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Development of a Rotating Platform with Built-In Power Extension: A Modern Lazy Susan

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I. THE PROBLEM AND ITS SCOPE INTRODUCTION

A. Rationale

Today, tables have evolved beyond their traditional functions of dining and studying. Now the table is an essential platform for holding electronic devices such as mobile phones, laptops, lamps and other gadgets that will require continuous access to electricity. However, a problem arises from the inconveniences caused by multiple wires such as wire entanglement, limited access for power source and potential safety hazards.

To address these occurring problems, this study proposes the Development of a Rotating Platform with Built-In Power Extension: A Modern Lazy Susan to provide a much more convenient approach in dealing with wire entanglement. The rotating mechanism provides flexibility allowing users to adjust table orientation and without disrupting connected devices to provide a comfortable workplace. Additionally, the stationary extension wire provides power source and ensures safety to users and prevents cord twisting and tangled wire during rotation.

This study aims to merge functionality, safety, and efficiency in a single furniture piece by integrating stationary power extension into a rotating table or lazy susan; the proposed study seeks to improve user convenience, promote workplace tidiness, and minimize electrical-related risks. Lastly, the project aims to contribute to the growing demand for smart , ergonomic, and space-saving solutions that are suitable for both home use and office environments.

B. Theoretical background

This study is anchored on the Technological Acceptance Model(TAM). Although TAM is technically a model, it is a widely accepted theoretical basis in technology acceptance studies. TAM explains that perceived usefulness and perceived ease of use greatly influence the individual's acceptance towards technological innovation. In the context of a rotating platform with built-in power extension, TAM provides a key to assess whether users perceive the product usefulness and beneficial in enhancing convenience and functionality, and whether it is easy to operate in everyday settings like kitchen, office and collaborative spaces. This model justifies that this study emphasizes usability and consumer acceptance as a successful design(Davis,1989).

Additionally, the study is also supported by the Affordance Theory, that objects signal their possible uses to users(Gibson, 1979). Applying this to the rotating platform, surface, form, and integrated sockets should commonly correct actions such as placing items, rotating the surface, or plugging devices without requiring extensive instruction. This will support the goal of intuitive interaction.

Lastly, Fitts Law is utilized to explain the relationship between movement time, target size, and distance(Fitts,1954). This model provides an important basis for the placement and sizing of sockets and ports on the rotating platform to ensure they can be accessed easily, quickly, and accurately, hereby minimizing user effort and maximizing efficiency.

These theories, principles, and laws form a strong foundation for the development of the rotating platform with built-in power extension. TAM addresses acceptance and adoption, Anthropometry ensures ergonomic stability, Affordance Theory enhances intuitiveness, and Fitt's Law promotes interaction efficiency. This theoretical framework supports both functionality and user-centered goals of the study.

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C. Statement of the Problem

This study assesses the efficiency of a Rotating Platform with Built-In Power Extension: A Modern Lazy Susan at Cebu Technological University - Main Campus during the school year 2025-2026 a basis for prototype development.

1) The demographic profile of the respondents in terms of;

- Age;
- Course; and
- Year level.

2) How the respondents perceived the product in terms of;

- Usefulness; and
- Ease of use.

3) Is there a significant difference in the respondents' perception of the product when grouped according to their demographic profile?

4) Based on the findings of the study, what improvements can be proposed for further prototype development of the Rotating Platform with Built-In Power Extension?

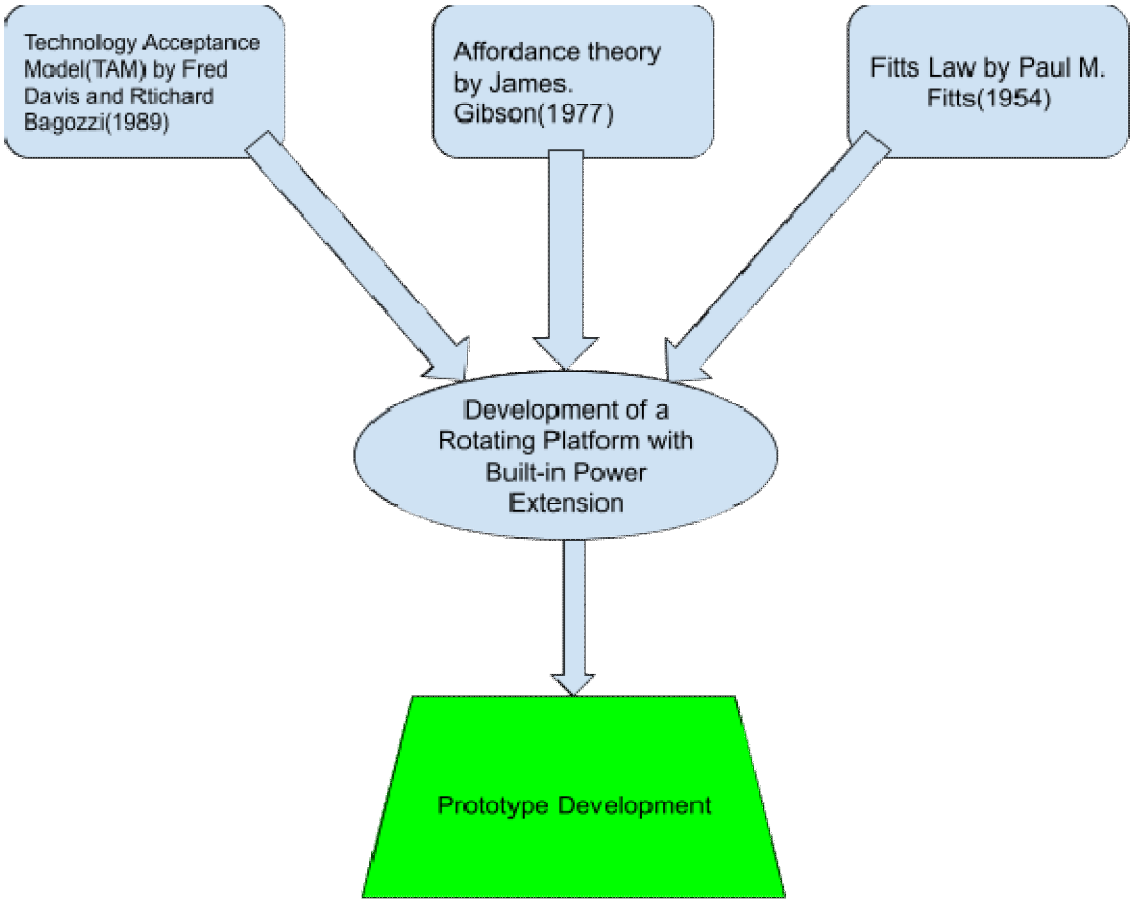


FIGURE I. Conceptual framework of the study

D. SIGNIFICANCE OF THE STUDY

The primary objective of this study is to design and develop a Rotating Platform with Built-In Power Extension: A Modern Lazy Susan that combines convenience, safety, and functionality in one innovative furniture piece. This study holds significance for several groups as follows:

For the Users, this study provides a modern solution for minimizing wire entanglement and maximizing workspace organization. The integration of a built-in power extension allows users to conveniently charge and operate multiple electronic devices without clutter, while the rotating platform promotes flexibility and comfort in use. It enhances efficiency in both household and office environments by offering a user-friendly and ergonomic design.

For Furniture Designers and Makers, the project introduces a new concept that merges traditional furniture craftsmanship with modern technological innovation. It serves as a reference for future designs that integrate electrical components into furniture while maintaining safety and aesthetic appeal. The study encourages local furniture makers to explore functional designs that meet the growing demand for smart and space-saving furniture.

For the Academic Community, this research contributes to the field of Industrial Technology, particularly in Furniture and Cabinet Making, by demonstrating the application of technological theories—such as the Technological Acceptance Model, Affordance Theory, and Fitts' Law—in product design and development. It provides a valuable learning reference for future students undertaking similar innovation-based projects.

For the Industry, the study may serve as a model for furniture manufacturers seeking to produce multifunctional products that cater to the needs of modern consumers. It emphasizes safety, efficiency, and adaptability—qualities that are highly sought after in contemporary furniture markets.

For Future Researchers, this study can serve as a foundation for further research and improvement of similar designs. Future researchers may build upon this concept by incorporating wireless charging systems, advanced rotation mechanisms, or sustainable materials to further enhance functionality and environmental friendliness.

E. DEFINITION OF TERMS

The following terms are defined conceptually and operationally to provide clarity and better understanding of the materials and components used in this study:

1) Rotating Platform – Refers to the circular or movable top surface that can turn around its central axis, allowing users to easily rotate and access items placed on it without physically moving the base or the table.
2) Lazy Susan – A rotating tray typically placed on tables or countertops to distribute food or objects easily. In this study, it serves as the main structure where the rotating mechanism is integrated.
3) Power Extension (Extension Wire) – A length of electrical cable with multiple outlets used to connect several devices to a single power source. In this project, it is built into the rotating platform to provide safe and convenient access to electricity.
4) Base Plate – The lower part of the platform that supports the rotating top and keeps it stable while allowing smooth rotation.
5) Bearing (Ball Bearing) – A mechanical component that reduces friction between moving parts, enabling smooth and consistent rotation of the platform.
6) Wood – The primary material used for the table structure, specifically chosen for its strength, workability, and natural aesthetic appeal.
7) Resin (Laminate Finish) – A synthetic material applied to the surface of the platform to create a smooth, glossy, and durable finish. It protects the wood and enhances the visual appearance of the table.
8) Electrical Wire – Conductors used to transmit electrical current from the power source to the built-in sockets on the platform.
9) Socket Outlet – A built-in electrical component that allows users to plug and power their devices safely.
10) Switch – A control device used to open or close the electrical circuit within the built-in power extension, ensuring safe and controlled use of electricity.
11) Plug – The electrical connector that links the power extension to the main power supply.
12) Screw – A metal fastener used to join parts of the structure securely, ensuring stability and durability of the rotating platform.
13) Varnish – A transparent coating applied to wood surfaces to protect them from moisture, scratches, and wear while enhancing the natural wood color and grain.
14) Plywood – A type of engineered wood made from thin layers of wood veneer glued together, providing strength, stability, and resistance to warping.
15) Metal Bracket – A small metal support used to reinforce joints and add strength to the structure, particularly in connecting the rotating parts.

II. REVIEW OF RELATED LITERATURE

This part of the study presents a different review of related literature and studies that are related to the study of developing a rotating platform with built-in power extensionfor BIT-FCM students.

User-centered design (UCD) is a framework of processes in whichusabilitygoals, user characteristics, environment, tasks and workflow of a product, service or brand are given extensive attention at each stage of the design process.

This attention includes testing which is conducted during each stage of design and development from the envisioned requirements, through pre-production models to post production(Norman, 1986). Development of a rotating platform with built-in power extension ensures that every mechanism that a rotating platform has promotes efficiency in everyday work. The concept of usefulness and ease of use has been widely discussed in studies related to product design, usability, and technology acceptance. According to the technology acceptance model by Fred D. Davis(1989), This model explains that the adoption and acceptance of a technology depend largely on two main factors: perceived usefulness and perceived ease of use. According to Davis, perceived usefulness refers to the degree to which a person believes that using a particular system would enhance their performance, while perceived ease of use refers to the degree to which a person believes that using the system would require minimal effort. The model has been widely applied in evaluating different types of systems and products to determine how user perceptions influence their intention to use a technology. In relation to Development of a rotating platform with built-in power extension users will perceive the modern lazy susan as beneficial in improving efficiency when working and accessing electrical devices on the table. If users perceive the modern lazy susan as both useful and easy to use, it is likely to be accepted and utilized in everyday use.

According to Jacob Nielsen usability consists of multiple key components such as learnability, efficiency, memorability, error reduction, and user satisfaction. These principles explain that products should not only be functionable but also easy for the users to understand and operate. In relation to modern lazy susan, the rotating platform makes it easy to access items on the surface without any difficulties. The development of a rotating platform with built-in power extension aims to enhance convenience by minimizing the need for multiple extension cords or frequent repositioning of devices. Therefore, the application of usability principles can help to ensure that the modern lazy susa provides an efficient access to both physical objects or items as well as power source.

International standards also support the importance of usability in product design. The ISO 9241-11 usability standard defines usability as the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a particular context of use. This standard emphasizes that systems should be designed to reduce effort while improving productivity and overall user experience. In relation to the development of a rotating platform with built-in power extension, this concept suggests that the product should allow users to rotate the platform smoothly while simultaneously accessing electrical outlets in a convenient and organized manner. By improving accessibility and reducing clutter caused by traditional extension cords, the platform may enhance both efficiency and satisfaction for users.

In addition, research in human factors and ergonomic design also highlights the importance of designing products that match human capabilities and limitations. According to Donald Norman in his book The Design of Everyday Things, effective product design should focus on intuitive interaction, clear functionality, and reduced cognitive effort. Norman emphasizes that users tend to prefer products that are simple, understandable, and convenient to use. In the context of this study, applying ergonomic principles is essential in designing a rotating platform that allows smooth movement and easy access to electrical outlets without requiring complex manipulation. The rotating feature of the modern Lazy Susan allows users to reach devices or objects with minimal physical effort, while the built-in power extension eliminates the need for multiple external cords, thereby improving safety and convenience.

Furthermore, the adoption of innovative products is also explained by the Diffusion of Innovations theory proposed by Everett M. Rogers. Rogers states that new technologies are more likely to be adopted when they demonstrate relative advantage, compatibility, and low complexity. Relative advantage refers to the perceived improvement that a product offers compared to existing solutions, while complexity refers to how difficult the innovation is to understand or use. In relation to the present study, the development of a rotating platform with integrated power extension provides a relative advantage by combining two practical functions: rotation and electrical accessibility into a single device. This multifunctional design may reduce workspace clutter and improve efficiency when using multiple electronic devices. If the platform is designed to operate smoothly and intuitively, its low complexity may encourage users to adopt it as a practical solution for modern workspaces and household environments.

Overall, the reviewed literature suggests that usefulness, ease of use, usability, and ergonomic design play a significant role in determining how users interact with and accept a product. These theoretical perspectives support the development of a modern Lazy Susan with built-in power extension by emphasizing the need for a design that enhances convenience, accessibility, and efficiency while maintaining simplicity in operation. By integrating these principles, the proposed rotating platform aims to improve the way users manage electronic devices and organize items in shared spaces such as dining tables, workstations, and study areas.

III. RESEARCH METHODOLOGY

This chapter presents the research design of study, flow of the study, environment, participants, instrument, data gathering procedure, ethical consideration, statistical treatment and the scoring procedure of the study.

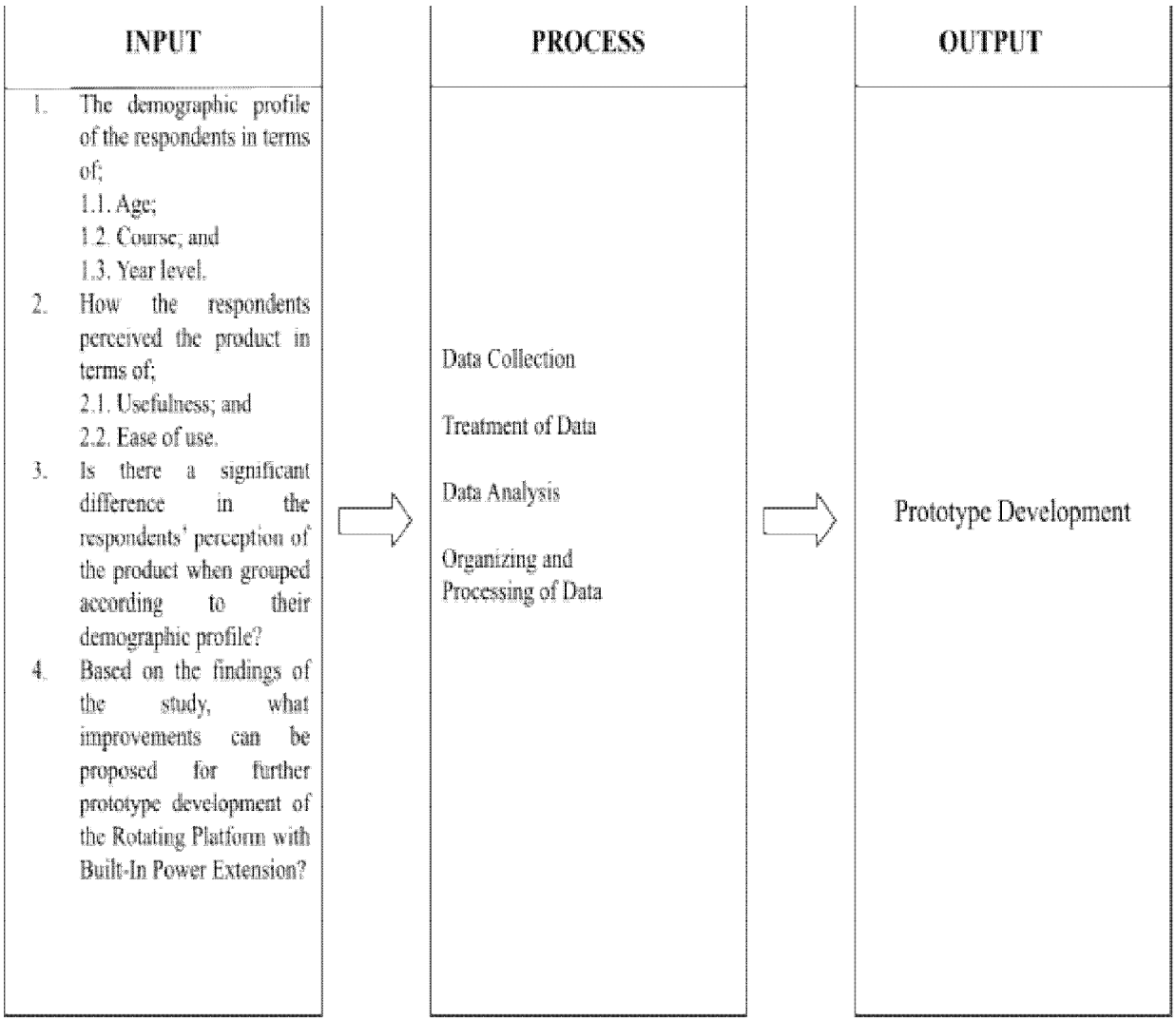
A. Research Design

This study utilizes survey descriptive design in order to gather or obtain data from the furniture related students of Cebu Technological University. This method will provide detailed information about the demographic profile, ease of use, and perceived usefulness of the participants on a certain subject. It is descriptive because it describes the usefulness and ease of use of the rotating platform with built-in power extension.

B. Research Flow

The input of this research are the different demographic profiles of the furniture related students such as age, course, year level, ease of use, and perceived usefulness. The data gathered is subject to treatment, analysis, interpretation, organizing, and processing. Lastly, may the researcher make a prototype enhancement plant based on their findings.

FIGURE II: Flow of the research



C. Research Environment

The study will be conducted at a specific university in Cebu city namely Cebu Technological University - main campus. The researchers will be conducting this study at Cebu Technological University in order to gain a different perception of the study among furniture related students and possibly making an enhancement plan for the product. The study will benefit the school by improving convenience, accessibility, safety, and efficiency in using electrical devices in classrooms or offices.

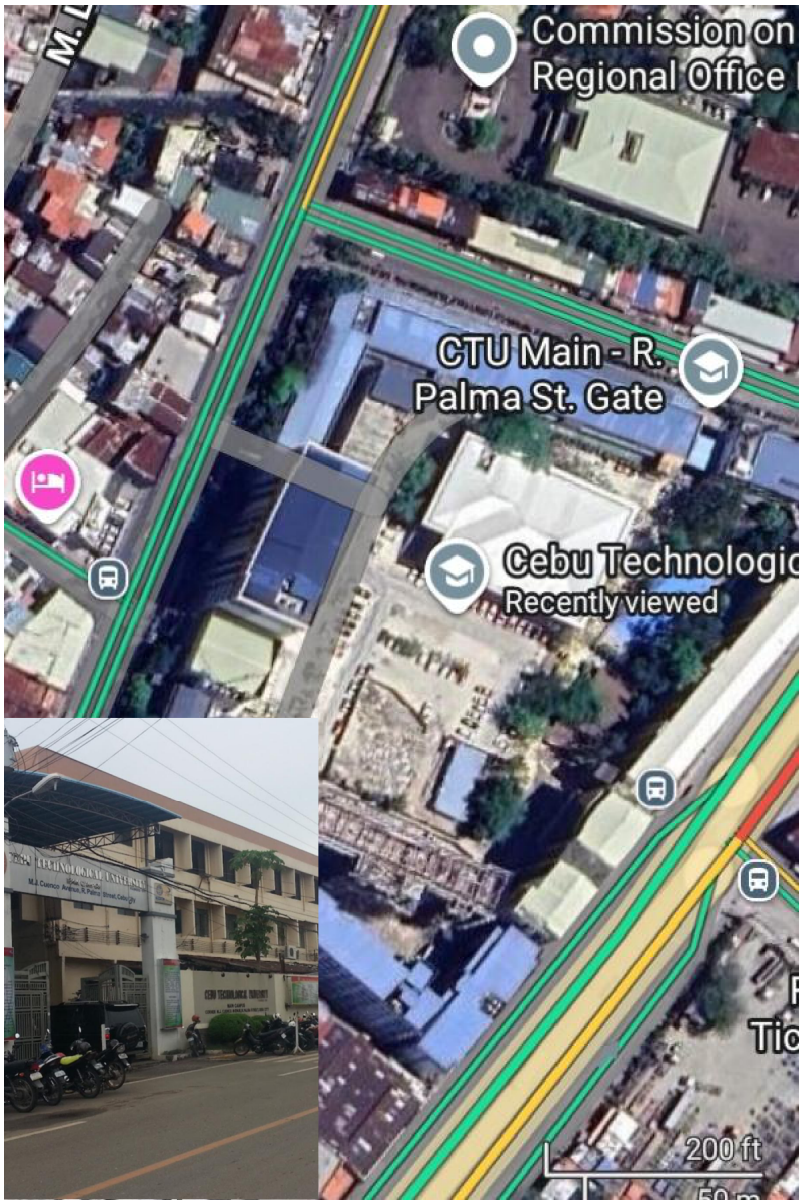


FIGURE III. Location of the study

D. Research Participants

The participants of the study are the furniture related students of Cebu Technological UniversityThe - main campus. This research will use the sample frame population with a sample population of 30 respondents from different courses with furniture related subjects

E. Research instrument

The data of this study will be collected using the researcher-made questionnaires which gathers demographic profiles and the ease of use and perceived usefulness of the modern lazy susan. Since this is a researcher-made tool, pilot testing will be performed and cronbach's alpha will be used to test the reliability of the tool.

F. Data Gathering Procedure

Before the formal start of data gathering, a transmittal letter will be sent to the school chair person of Cebu Technological University - main campus as a formal way of asking permission to conduct a study in the school parameters then, the researchers will give the signed transmittal letter to the professors of furniture related students.

After which, the researchers will conduct an orientation to respondents of the study before answering the survey questionnaires. Lastly, the data gathered will be the subject for analyzing and interpretation of data.

G. Ethical Considerations

Observed by the ethical standards of giving protection and respect to the respondents of the study, the individual rights and privileges of the respondents will be clearly explained by the researchers before taking part in the study. The privacy of the said respondents will be protected and respected by the researchers during the process of the study. The participation of the respondents in the study are voluntary and will not be forced to participate. Lastly, the gathered information from the respondents of the study will be handled in private and will be disposed properly when the study is complete.

IV. PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

This chapter presents, analyzes, and interprets the data gathered from the respondents of the study. The data focuses on the demographic profile, perceived usefulness, and ease of use of the developed Rotating Platform with Built-In Power Extension.

Respondents of the Study

A total of 30 respondents participated in the study. They are students from furniture-related courses at Cebu Technological University – Main Campus.

1) Demographic Profile of the Respondents

Table 1: Distribution of Respondents According to Age

Age	Frequency	Percentage
18 - 20	16	53.33%
21 - 23	10	33%
24 and above	4	13.33%
	30	100%

Table 1 presents the age distribution of the respondents, showing that the majority belong to the 18–20 age group, with 16 respondents (53.33%). This indicates that more than half of the participants are young college students who are likely in the early stage of their academic journey. The 21–23 age group follows with 10 respondents (33%), representing a considerable portion of students who may already have gained some academic or practical experience.

Meanwhile, the 24 years and above group has the smallest number of respondents, with only 4 (13.33%), suggesting limited participation from older or returning students. Overall, the data reveals that the study is largely composed of younger individuals, which may influence the perspectives and responses gathered.

Table 2: Distribution According to Course

Course	Frequency	Percentage
BIT - Furniture & cabinet making	18	60%
Other related courses	12	40%
	30	

Table 2 shows the distribution of respondents based on their course. The majority, 18 out of 30 respondents (60%), are from BIT – Furniture and Cabinet Making, indicating that most participants have a direct background and relevant knowledge related to the product being studied.

Meanwhile, 12 respondents (40%) come from other related courses, providing additional insights from a broader perspective. Overall, this distribution suggests that the study largely reflects the views of individuals knowledgeable in furniture design and construction, making the results more reliable and aligned with the product's purpose.

Table 3: Distribution According to Year Level

Year level	Frequency	Percentage
1st Year	8	27%
2nd Year	10	33%
3rd Year	7	23%
4th Year	5	17%
	30	100%

Table 3 presents the respondents according to their year level. The largest group is composed of 2nd year students, with 10 respondents (33%), indicating that they form the core of the study participants. This is followed by 1st year students with 8 respondents (27%), showing a strong representation of beginners.

Meanwhile, 3rd year students account for 7 respondents (23%), and 4th year students have the smallest group with 5 respondents (17%). Overall, the distribution reflects a balanced representation across year levels, though slightly concentrated in the lower to middle years, suggesting that the responses capture both fresh perspectives and some level of experience in the field.

2) Perceived Usefulness of the Product

Table 4: Usefulness of the Rotating Platform

Response	Frequency	Percentage
Very Useful	12	40%
Useful	10	33%
Moderately Useful	5	17%
Not Useful	3	10%
	30	100%

Table 4 shows the respondents' perception of the usefulness of the rotating platform. The highest number of respondents, 12 (40%), rated the product as "Very Useful," while 10 respondents (33%) rated it as "Useful," resulting in a combined positive response of 73%, which indicates strong approval of the product.

Meanwhile, 5 respondents (17%) rated it as "Moderately Useful," suggesting that while the product is beneficial, there is still room for improvement. Only 3 respondents (10%) rated it as "Not Useful," representing a small minority, further supporting the overall positive perception of the product's usefulness.

3) Ease of Use of the Product

Table 5: Ease of Use

Response	Frequency	Percentage

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Very Easy to Use	14	47%
Easy to Use	9	30%
Neutral	4	13%
Difficult to Use	3	10%
	30	100%

The results indicate that the majority of respondents perceive the system as easy to use, reflecting a generally positive user experience. Specifically, 47% rated it as very easy to use, while 30% described it as easy, resulting in a combined 77% of users expressing favorable perceptions. This suggests that the system demonstrates a high level of usability and accessibility, with an effective design and functionality that allows users to interact with it comfortably, even with minimal training or technical expertise.
However, not all responses were positive. About 13% of respondents remained neutral, possibly due to limited familiarity or minor usability concerns, while 10% found the system difficult to use. Although these groups represent a smaller portion, their feedback highlights areas for improvement, such as enhancing instructions, simplifying features, or refining the interface. Overall, while the system is largely user-friendly, continuous improvements are recommended to ensure a more inclusive and satisfactory experience for all users.
Furthermore, the data shows that there is no significant difference in the respondents' perception of usefulness and ease of use when grouped according to age, course, and year level. This indicates that the product is generally accepted across different groups of users.
Feedback from Respondents
The respondents provided the following feedback regarding the product:
"The rotating feature makes it easier to access items."
"The built-in extension is very helpful for charging devices."
"It reduces clutter on the table."
"The design is convenient and modern."
"Improve the durability and materials used."
Add more outlets or USB ports."
Analysis of Feedback:
The feedback shows that respondents appreciate the functionality, convenience, and innovation of the product. However, they also suggested improvements in durability, design enhancement, and additional features, which are important for future development.

V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

A. Summary

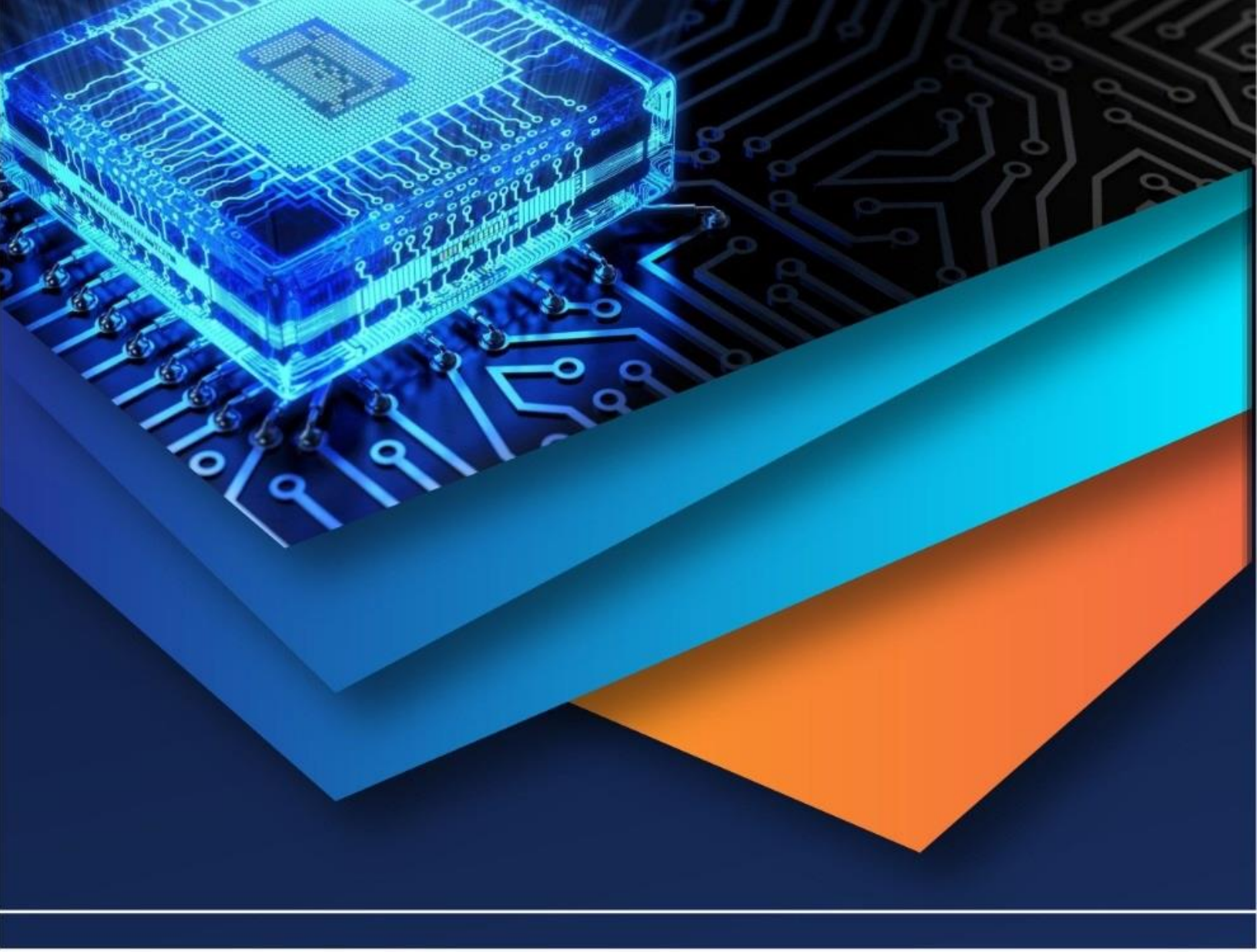
This research focused on the development and evaluation of a Rotating Platform with Built-In Power Extension: A Modern Lazy Susan, designed to address common workspace problems such as wire entanglement, limited access to electrical outlets, and disorganized table setups. The study aimed to combine functionality, safety, and convenience into a single innovative furniture product suitable for both home and office use.
Grounded in theories such as the Technological Acceptance Model (TAM), Affordance Theory, and Fitts' Law, the study emphasized usability, efficiency, and user-centered design. These principles guided the development of the prototype to ensure that it is not only functional but also easy and intuitive to use.
A descriptive survey research design was employed, involving 30 respondents from furniture-related courses at Cebu Technological University – Main Campus. Data were gathered using a researcher-made questionnaire focusing on demographic profile, perceived usefulness, and ease of use of the product.
The findings revealed that the majority of respondents perceived the product positively. Specifically, 73% rated the rotating platform as useful or very useful, while 77% found it easy or very easy to use.

These results indicate a high level of user acceptance and satisfaction. Furthermore, no significant differences were found in perceptions when respondents were grouped according to age, course, and year level, suggesting that the product is widely acceptable across different user groups.

Feedback from respondents highlighted the product's strengths, particularly its ability to reduce clutter, improve accessibility, and provide convenience through its rotating mechanism and built-in power extension. However, suggestions for improvement included enhancing durability, using higher-quality materials, and adding more features such as additional outlets or USB ports.

Overall, the study concludes that the developed rotating platform is an effective and innovative solution that meets the needs of modern users. It successfully integrates traditional furniture design with technological functionality, contributing to the advancement of smart and ergonomic furniture. The study also recommends further improvements and future innovations to enhance the product's performance, durability, and applicability in various settings.

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