for effectively selecting a laptop. Today, many individuals find it challenging to imagine their lives without computers, highlighting the critical role computers play in our society. The adaptability, portability, and mobility of laptops make them a popular choice for individuals and organizations. In the realm of education, computers have the potential to significantly enhance productivity. They enable students to utilize educational software, take better notes, complete tasks more efficiently, organize their work, and access a wide range of educational resources. However, concerns regarding student misuse of computers, including cyber bullying and distractions from internet-related activities, have also grown. If students are prone to distractions or engage in counterproductive computer use, the costs of computer utilization may outweigh the benefits. Therefore, it is important to address these concerns and strike a balance that maximizes the advantages of having computers in the classroom while minimizing potential drawbacks.

2. TOPSIS METHOD

In todays increasingly complex and competitive world, decision-making has become more challenging due to the abundance of options and the need to consider multiple criteria. Whether it's making decisions for a

company or personal choices, having an effective method to evaluate alternatives is essential. The Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) has emerged as a prominent decision-making technique. TOPSIS is a systematic approach used to evaluate and rank alternatives based on a set of criteria. Its goal is to identify a solution that closely resembles the ideal solution while minimizing the distance to the negative ideal solution. By considering both positive and negative aspects, TOPSIS provides a comprehensive evaluation for making well-informed decisions. The TOPSIS process involves several steps. First, a decision matrix is created where alternatives are assessed against the criteria. These criteria can be quantitative or qualitative, allowing for a systematic comparison and evaluation of alternatives. Next, weights are assigned to each criterion to reflect their relative importance, and the data in the matrix is normalized to ensure a fair comparison. The ideal and negative ideal solutions are then determined based on the best and worst values for each criterion. The Euclidean distance is calculated between each alternative and these reference points, representing their similarity to the ideal and negative ideal solutions. Performance scores are assigned to alternatives based on the calculated distances, and they are ranked accordingly. TOPSIS is particularly valuable when there are conflicting criteria or trade-offs between attributes. It provides a comprehensive evaluation that goes beyond a single criterion, enabling decision-makers to understand the strengths and weaknesses of each alternative and make informed choices. In this guide, we will provide a detailed exploration of TOPSIS, explaining its principles, steps for implementation, and considerations for effective application. We will also discuss its strengths, limitations, and provide real-world examples to enhance understanding of how TOPSIS can be a powerful tool for decision-making in various domains. The TOPSIS method is commonly employed in multi-criteria decision-making scenarios. It helps in selecting the best alternative from a set of possibilities by assessing how closely they resemble the ideal solution. This approach offers a comprehensive examination by considering both the advantages and disadvantages of each option. The first step involves identifying relevant criteria that are quantitative and indicative of the decision problem. The decision matrix is then normalized and scaled to a range of 0 to 1. The weight of each criterion is determined to reflect its relative importance. Determining the ideal and negative ideal solutions for each criterion allows for the identification of the best and worst values. The distance between each alternative and these reference points is then calculated, measuring their proximity to the positive and negative ideal solutions. Subsequently, the alternatives are ranked based on their scores, with the one closest to the ideal solution being considered the most preferred. This method offers a systematic and logical approach to decision-making, facilitating quick comparisons and assessments across multiple factors. By understanding the principles and steps of TOPSIS, decision-makers can effectively evaluate alternatives and make informed choices that align with their objectives.

3. MATERIALS AND METHOD

Processor Speed (GHz): This study examined the effects of "laptop-free zones" on students' attitudes and learning in large introductory biology lecture sections. In the two areas marked as Control, there were no limitations on where laptop users may sit. The two zones in the lecture hall that are designated as Zoned are the only areas where laptop users are permitted.

Cache (MB): laptop cache of choice A cache is a collection of temporary files that may be used by an application or the operating system. These temporary cache files are kept in memory using cache. Cache memory stores information so you can access it more rapidly when you need it.

RAM (GB: Configurations of laptop RAM Data may be received and read almost instantly thanks to RAM, a type of temporary computer storage. Instead of being written to the permanent hard drive when an application is launched, information is instead momentarily saved for easy access in your computer's memory (sometimes referred to as RAM).

Choice of laptop battery life for each hour If a laptop is used for typical duties like document creation and web browsing, it should last nine to ten hours. You should anticipate five to six hours of operation at maximum capacity, depending on your workload, battery size, and brightness level.

Hard Disk: choosing a laptop's hard drive In laptops and desktop computers, a hard drive or hard disc drive (HDD) is a type of data storage device. An HDD is a "non-volatile" storage drive, which implies it can maintain the data it has stored even if the device is not receiving electricity..

Capacity (GB): choices of laptop capacityYour laptop’s design capacity are the amount of power it could store before you opened the box. What it can currently contain is its full charging capacity.

Weight (Kg): the chosen laptop's weight A compact, transportable personal computer (PC) is known as a computer or notebook, or notebook for short.

Price in rupees: price of your choice of laptop A high-end laptop typically costs between $1,500 and $5,000 or more. Certain high-end laptops, such the Apple Mac Book Pro and the Dell XPS 15,

4. RESULTS AND DISCUSSION

TABLE 1. Processor speed

laptop	processor speed	Cache (MB)	Ram (GB)	Battery life (hours)	Harddisk capacity (GB)
Laptop 1	0.923076923	1	0.5	0.53125	0.5
Laptop 2	0.923076923	1	0.5	1	1
Laptop 3	0.923076923	1	0.5	0.375	1
Laptop 4	1	0.5	0.25	0.625	0.25
Laptop 5	0.923076923	0.5	1	0.1875	0.5
Laptop 6	0.807692308	0.5	0.5	0.375	1
Laptop 7	0.653846154	0.5	0.25	0.4	0.5

Table 1 shows the processor speed; hard disk capacity has 1 GB in Laptop 2, Laptop 3 and Laptop 6. Hard disk capacity has 0.5 GB in Laptop 1, Laptop 5, Laptop 7. ,hard disk capacity has 0.25 GB in Laptop 4.

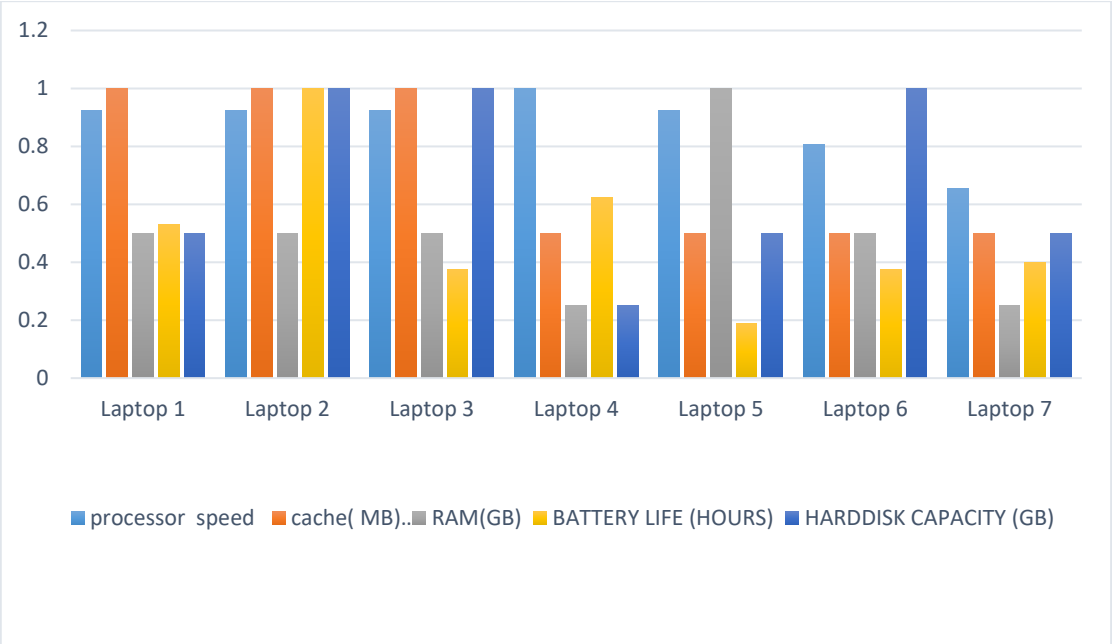

FIGURE 1. Processor speed

Figure 1 shows the processor speed; hard disk capacity has 1 GB in Laptop 2, Laptop 3 and Laptop 6. Hard disk capacity has 0.5 GB in Laptop 1, Laptop 5, Laptop 7. , hard disk capacity has 0.25 GB in Laptop 4.

TABLE 2. Normalized Data

	Normalized Data				
Laptop 1	0.4625	0.5010	0.2505	0.2662	0.2505
Laptop 2	0.4625	0.5010	0.2505	0.5010	0.5010
Laptop 3	0.4625	0.5010	0.2505	0.1879	0.5010
Laptop 4	0.5010	0.2505	0.1253	0.3131	0.1253
Laptop 5	0.4625	0.2505	0.5010	0.0939	0.2505
Laptop 6	0.4047	0.2505	0.2505	0.1879	0.5010
Laptop 7	0.3276	0.2673	0.1336	0.2138	0.3123

In this Table 2 shows that normalized data of all 7 laptops.

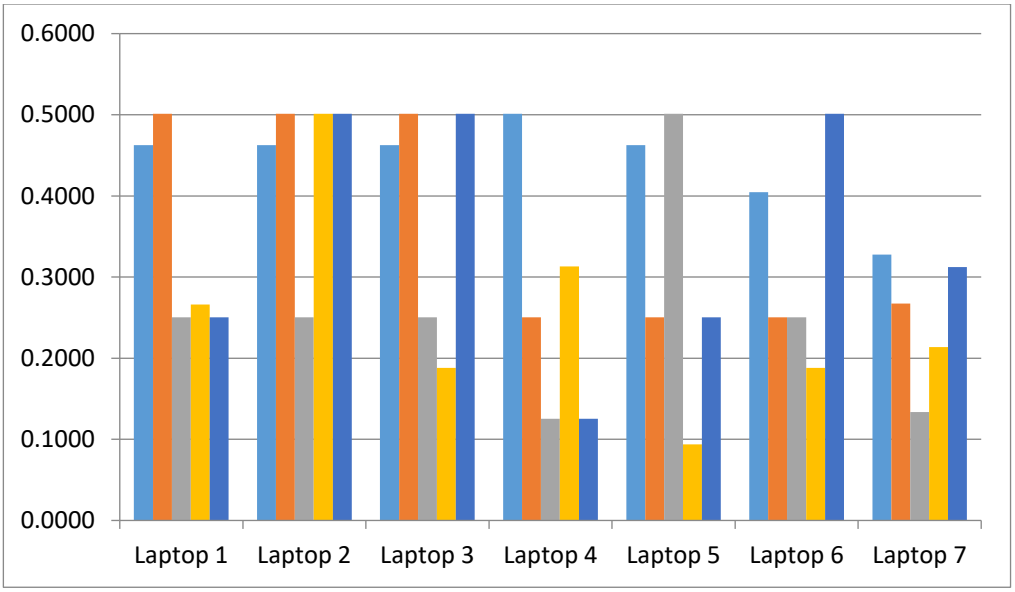

FIGURE 2. Normalized data

In this Figure 2 shows that normalized data of all 7 laptops.

TABLE 3. Weight

	Weight			
Laptop 1	0.20	0.20	0.20	0.20
Laptop 2	0.20	0.20	0.20	0.20
Laptop 3	0.20	0.20	0.20	0.20
Laptop 4	0.20	0.20	0.20	0.20
Laptop 5	0.20	0.20	0.20	0.20
Laptop 6	0.20	0.20	0.20	0.20
Laptop 7	0.20	0.20	0.20	0.20

In this Table 3 shows the weight of the laptop

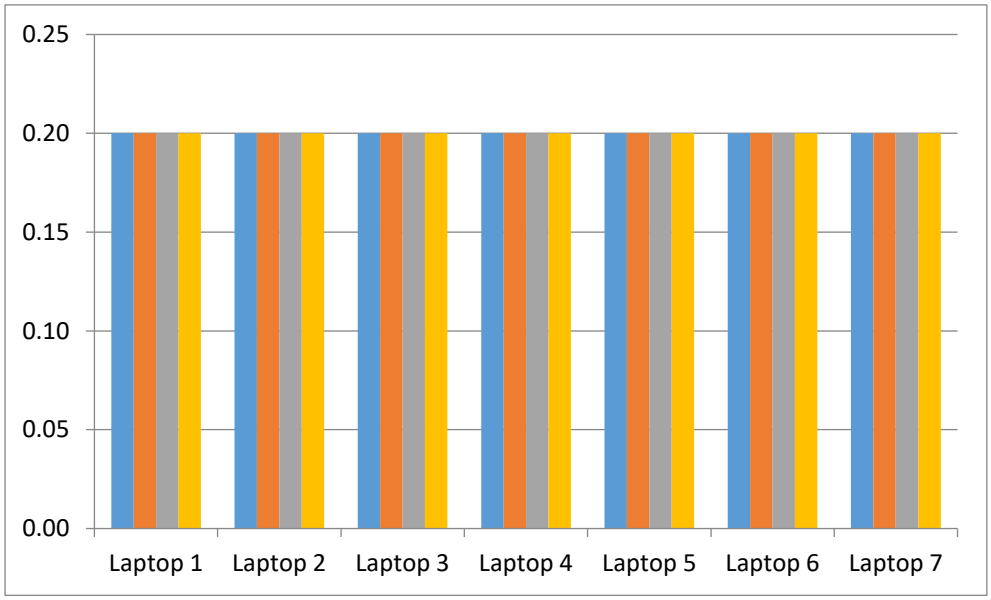

FIGURE 3. weight avg of all seven laptops

In this Figure 3 shows the weight of the laptop

TABLE 4. Weighted normalized decision matrix

	Weighted normalized decision matrix			
Laptop 1	0.0925	0.1002	0.0532	0.0501
Laptop 2	0.0925	0.1002	0.1002	0.1002
Laptop 3	0.0925	0.1002	0.0376	0.1002
Laptop 4	0.1002	0.0501	0.0626	0.0251
Laptop 5	0.0925	0.0501	0.0188	0.0501
Laptop 6	0.0809	0.0501	0.0376	0.1002
Laptop 7	0.0655	0.0535	0.0428	0.0625

In the table 4 variation of Weighted normalized decision matrix of all laptops

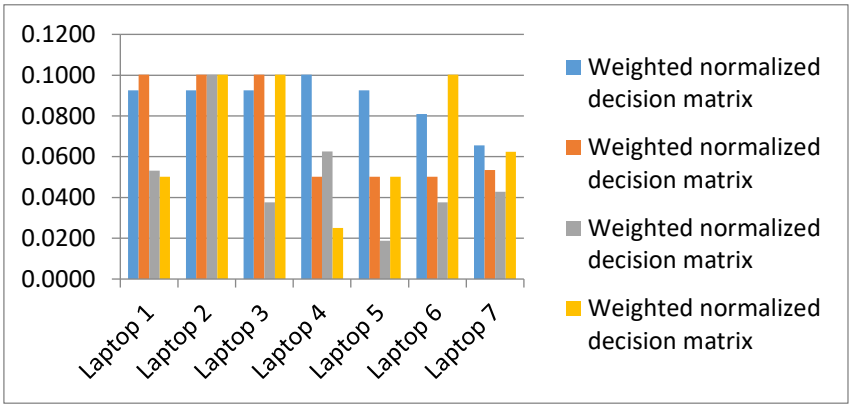

FIGURE 4. weighted normalized decision matrix

In the figure 4 variation of Weighted normalized decision matrix of all laptops

TABLE 5.Positive Matrix

	Positive Matrix			
Laptop 1	0.1002	0.1002	0.1002	0.1002
Laptop 2	0.1002	0.1002	0.1002	0.1002
Laptop 3	0.1002	0.1002	0.1002	0.1002
Laptop 4	0.1002	0.1002	0.1002	0.1002
Laptop 5	0.1002	0.1002	0.1002	0.1002
Laptop 6	0.1002	0.1002	0.1002	0.1002
Laptop 7	0.1002	0.1002	0.1002	0.1002

In this Table 5 represents the Positive Matrix

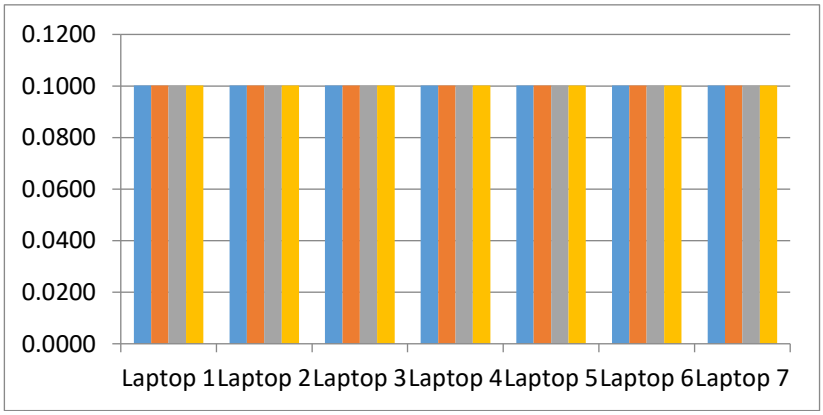

FIGURE 5. Positive Matrix

In this Figure 5 represents the Positive Matrix

TABLE 6. Negative Matrix

	Negative matrix			
Laptop 1	0.0655	0.0655	0.0655	0.0655
Laptop 2	0.0655	0.0655	0.0655	0.0655
Laptop 3	0.0655	0.0655	0.0655	0.0655
Laptop 4	0.0655	0.0655	0.0655	0.0655
Laptop 5	0.0655	0.0655	0.0655	0.0655
Laptop 6	0.0655	0.0655	0.0655	0.0655
Laptop 7	0.0655	0.0655	0.0655	0.0655

In this Table 6 represents the Negative Matrix

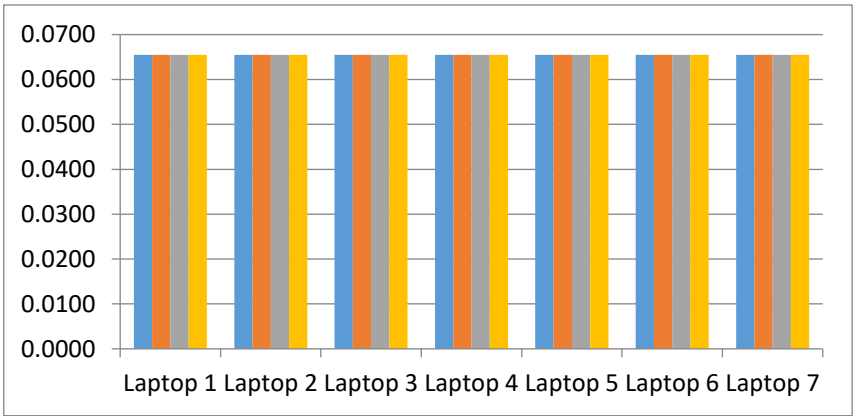

FIGURE 6. Negative matrix

In this Table 6 represents the Negative Matrix

TABLE 7 .SI Plus

	SI Plus
Laptop 1	0.0691
Laptop 2	0.0077
Laptop 3	0.0631
Laptop 4	0.0978
Laptop 5	0.1082
Laptop 6	0.0825
Laptop 7	0.0901

In this Table 7 shows the value of SI Plus

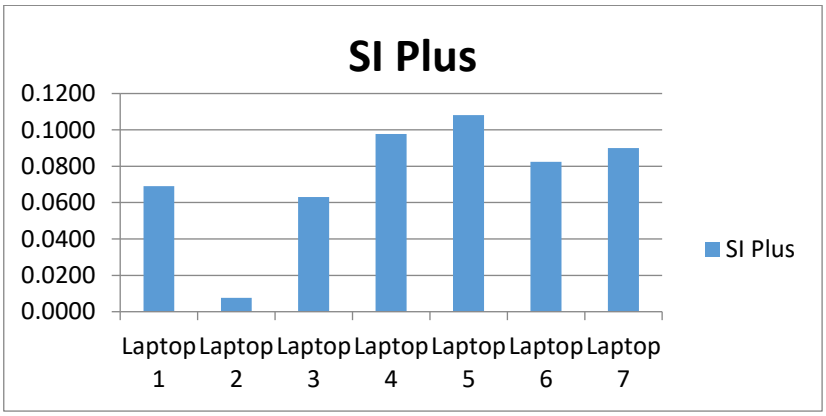

FIGURE 7. The si plus

Figure 7: it is representing the si plus value of all 7 laptops

TABLE 8. SI Negative

	Si Negative
Laptop 1	0.0482
Laptop 2	0.0659
Laptop 3	0.0626
Laptop 4	0.0556
Laptop 5	0.0582
Laptop 6	0.0496
Laptop 7	0.0259

In this Table 8 shows the value of SI Negative

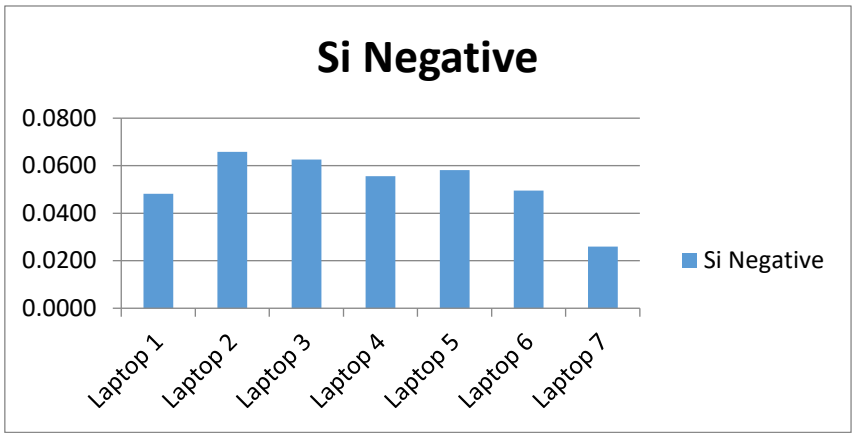

Figure 8.SI Negative

Figure8, it represents the si negative value of all seven laptop

TABLE 9.Ci

	Ci
Laptop 1	0.4107
Laptop 2	0.8952
Laptop 3	0.4979
Laptop 4	0.3622
Laptop 5	0.3497
Laptop 6	0.3755
Laptop 7	0.2236

In this Table 9 shows the high ci value got laptop 2 and low ci value got laptop 7

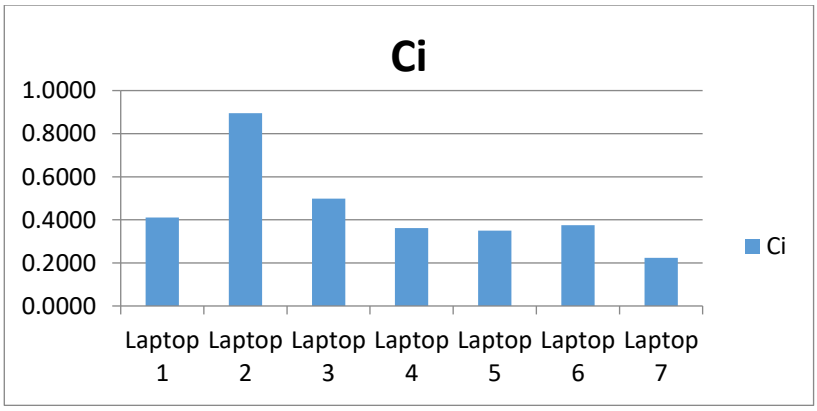

FIGURE 9.ci

Figure9 it represents the ci value of all seven laptops. the high ci value got laptop 2 and low ci value got laptop 7

TABLE 10. Rank

	Rank
Laptop 1	**3**
Laptop 2	**1**
Laptop 3	**2**
Laptop 4	**5**
Laptop 5	**6**
Laptop 6	**4**
Laptop 7	**7**

In this Table 10 shows the laptop 2 got first rank and laptop seven got last rank.

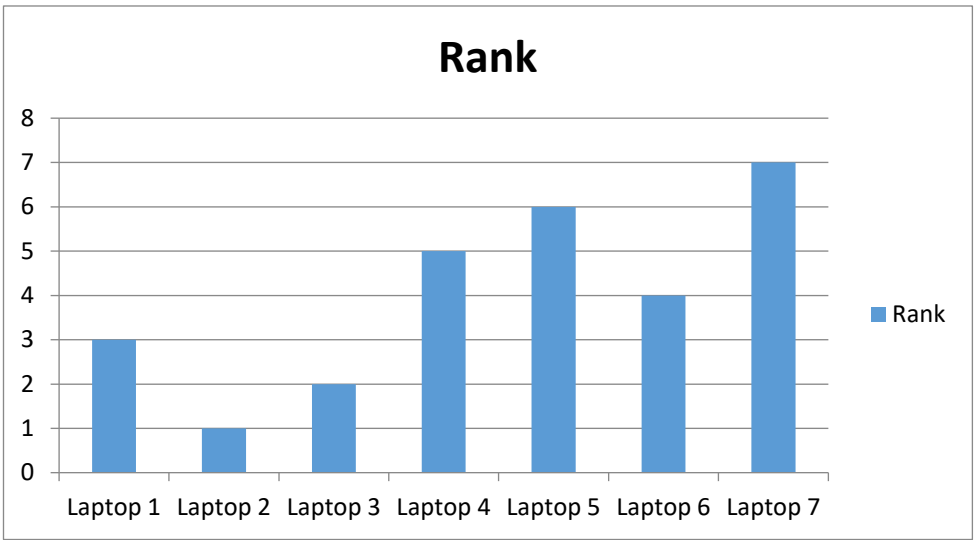

FIGURE 10. The rank of all seven laptops

In this figure10 shows the laptop 2 got first rank and laptop seven got last rank.

5. CONCLUSION

We've demonstrated a revolutionary portable laptop control experiment that doesn't need the room or money that normal undergraduate control laboratories do. All of the concepts needed for an introduction course in controls, as well as experiment, are covered in interactive experiments. Three findings can be motivating to proponents of e-learning in dental schools. First, compared to upperclassmen, freshmen had much more favorable opinions about the frequency of use, cost-effectiveness, educational value, and general quality of laptops and included software. Second, even though the cost-effectiveness of the computers and software was appraised by students at vendor-supplied schools. Zone-making had a favorable effect on the classroom atmosphere and students' attitudes, even if it had little effect on total student performance. Even though zoned laptop users spent more time off-task, this wasn't linked to a decline in performance. Therefore, this is an effective tactic for teachers who want to protect student choice in note-taking while causing the least amount of disruption to those students who don't use laptops in class. The findings of adding the cognitive architecture Soar to a laptop were presented in this research. In order to find the locations and the number of screw holes, a combination of force sensing from a screwdriver and vision sensing from several webcams was used. The location of circles containing screws and the areas devoid of screws were remembered by Soar using its semantic memory module. By employing Soar to simplify the screw removal process for eight distinct laptop models, these findings were empirically confirmed.

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