



Acceptability of Knockdown Spray Booth Painting System Device for Interior Design

Criselda A. Esmero¹, Jocelyn A. Abojon²

¹Associate Professor 2, Mechatronics, and Graphics Design Department, Cebu Technological University-Main Campus.

²Assistant Professor 1, Mechatronics, and Graphics Design Department, Cebu Technological University-Main Campus.

Abstract: This study was conducted at Cebu Technological University-Pinamungajan Extension. This research used the descriptive-developmental method to gather facts relevant to attaining the details in the planning, designing, and fabricating of the Design and Development of a Knockdown Spray Booth Painting System Device for Interior Design Technology. Convenience sampling was utilized to identify the respondents from the Bachelor of Industrial Technology (BIT) specialized in Interior Design Technology, the Bachelor of Industrial Technology (BIT) specialized in Civil Technology, and the selected Technology Instructor/Professor. For data treatment, frequencies, percentages, and a weighted mean were used. Assessed the acceptability of the developed knockdown spray booth painting system device for interior design at the Cebu Technological University-Pinamungajan Extension Campus, Pinamungajan, Cebu, Philippines. The acceptability of the developed spray booth device is based on the technology acceptance model. Based on the findings, it can be concluded that the perceptions of the development of the spray booth device, the performance of the design and development of the spray booth device based on the quality dimensions, and the extent of acceptability of the spray booth device on the Technology Acceptance Model was very highly acceptable. The performance and acceptability of the design and development of a knockdown spray booth painting system device for interior design technology were recommended for technology adoption at the university.

Keywords: Technology Management, Knockdown Spray Booth, Painting System, Interior Design, Descriptive-Developmental, Cebu City, Philippines.

Introduction

The release of more stringent regulations that govern the discharge of hazardous air, solid, and liquid waste pollution generated by spray painting has resulted in significant conversions from water-wall to dry-filter exhaust filtration systems. The rapid transformation to dry filter systems or paint overspray arrestors has led to questions on which arrestor designs provide the most efficient capture of particulate overspray emissions. In late 1995, the U.S. Environmental Protection Agency (EPA) initiated a study to evaluate various dry overspray arrestor designs to assess their abilities to collect paint overspray in the PM10 size range. PM10 is defined as particles with surface diameters of less than 10 μm . Paint overspray arrestor systems were

selected for evaluation, each representing one of the five operating principles for capturing particulate matter.

Paints are typically applied to products in paint spray booths or other painting enclosures where the air is filtered to capture paint overspray prior to being exhausted into the atmosphere. Until recently, many painting operations removed paint overspray from the exhaust by using water wall scrubbers, which generated waste sludge that is typically defined as hazardous. Dry arrestor systems have been introduced into many painting operations since they reduce waste disposal concerns, require less maintenance, and result in lower operating and maintenance costs. Paint arrestor designs are usually a trade-off between overall filtration efficiency and pressure drop across the system. A paint arrestor's design will prioritize one of the three performance criteria listed in the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Standard 52–76, depending on the materials used in construction and the intended usage. The ability of the arrestor to maximize particle capture efficiency is usually accomplished at the expense of higher pressure drops and operating costs. The ability of the arrestor to operate at a low pressure drop, usually at the expense of lower paint overspray capture efficiency but at a lower operating cost, The ability of the arrestor to hold a greater mass of paint overspray, thereby operating for a more extended period before cleaning or replacement is required, adopting new technology at an organizational level is subject to various factors. Organizational adoption occurs in two stages: initiation and completion (Zaltman, Duncan, and Holbek, 1973). A substantial painting industry modification to the ASHRAE method is substituting actual paint spray for the standardized dust used for air cleaners. The paint gun settings and formulations control the spray paint stream pattern. Spray Systems can help you select the proper size spray paint booth needed for your operations—the first step toward designing the "perfect" booth. (Axelsson, 2019). These parameters are selected to represent the paint arrestor's intended operating environment. This method quantifies particles in the inlet and exhaust streams without regard to their weights. Therefore, each arrestor system's small particle capture potential can be evaluated based on its ability to capture paint aerosol droplets of a particular size fraction in the exhaust stream.

In order to minimize the problems, the researcher proposes to invent a spray booth for painting. The spray booth is confined to knocking down walls with a ceiling. It has an exhaust fan with filters, lights, a temperature gauge, an air compressor with an air spray gun, and a turntable for painting objects. In this study, the IDT and Civil Technology students will benefit from using the spray booth device.

Methods and Materials

To test the acceptability of the developed knockdown spray booth painting system device for interior design. This study utilized the descriptive-developmental method to gather facts relevant to attaining the details in planning, designing, and fabricating the device. A convenience sampling was utilized, and the target respondents were twenty-five (25) instructors or technology experts and one hundred eleven (111) selected students. Instructors are those teaching at the Cebu Technological University Pinamungajan Extension Campus. Technology experts are those

professionals who are exposed to the fields of interior design technology and civil technology. Selected students are student representatives from the Bachelor of Industrial Technology (BIT) specialized in Interior Design Technology and the Bachelor of Industrial Technology (BIT) specialized in Civil Technology who are enrolled in the same university.

Moreover, the study utilized a modified questionnaire from the Davis Technology Acceptance Model as the primary tool for gathering data. The questionnaire sought the acceptability of the respondents regarding the device's perceived usefulness, perceived ease of use, and user satisfaction.

Procedure for Data Gathering

The data gathering procedure is to distribute the survey questionnaire to the identified respondents. The identified respondents are sixty (60) Bachelor of Industrial Technology (BIT) students specializing in interior design technology, fifty-one (51) Bachelor of Industrial Technology (BIT) students specializing in civil technology, and twenty-five (25) selected technology instructors or professors. A letter of intent to conduct the study was sought from the office of the campus director. Prior to the distribution of questionnaires to the identified respondents, the researcher explains the purpose of the study and performs an actual demonstration to show how the project works. The respondents can raise questions for clarification at any time during the answering of the questionnaire. The proponent personally collected the questionnaire for data treatment and analysis.

Results and Discussion

This part of the study identifies the level of acceptability of the developed Knockdown Spray Booth Painting System Device for Interior Design using the technology acceptance model. Assessed the effectiveness, efficiency and satisfaction to gauge the device usability. The present research seeks to understand the spray booth device acceptability, perceived usefulness, perceived ease of use, the behavioral intention of use and actual use focused on the Technology Acceptance Model (TAM). This includes the technical requirements of the developed device.



Figure 1. Knockdown Spray Booth Painting System Device for Interior Design

In Figure 1, presented the researcher developed Knockdown Spray Booth Painting System Device for Interior Design at Cebu Technological University – Pinamungajan Campus, Pinamungajan, Cebu. The device developed a spray booth or spray room which is mechanically ventilated used to enclose or accommodate spraying operation and curing cycle to harden paint and confine and limit the escape of spray, volatile vapors, mist or combustible residue, dust, odors, and exhaust in the classroom. The device is a innovative spray booth painting system device for health and wellness of the students and instructors involve in this major field of specialization.

Perceived Usefulness

The first part of the respondent's acceptability of the developed Knockdown Spray Booth Painting System Device for Interior Design utilizing the Technology Acceptance Model (TAM). It determines the respondent's acceptability in terms of efficiency in productivity, improvement in job performance, increase in productivity, enhancement of effectiveness on job and product usefulness, as shown in Table 1.

Table 1 Acceptability of the Knockdown Spray Booth Painting System Device for Interior Design as to Perceived Usefulness

Indicators	WM	Verbal Description
1. Using this product, the job would enable to accomplish tasks more quickly.	4.82	VHA
2. Using this product would improve the job performance.	4.82	VHA
3. Using this product in the job would increase productivity.	4.88	VHA
4. Using this product would enhance effectiveness on the job.	4.88	VHA
5. Using this product would make it easier to do the job.	4.79	VHA
6. Find this product useful in the job.	4.82	VHA
Average Weighted Mean	4.84	VHA

Legend: VHA = Very Highly Acceptable 4.21-5.00; HA = Highly Acceptable 3.41-4.20; MA = Moderately Acceptable 2.61-3.40; A = Acceptable 1.81-2.60; NA = Not Acceptable 1.00-1.80; WM = Weighted Mean

This Table describes that this aspect was rated Very Highly Acceptable with an average weighted mean of 4.84 as shown in Table 1. This means that the respondents accepted that the developed spray booth device allows them to interact with the device easily through predefined templates.

Fast (or quick), time- and effort-saving, cost-cutting, and general utility have all been used to gauge perceived usefulness. Perceived usefulness, according to the TAM, is the extent to which a person thinks utilizing a specific technology will improve their ability to accomplish their work. Perceived utility, according to Davis et al. (1989), refers to how customers view the encounter's conclusion. According to Davis (1989), perceived usefulness is a person's belief that utilizing new technology will improve or enhance her/his performance. According to Mathwick et al. (2001), perceived usefulness is the degree to which a person believes a specific system would improve his or her ability to accomplish a job performance. These elements must be considered when designing a paint booth ventilation system. To meet the exacting requirements of this highly unusual environment, everything must be correctly and carefully handled (Darvin, 2019).

Perceived Ease of Use

The second part of the respondent's acceptability of the developed Knockdown Spray Booth Painting System Device for Interior Design utilizing the Technology Acceptance Model (TAM). It classifies the respondent's acceptability regarding the ease of use of the device utilization, comprehensible device interface, device suitability in doing job, as shown in Table 2.

Table 2 Acceptability of the Knockdown Spray Booth Painting System Device for Interior Design as to Perceived Ease of Use.

Indicators	WM	Verbal Description
1. Learning to operate this product would be easy for the worker.	4.84	VHA
2. Find it easy to get this product to do what one wants it to do.	4.87	VHA
3. Interaction with this product would be clear and understandable	4.90	VHA
4. Find this product very helpful and convenient in doing the job.	4.76	VHA
5. It would be easy for a worker to be skillful at using this product	4.88	VHA
6. Find this product easy to use.	4.84	VHA
Average Weighted Mean	4.85	VHA

Based on the results, the "Perceived Ease of Use" was rated Very Highly Acceptable with an average weighted mean of 4.85. According to Cho, perceived ease of use is the individual's perception that using the new technology will be free of effort. Applying this context to that of a spray booth device, ease of use refers to consumers' perceptions that spraying or painting systems will involve a minimum of effort (1989). Perceive ease of use refers to the degree to which a person believes that using a particular device would be free of action (Davis, 1989).

Users' Satisfaction

The third part of the respondent's acceptability of the developed Knockdown Spray Booth Painting System Device for Interior Design utilizing the Technology Acceptance Model (TAM). It administers the respondent's acceptability of having a clear conception of the device users' satisfaction. It also includes respondents' acceptability of the device's low operation cost, design's aesthetic, and design's capability, as shown in Table 3.

Table 3 Acceptability of the Knockdown Spray Booth Painting System Device for Interior Design as to Users' Satisfaction.

Indicators	WM	Verbal Description
1. Safe for the user	4.93	VHA
2. Cheap to build up	4.89	VHA
3. Low operation costs	4.80	VHA
4. Easy to build up	4.90	VHA
5. Easy to use	4.85	VHA
6. Fit into a smaller area	4.83	VHA
7. Simple design	4.88	VHA

8. Robust design	4.88	VHA
9. High capacity.	4.83	VHA
Average Weighted Mean	4.87	VHA

In the users' satisfaction with using the device, the respondents rated Very Highly Acceptable, with an average weighted mean of 4.84. The findings indicate that the spray booth equipment corresponds to the Technology Acceptance Model and has very high acceptability. According to the Technology Acceptance Model (Davis, 1989), or TAM, perceived usefulness and perceived user-friendliness are the two elements that affect whether potential users will embrace a computer system.

This model's emphasis on the perceptions of the potential user is its defining characteristic. That is to say, even while a technology product's inventor may think it is practical and user-friendly, the product will only be accepted by potential customers once those consumers also have the same opinions Retter (2002). According to research, excellent customer satisfaction increases customer retention, lifetime value, and brand reputation. The location contributes to both operational and application efficacy, which are the two most important factors (Nunes, 2018). User satisfaction (U.S.) is frequently used as a stand-in for an effective information system performance metric. If a system is effective if it offers value to the company, it must positively affect user behavior, for instance, by enhancing productivity and decision-making, among other things (Gatian,2016).

Summary of Acceptability

The summary of the respondent's acceptability of the developed Knockdown Spray Booth Painting System Device for Interior Design utilizing the Technology Acceptance Model (TAM). It contains the respondent's acceptability of the device pertaining to perceived usefulness, perceived ease of use, and users' satisfaction, as shown in Table 4.

Table 4 Acceptability of the Knockdown Spray Booth Painting System Device for Interior

Aspects	Average Weighted Mean	Verbal Description
Perceived Usefulness	4.83	VHA
Perceived Ease of Use	4.87	VHA
User's Satisfaction	4.84	VHA
Grand Mean	4.84	VHA

According to the Technology Acceptance Model (Davis, 1989), or TAM, perceived usefulness and perceived user-friendliness are the two elements that affect whether potential users will embrace a computer system. Based on the technology acceptance model, the findings indicate the developed Knockdown Spray Booth Painting System Device for Interior Design has very high acceptability. As per Abojon et al (2023), helping students build their technological skills a technology-based tools and resources are crucial. This model's emphasis on the perceptions of the potential user is its defining characteristic. A good paint booth doesn't only protect its operators, it's also good for the environment and should help work faster and more efficiently. And lastly, can help reduce production time and wastage. (Guiddo, 2020). That is to

say, even while a technology product's inventor may think it is practical and user-friendly, the product will only be accepted by potential customers once those consumers also have the same opinions Recker (2021).

Conclusion

Based on the research findings, the developed Knockdown Spray Booth Painting System Device for Interior Design was very highly acceptable. It has been utilized successfully in the university for technology adoption and teaching-learning purposes.

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