

Design and Development of Retractable Art Material Case with Compartments

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Abstract: *Organizing, categorizing, protecting, and keeping your art and art equipment are one of the difficult situations of an artist this day. Most people struggle with it at some point or another. One of the biggest reasons it's hard to declutter for many people is simply lack of storage, so this can make organizing items more difficult. The proponents conduct this study to formulate Retractable Art Materials Case with Compartments, made of wood. It is to help improve and easy for the artist organizing their art materials. This product could be adjusted and slide on the both sides to keep the layers accessible. To measure the effectiveness of of the Design and Development of Retractable Art Materials Case with Compartments, the proponents construct the product at Kaskag Brgy. Washington, Surigao City, by the following procedures of constructing Retractable Art Material Case with Compartments.*

Keywords: Retractable, Art Materials, Compartments

I. INTRODUCTION

One of the fundamental and practical aspects of art is the importance of materials, the things artist use when they make a work of art influences both form and the content. Every material brings something special to the creative process and the finished work, Retractable Art Material Case with Compartments is not an exemption to that. The past studies stated the advantages and disadvantages of having a material case getting carried for daily basis. Drafting students and Artists today are having difficulty struggling to deal with current technologies, particularly those who haven't been able to come up with existing technologies yet. Some of the problems include the functionality, durability, economy and safety using existing Art Material Case (Asefi, et.al., 2013).

It is important to have art materials organizers. According to Grove Collaborative, nothing compares to keeping all of your artistic supplies organized and accessible. Art material storage Case will keep your stuff organized. Making art may be enjoyable with the right organization and storage. It is easier to focus entirely on the work at hand, creativity is enhanced when all of your art materials are easy to find.

This condition will influence the comfort level of the technology students where it also makes an impact in their productivity since one of the factors that affect the worker's productivity is the working environment. By considering functionality in the design, the case would not only become portable but also convenient to use (Radvan, et.al.,2013). In spatial design, saving space in a compact type of case is essential to optimize energy usage that's why the improvement of multi-functionality of the overall design addresses the problem of comfort. The present study about the Retractable Case presents a solution in minimizing the use of space, energy and time and making a portable case that will benefit technology students and other artist. Functionality is one of the essential performing tasks of the product. As stated by (Hartomo Soevardi, et. Al., 2016) in their study "The development of working environment comfort to improved productivity". The case also emphasizes its reliable and safety aspect for it has locks to make sure every part is secured. The study aims to develop a space saving multipurpose Retractable Art Material Case with Compartments for improved performance. One of the goals is made to do a certain purpose for drafting and engineering students. By mean of this, they may conveniently bring their materials and have access to them anytime they need them. Features and functions are extracted and taken from previous research and patent for our improvised concept generation is hereby presented (Hou, et.al. 2021).

II. REVIEW OF LITERATURE

Benefits of Storage for Artist

As an artist, we know the difficulties that come with organizing, categorizing, protecting, and keeping our art and art equipment. It is very important to take good care of your art supplies, you don't want to spend all that money on high-quality paint, pencils, brushes, or etc. only to scatter them around in a haphazard manner. It is essential to organize your art supplies, and responsibly storing them is a "must." (Bot, G. 2022) A container is frequently the most effective storage method for an item. This will help keep it clean, keep fragments or other parts that have fallen off with the item, and depending on the kind of container, it will help move the item from one place to another and prevent it from breaking. Most likely, boxes are the most frequently used containers. Storage boxes are durable, reusable containers used to carry things and related components. They give a perfect solution to conserve space and keep spaces neat and organized because they come in a variety of sizes to contain a variety of items.

Tool Case: Types, Use and Benefits

For those of us who work as drafters, plumbers, and other tradespeople, a tool case is a necessity. We can easily and quickly access the tools, gadgets, and equipment we require thanks to it. Hard-walled plastic boxes with sections for organizing tools for easy access has replaced the idea of the traditional metal box into which tools were packed and hurled (Jackson, et.al., 2007). The materials used to construct tool boxes are a crucial component. The materials for a tool case should be chosen based on the tools it will hold and the range of tasks or applications it will be used for.

Wooden Boxes and Their Benefits

A container is frequently the most effective storage method for an item. This will help keep it clean, keep fragments or other parts that have fallen off with the item, and, depending on the kind of container, it will help move the item from one place to another and prevent it from breaking. Most likely, boxes are the most frequently used containers. Storage boxes are durable, reusable containers used to carry things and related components. They give a perfect solution to conserve space and keep spaces neat and organized because they come in a variety of sizes to contain a variety of items. Wooden boxes have served various storage needs from the past years until today. These days, these boxes are still reliable and useful for a variety of applications. It is strong, resilient and not easily damaged. As a result, you can be sure that the things you put in them will remain safe and undamaged. Compared to cardboard boxes, wooden storage containers can support larger loads. It is important to note that paper is used to make cardboard boxes. Wooden boxes, on the other hand, are constructed from tough fibrous materials derived from tree branches and bark. Of course, the latter is tougher and can support more weight than something softer (Wei, 2021).

The purpose of wooden storage boxes is to hold things. Since these containers let you store a variety of products, incorporating them in rental warehouses is rather useful. Wooden boxes will help you keep things arranged. After all, goods that are systematically stored can be easily accessed whenever they are required. It would be easier for you to locate the items you require. As a result, purchasing wooden storage boxes can help you make better use of any available space. It is also worth mentioning that choosing timber storage boxes over cardboard or plastic boxes is an environmentally friendly choice. They are sustainable because suppliers typically replace the trees they cut down with new ones. They can disintegrate, decompose, and become soil if properly disposed of. This is not the case with plastic. Instead, it contaminates the soil and pollutes the water (Bean, 2018).

Importance and Uses of Storage Boxes in Daily Life

Storage boxes are inextricably linked to history because they were used by renowned discoverers such as Columbus and others to store and organize their belongings. It would have been hard for them to stay organized throughout the long journey where they explored huge regions without these. Storage boxes assist us by allowing us to arrange ourselves by containing undesired or infrequently used items. There are many items in our everyday lives that we use every day, and then there are a few things that we use only once a week, and these two different things must be stored separately, and this separation may be achieved with the help of these boxes. As a result, these boxes can be utilized for a wide range of purposes and in a wide range of ways. Storage boxes used for various purposes differ in their design and construction,

as well as the materials utilized to construct them. The material utilized to create the box, as well as the strength required by the box, varies drastically from box to box and purpose to purpose for which the box is employed.

Advantage of the Project

- Working with a retractable case has many benefits, one of which is the ability to store your stuff neatly and conveniently.
- As materials may be housed in material boxes to make them easy to find. • This is perfect if you just have a small number of materials that you routinely use.
- This material case has many compartments where you can arrange and store your art materials.

Disadvantage of the Project

- It could be heavy to bring.
- Only limited materials can be placed inside.
- The materials that will be stored inside should be properly arranged first.

III. CONCEPTUAL FRAMEWORK

Material inputs in innovating the device is carefully planned, designed, constructed, tested and evaluated in order to achieve efficiency of the innovation. Figure 1 shows the study's conceptual framework. The study's flow is depicted in the figure. First box represents the input of the study. This entails the first step in developing all the concepts in order to materialized the project. It also implicates on how the proposed project being weighed. The second box entails the designing and fabrication of the project. This area discusses the whole design of the project, its diagram and the connection point. Base on the materials gathered fabrication stage will follow by following the procedural design of the project. In order to get the desired product, project prototyping demands a great deal of attention, which can spark ideas. The collecting of tools and resources is a vital step in creating projects, according to Atkins (2014). In completing the project, it is the most important component. The third box complies the output of the device. It is understood that in this stage the device is now on its completion and under go already series of testing.

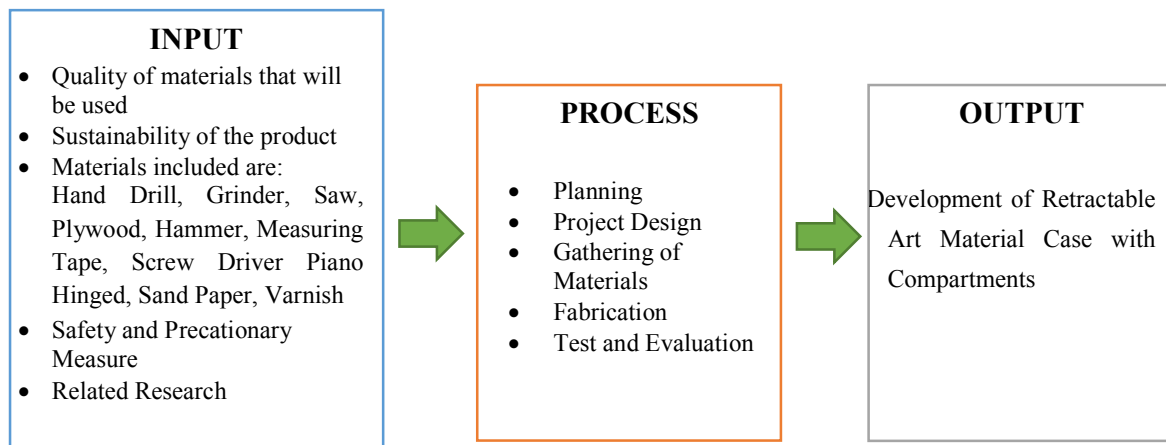


Figure 1
Research Design

Statement of the Problem

This study focuses on the Design and Development Retractable Art Materials Case with Compartments to address the problems in using the existing retractable art materials case.

Specifically, this study seeks to answer the following:

1. What is the insight of the respondents on the efficacy of the style in terms of Functionality as to?
 - 1.1 Facilities of Portable and Comfort
 - 1.2 Usefulness
2. What is the insight of the respondents on the efficacy of the style in terms of Durability as to?
 - 2.1 Distortion resistant
 - 2.2 Quality of the design
 - 2.3 Capacity of the model
3. What is the insight of the respondents on the efficacy of the style in terms of Economy as to?
 - 3.1 Materials are available at a local hardware
 - 3.2 Economy in term of labor and time
4. What is the insight of the respondents on the efficacy of the style in Safety?
 - 4.1 Absence of sharp edges
 - 4.2 Use of standard materials

Significance of the Study

This research demonstrated an innovative art materials case that may be used in storing various drafting and art materials. The design and development of a retractable art materials case make it easier for the user to store and organize things. The following will benefit from the results of a study:

- **Drafting Student** - This tool is really beneficial to drafting students since drafting students are required to bring plenty of instruments in one setting. This research enables them to work more organize, conveniently, and efficiently. It will also protect their papers and materials.
- **Instructor** - As for the instructor, the materials that will be used during the discussion will be easily accessible and safe. The instructor could ensure that their students bring all of the necessary materials. Artists, Engineers and **Draftsman** - It will reduce the artist's, engineer's and draftsman's hassles and ensure that their materials are properly stored. With this retractable art materials case, they can easily bring their mat and have access to them whenever they need them.

Scope and Limitation

This study is conducted at Surigao del Norte State University campus, located in Surigao City. The researcher highly considered and analyzed the needs of the secular Drafting and Engineering students at Surigao del Norte State University as participants. The study was conducted that starts from December 2022 and is to be done in the year 2023.

Objectives of the Study

This study aims to:

1. To design and develop a Retractable Art Material Case with and Compartments.
2. To fabricate a Retractable Art Material Case with Drawing Board and Compartments.
3. To evaluate the finished product in terms of acceptance to Functionality, Durability, Economy and Safety.

IV. METHODS

Project Development

Below are the stages on how the design Retractable Art Materials Case with Compartments is to be developed or constructed right after the gathering or constructed right after the gathering of the needed materials.

Step 1 - Collect the necessary tools and supplies to be put into in the case construction.

Step 2 - the measurement activities, it must be carried out precisely and based on the drawing plan

Step 3 - Involves assuring the measurements, markings, etc.

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Step 4 - Involves the cutting process with the using accurate cutting techniques and the right equipment observed.

Step 5 - Involves sanding and cleaning the wood parts. Materials.

Step 6 - The systematic process of putting together the using the necessary materials, assembling the Retractable Case's parts according to the design plan materials for addressed.

Step 7 - Involves inspecting the overall design and construction of ensuring that the screws are firmly hammered into for the user's security.

Step 8 – Cleaning the newly surfaces with paint, built a retractable application case of decorative parts like paint or varnish. The recently built Retractable Case is now prepared for evaluation and testing.

Material Selection and specifications:

The materials that will be chosen for the whole product will be based on its availability, high quality characteristics, affordability and durability. The material chosen for the case surfaces plywood. Other materials that will be used in the project include: woods, wood glue, hinge, case handle, nails, screw bolt with nut.

Project Design

Design Consideration

In designing the Retractable Case, the following factors have been considered:

Space – The standard measurements of the design like spacing of compartments area was observed.

Safety - Edges should be cleaned so that it can't damage the user.

Durability – Craftsmanship will be monitored throughout the process of constructing the Retractable Case.

Quality of the design – the materials must have high quality characteristics.

Functionality – the proposed project featuring the usefulness for sorting art materials



Figure 2
Isometric View: 1st Layer



Figure 3
Isometric View: 2nd Layer



Figure 4
Isometric View: Top Layer



Figure 5
Isometric View: Open

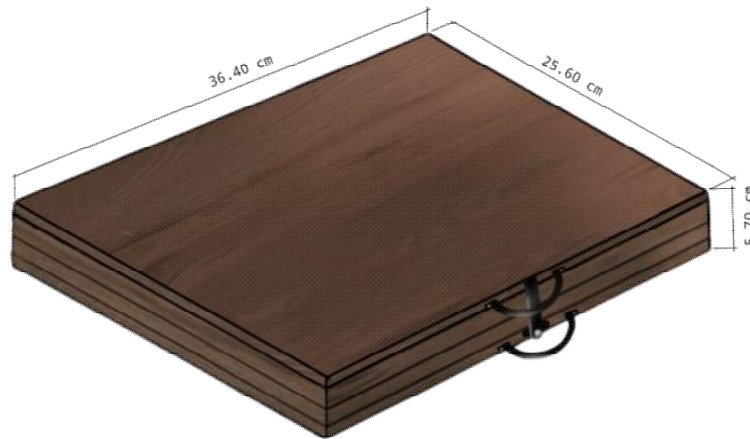


Figure 6
Isometric View with Dimensions



Figure 7
Top View of the product when open

The images above illustrate the final Project design and development of the Retractable Art Materials Case with Compartments. This project consists of three (3) layers. The first layer has flat space which is recommended for storing documents. The second layer is for additional space to store papers and other materials. The top layer is designed to keep the materials organized. This product could be adjusted and slide on the both sides to keep the layers accessible.

Evaluation Procedure

The review process will produce the data that was tallied and calculated to determine the mean of each both the total means and the criterion. The Surigao Del Norte State University of Technology's College of Industrial Technology standard instrument was utilized to create the device Instrument for evaluation.

Testing of Tools

The group is beginning a portion of the operation and carefully examining it to generate before proceeding to the final evaluation. The product was analyzed throughout the detailed process to determine whether any development would be necessary.

Safety Operations

When using this tool, there will be no caution. We use it frequently, particularly with students of Drafting and Civil Engineering. We can use it to hold a lot of different supplies, keep our workspace organized, and quickly locate what we need when it's time to create. This tool is safe and simple to use.

Efficiency Operation

This kind of retractable art materials case with compartments will be evaluated well to determine how to keep our art materials in order and convenient by using art materials case, especially for the main user of this tool, the students of Drafting and Civil Engineering. The design and development of the retractable art materials case with compartments will be simple while ensuring its functionality and safety. The goal is to keep the operational cost to a minimum and make it affordable for the user. It took a lot of time, effort, and money to make.

Evaluation of Performance

Each group member tests the product to ensure its effectiveness and quality while looking for any flaws. The testing results was incorporated into the primary reason for the evaluation.

Operation manual of the Device

- High quality materials: Made of good quality, wood, durable and lightweight.
- Easy to carry: It allows the user to bring their equipment and materials easily.
- Wide Applications: The versatility of Retractable Art Materials Case with compartments provides storage and organize the materials or tools.
- Multiple use: whether you are an artist, student, or designer, this Art materials case with compartment is a good product for you. The layers of the case provide different uses including paper storage to avoid it from being crumpled. While, the compartments attached in the case can be used to organize the user’s materials.
- More details: It is designed to ensure that the tools such as rulers, mechanical pens, papers and etc. can be stored properly and away from any damages. Different sizes of compartments and divisions in specific layers are installed for specific uses.

V. RESULTS AND DISCUSSION

The results and interpretation of the data gathered in this research project are presented in sequence of tables 1 to 4.

Table 1- Effectiveness in terms of Functionality

Area of Concern	Respondent (Students) n=30				X	VD
	4 VE	3 E	2 LE	1 NE		
Portability and Comfort	21	7	2	0	3.6	VE
Usefulness	23	5	2	0	3.7	VE
Average Weighted Mean	3.65					
Interpretation	Very Effective					

As show in Table 1, the perception of the respondents’ groups on the effectiveness of the model in terms of Functionality as to portability and Comfort has a weighted mean of 3.6 as rated by the Drafting and Engineering student which is described as Very Effective. as to usefulness ha a weighted mean of 3.7 as rated by the respondents which is also describe as Very Effective. This means that the respondents confirm the effectiveness of the model in terms of functionality. These results imply that the utility model has been very effective in terms of Functionality.

Table 2- Effectiveness in Terms of Durability

Area of Concern	Respondent (Students) n=30				X	VD
	4 VE	3 E	2 LE	1 NE		
Distortion resistant	17	13	0	0	3.6	VE
Quality of the design	24	5	1	0	3.8	VE
Capacity of the model	17	12	1	0	3.5	VE
Average Weighted Mean	3.63					
Interpretation	Very Effective					

Reflected in Table 2, the perception of the respondent's groups on the effectiveness of the model in terms of Durability as to distortion resistant has a weighted mean of 3.6 as rated by the Architectural Drafting and Engineering student respondents which is describe as Very Effective. As to quality of the design has a weighted mean of 3.8 as rated by the respondents which is describe as Very Effective. As to capacity of the model has a weighted mean of 3.5 as rated by the respondents which is also described as Very Effective. this means that the respondents confirmed that the model is highly effective in terms of Durability.

Table 3- Effectiveness in terms of Economy

Area of Concern	Respondent (Students) n=30				X	VD
	4 VE	3 E	2 LE	1 NE		
Absence of sharp edges	9	17	4	0	3.2	VE
Use of standard materials	19	11	0	0	3.2	VE
Average Weighted Mean	3.5					
Interpretation	Very Effective					

The result in Table 3 are the perception of the respondents based on effectiveness of the model in terms of Economy. As to materials are available at the local market has a weighted mean of 3.6 as rated by the respondents which is described as Very Available. As to Economy in terms of labor and time it has a weighted mean of 3.4 as rated by the same respondents and described as Very Effective. This means that the respondents confirm the effectiveness of the model in terms of safety with an average mean of 3.5 and considered as Very Effective.

Table 4- Effectiveness in terms of Safety

Area of Concern	Respondent (Students) n=30				X	VD
	4 VE	3 E	2 LE	1 NE		
Absence of sharp edges	9	17	4	0	3.2	VE
Use of standard materials	19	11	0	0	3.2	VE
Average Weighted Mean	3.5					
Interpretation	Very Effective					

As indicated in the table 4, the perception of the respondent's groups on the effectiveness of the model in terms of Safety as to absence of sharp edges has a weighted mean of 3.2 as rated by the respondents from the said group of students which is described as very effective. As to the use of standard materials has a weighted mean of 3.6 as rated by the respondents which is described as very effective. The average weighted mean is 3.4 which was described as very effective.

V. CONCLUSION

Generally, based on the results, the proponents therefore conclude that the Design and Development of Retractable Art Materials Case with Compartments has the great result to the performance of the respondents as of functionality, durability, economy and safety of the product was described as very effective and highly accepted.

VI. FINDINGS

The following are the findings of the study the perception of the respondent groups on the effectiveness of the model in terms of Functionality “as to Portability and Comfort” has a mean of 3.6 as rated by the selected group of students which are described as Very Effective and “Usefulness” has a mean of 3.7 as rated by the respondents which is also described as Very Effective The respondents confirms the effectiveness of the model in terms of Functionality. These results imply that the model has been very effective in performing its purpose. The perception of the respondents provides results on the effectiveness of the model in terms of Durability “as to distortion resistant” has a weighted mean of 3.6 as rated by the Architectural Drafting and Engineering student respondents which is described as Very Effective; “as to quality of the design” has a weighted mean of 3.8 as rated by the respondents which is described as Very Effective; “as to capacity of the model” has a weighted mean of 3.5 as rated by the respondents which is also described as Very Effective. This means that the respondents confirmed that the model is highly durable and very effective. Students from Architectural Drafting and Civil Engineering rate the model based on its effectiveness in terms of Economy “as to materials are available at the local market” has a weighted mean of 3.6 as rated by the respondents from Architectural and Engineering students which is described as Very Effective; “as Economy in terms of labor and time” has a weighted mean of 3.4 as this means that the respondents confirm the effectiveness of the model in terms of Safety with an average weighted mean of 3.5 and considered as Very Effective.

Another result is the perception of the respondents on the effectiveness of the model in terms of Safety “as to absence of sharp edges” has a weighted mean of 3.2 as rated by the respondents from Architectural and Engineering students which is described as Very Effective; “as to use of standard materials” has a weighted mean of 3.6 as rated by the respondents which is described as Very Effective. The average weighted mean is 3.4 which was described as Very Effective. This means that the respondents confirm that the model is follows the standard materials and safe for the user.

Based on the test and evaluation of the Design and Development of Retractable Art Materials Case with Compartments, the product is considered as an important material that the Architectural Drafting and Engineering students could use to ensure the safety of their and to properly organized them. The results from respondents also shows that the product is very effective in terms of Functionality, Durability, Economy and Safety.

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