



ACCEPTABILITY AND USABILITY OF THE DEVELOPED WELDING TOOL STORAGE ORGANIZER ON WHEELS AND STUDENTS' COMPETENCY-BASED PERFORMANCE

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Abstract: The development of strategies in education is the main backbone of teaching and learning process between students and teachers to measure the desired task. The primary objective of this descriptive-correlational study was to develop a welding tool storage organizer on wheels and determined its level of acceptability and the usability of its different features. The device was evaluated by the 30 teachers and 30 welders/ shop owners. The level of competency-based performance of the 30 students who used the developed welding tool storage organizer was also determined for School Year 2022-2023. Moreover, the study determined if there were significant relationships among the level of acceptability and usability of the different features of the developed welding storage organizer as evaluated by teachers and welders/shop owners and the level of competency-based performance of the students using the developed welding tool storage organizer. The study was conducted at selected schools in the Division of Capiz, Division of Roxas City, and Capiz State University where the respondents. The shop owners who evaluated the acceptability and usability of the developed welding tool storage organizer on wheels were also from the selected welding shop in the province of Capiz. For the students' respondents, measuring their competency-based performance, the study was conducted at Sopian National High School, School Division of Capiz. The research instrument used by the researcher was a survey questionnaire/evaluation sheet to determine the acceptability and usability of the product. The statistical tools utilized in this study were the percentage, mean and Pearson product –moment correlation for the inferential question which was set at .05 alpha level. The data were analyzed using the Statistical Package for Social Science (SPSS) Software. The findings of the study revealed that developed welding tool storage organizer on wheels was “very acceptable” as evaluated by the teachers and welding shop owners. The device as also “very usable” as evaluated by the teachers and welding shop owners. The students who used the developed welding tool storage organizer were “very competent” in their competency-based performance. Finally, there were no significant relationship among the acceptability and usability of the developed welding tool storage organizer and the level of competency-based performance of the students.

I. INTRODUCTION

Senior High School learners are one of the heavily affected sectors by school closures amid COVID-19 pandemic. Learning has been done remotely, through modules, internet, televisions, or radios. However, the degree to which learning can still take place outside the classroom, particularly in Technical-Vocational-Livelihood (TVL) Track, is often limited by lack of access to electricity, internet connectivity, devices, or media, learning platforms, or the inadequate preparation of teachers and students for distance learning.

Some students face additional constraints in terms of time availability due to competing household responsibilities, such as caring for children and elderly family members and other household duties to help the family economically survive. Adjustments to distance learning can be the hardest in low-income contexts and among vulnerable learners.

As one of the teacher in the Senior High School who think of a better teaching learning outcomes of the student, this study was conducted to deliver basic education after the effect of pandemic. Furthermore, the researcher decided to determine the acceptability and usability of the different features of the developed welding storage and determine the level of competency based performance of the students using the developed welding storage for School Year 2022-2023.

The main objective of the study was to determine the acceptability and usability of the welding tool storage organizer on wheels for School Year 2022 – 2023.

Generally, this study aimed to answer the following questions:

1. What is the level of acceptability and usability of the different features of the developed welding storage organizer on wheels as evaluated by teachers and welding shop owners?
2. What is the level of competency-based performance of the students using the developed welding storage organizer on wheels?
3. Are there significant relationships among acceptability and usability of the different features of the developed welding storage organizer on wheels as evaluated by teachers and welding shop owners, and the level of competency-based performance of the students using the developed welding storage organizer on wheels?

The study was anchored on the theory of New Product Development and its Applications (Gurbuz 2018), which discussed that product is defined as an entity that is brought to a market for attention, acquisition, use or consumption which meets a need of consumers. Product does not mean only tangible items such as houses, foods and computers, but also intangible items such as services including thoughts, events, organizations, persons, places, etc. or a mixture of these. Services are the form of product that consists of activities, benefits or satisfactions offered for sale. Therefore, product is a broad term which defines all those things that summarize the elements of a product. Furthermore, the study was also anchored on Kotler's (2018) new product development theory, which emphasis that "New products include original products, improved products, modified products, and new brands that the firm develops through its own research and development efforts". This study was also associated with the theory of product concept (Sas, 2019) which is a marketing strategy. You can use it for both new and existing products. It helps build a new product based on the existing idea. The basic concept is to build a new product based on the already existing idea. However, it can be challenging to generate product concept. These theories serves as the basis incoming up with this study.

The study was focused in determining the acceptability and usability of the welding tool storage organizer on wheels by the teachers and welding shop owners and determining the level of competency-based performance of the students using the developed welding storage organizer on wheels for School Year 2022-2023. The independent variable in this study were acceptability and usability of the welding tool storage organizer on wheels, while the dependent variable was the level of competency-based performance of the students using the developed welding storage organizer on wheels.

II. METHODOLOGY

This study utilized the descriptive correlation research design. A descriptive correlation design is used in study that aims to provide static pictures of situations as well as establish the relationship between different variables. Descriptive correlation studies also predict the variance of one or more variables based on the variance of another variable (McBurney & White, 2009).

The study was conducted at selected schools in the Division of Capiz, Division of Roxas City, and Capiz State University where the respondents. The shop owners who evaluated the acceptability and usability of the developed welding tool storage organizer on wheels were also from the selected welding shop in the province. For the students' respondents, measuring their competency-based performance, the study was conducted at Sapian National High School, School Division of Capiz.

The respondents of the study were the (90) evaluators composed of 30 teachers, 30 shop owners, and 30 students who evaluated the acceptability and usability of the developed welding tool storage organizer on wheels. They were chosen through purposive sampling. Purposive sampling is a non-probability method for obtaining a sample where researchers use their expertise to choose specific participants that will help the study meet its goals and the researchers need to evaluate their research question.

The research instrument used by the researcher was a survey questionnaire/evaluation sheet to determine the acceptability and usability of the product. It dealt with the variables that were used to evaluate the product in terms of design and composition.

III. RESULTS AND DISCUSSION

Level of Acceptability of the Developed Welding Tool Storage Organizer on Wheels as Evaluated by the Teachers

The level of acceptability of the different features of the developed welding tool storage organizer on wheels as evaluated by the teachers. Data further showed a mean of 4.91 which means "Very Acceptable". Data further revealed that of the

20 statements under the acceptability of the different features of the developed welding tool storage organizer on wheels as evaluated by the teachers, statement numbers 15, 17, and 20 got a highest mean scores of 5.00 which stated that “Accessibility of first aid kit”, “Circuit breaker to safeguards load capacity”, and “Adjustable welding positioners” respectively were verbally interpreted as “Very Acceptable”. Followed closely by statement numbers 3 with a mean score of 4.97 which stated “Structural material used” was also interpreted as “Very Acceptable”. Followed by statement numbers 1, 10, 11, 13, 14, 18, and 19 with a mean score of 4.93 which stated “Organization of tools based on usage”, “Availability of hooks for hanging tools”, “Easy access to its contents”, “Sufficient ventilation”, “Chalkboard for illustration and instruction”, “Electrode storage bin”, and “Use the incandescent lamp to maintain the electrode quality” which were also interpreted as “Very Acceptable”. Followed by statement numbers 4, and 16 with a mean score of 4.90 which stated that “Tidy and space saver”, “Provision for instructional materials” which also interpreted as “Very Acceptable”. It was also followed by statement numbers 5, and 9 with a mean score of 4.87 which stated that “Convenient tool storage”, and “Integration locks for security of tools collection” which were also interpreted as “Very Acceptable”. Statement numbers 6, and 7 also got a mean score of 4.83 which stated “Availability of tool sets and collection”, and “Heavy-duty lockable caster or wheels” which were interpreted as “Very Acceptable”. Lastly, Statement numbers 2, and 8 also got a mean score of 4.80 which stated “Load capacity of the storage”, and “Welded steel construction” also interpreted as “Very Acceptable”

Table 1. Level of acceptability of different features of the developed welding tool storage organizer on wheels as evaluated by the teachers.

Acceptability of the Device	Mean	Verbal Interpretation
1. Organization of tools based on usage	4.93	Very Acceptable
2. Load capacity of the storage	4.80	Very Acceptable
3. Structural materials used	4.97	Very Acceptable
4. Tidy and space saver	4.90	Very Acceptable
5. Convenient tool storage	4.87	Very Acceptable
6. Availability of tool sets and collection	4.83	Very Acceptable
7. Heavy-duty lockable casters or wheels	4.83	Very Acceptable
8. Welded steel construction	4.80	Very Acceptable
9. Integration of locks for security of tools collection	4.87	Very Acceptable
10. Availability of hooks for hanging tools	4.93	Very Acceptable
11. Easy access to its contents	4.93	Very Acceptable
12. Quick location of tools	4.83	Very Acceptable
13. Sufficient ventilation	4.93	Very Acceptable
14. Chalkboard for illustration and instruction	4.93	Very Acceptable
15. Accessibility of first aid kit	5.00	Very Acceptable
16. Provision for instructional materials	4.90	Very Acceptable
17. Circuit breaker to safeguards load capacity	5.00	Very Acceptable
18. Electrode storage bin	4.93	Very Acceptable
19. Use of incandescent lamp to maintain the electrode quality	4.93	Very Acceptable
20. Adjustable welding positioners	5.00	Very Acceptable
Grand Mean	4.91	Very Acceptable

Level of Usability of the Developed Welding Storage Organizer on Wheels as Evaluated by the Teachers

The level of usability of the different features of the developed welding tool storage organizer on wheels as evaluated by the teachers. Data further showed a grand mean of 4.90 which means “Very Usable”. Data further revealed that of the 10 statements under the usability of the different features of the developed welding tool storage organizer as evaluated by the teachers, statement numbers 1 and 6 got a highest mean scores of 4.97 which stated that “Helps my work be more effective” and “Meets and create a positive effect on my needs” verbally interpreted as “Very Usable”. Followed closely by statement numbers 3 and 5 with mean scores of 4.93 which stated that “Gives me more control over the task during my welding performance” and “Saves me time when I use it” interpreted as “Very Usable”. Followed by statement numbers 7 and 9 with mean scores of 4.90 which stated that “Everything I would expect to do during the day were

possible”, and “It is timely to my needs, especially on the community where I live” interpreted as “Very Usable”. This was followed by statement numbers 4, 8 and 10 with mean scores of 4.87 which stated “Makes the things I want to accomplish easier”, “When using the welding storage, it enhances my skills that satisfy my costumers/clientele”, and “It is less in cost because it is a locally made” interpreted as “Very Usable”. Lastly, statement number 2 got a mean score of 4.83 which stated “Helps me to be more productive” interpreted as “Very Usable”. This implies that teachers can relate the concepts of Technology and Livelihood in the developed welding organizer. They can use it in teaching the subject. It can substitute other equipment bought in the market. The materials, tools, and facilities they used in the TVL –offering can be stored in this storage organizer.

Table 2. Level of usability of the different features of the developed welding tool storage organizer on wheels as evaluated by the teachers.

Usability of the Device	Mean	Verbal Interpretation
1. Helps my work be more effective	4.97	Very Usable
2. Helps me to be more productive	4.83	Very Usable
3. Gives me more control over the task during my welding performance	4.93	Very Usable
4. Makes the things I want to accomplish easier	4.87	Very Usable
5. saves me time when I use it	4.93	Very Usable
6. Meets and create a positive effect on my needs	4.97	Very Usable
7. Everything I would expect to do during the day were possible	4.90	Very Usable
8. When using the welding storage, it enhances my skills that satisfy my costumers/ clientele	4.87	Very Usable
9. It is timely to my needs, especially on the community where I live	4.90	Very Usable
10. It is less in cost because it is a locally made	4.87	Very Usable
Grand Mean	4.90	Very Usable

Level of Acceptability of the Developed Welding Tool Storage Organizer on Wheels as Evaluated by the Welder/ Shop Owners

The level of acceptability features of the developed welding tool storage organizer on wheels as evaluated by the welder/shop owners. Data further showed a grand mean of 4.97 which means “Very Acceptable”. Data further revealed that of the 20 statements under the acceptability of the different features of the developed welding tool storage organizer as evaluated by the welders/shop owners, statement numbers 8, 13, 14, 15, 16, 17, and 20 got a highest mean scores of 5.00 which stated that “Welded steel constructions”, “Sufficient ventilation”, and “Chalkboard for illustration and instruction”, “Accessibility of first aid kit”, “Provision for instructional materials”, Circuit breaker to safeguards load capacity”, and “Adjustable welding positioner” respectively were verbally interpreted as “Very Acceptable”.

Followed by statement numbers 3, 4, 5, 6, 9, 10, 11, 12, 18, and 19 with a mean scores of 4.97 which stated “Structural materials used”, “Tidy and space saver”, “Convenient tool storage”, “Availability of tool sets and collection”, “Integration of locks for security of tools collection”, “Availability of hooks for hanging tools”, “Easy access to its contents”, Quick location of tools”, “Electrode storage bin”, “Use of incandescent lamp to maintain the electrode quality” which is also interpreted as “Very Acceptable”. Followed by statement number 1 with a mean score of 4.93 which state that “Organization of tools based on usage” which were also interpreted as “Very Acceptable”. Lastly, statement numbers 2, and 7 also got a mean scores of 4.90 which stated “Load capacity of the storage”, and “Heavy-duty lockable caster and wheels” also interpreted as “Very Acceptable”. This implies that welder / shop owner used the same tools as in the TVL SMAW in school, the different features of the developed welding storage organizer was very acceptable in a welding shop.

Table 3. Level of acceptability of the different features of the developed welding tool storage organizer on wheels as evaluated by the welder/shop owners.

Acceptability of the Device		Mean	Verbal Interpretation
1	Organization of tools based on usage	4.93	Very Acceptable
2	Load capacity of the storage	4.90	Very Acceptable
3	Structural materials used	4.97	Very Acceptable
4	Tidy and space saver	4.97	Very Acceptable
5	Convenient tool storage	4.97	Very Acceptable
6	Availability of tool sets and collection	4.97	Very Acceptable
7	Heavy-duty lockable casters or wheels	4.90	Very Acceptable
8	Welded steel construction	5.00	Very Acceptable
9	Integration of locks for security of tools collection	4.97	Very Acceptable
10	Availability of hooks for hanging tools	4.97	Very Acceptable
11	Easy access to its contents	4.97	Very Acceptable
12	Quick location of tools	4.97	Very Acceptable
13	Sufficient ventilation	5.00	Very Acceptable
14	Chalkboard for illustration and instruction	5.00	Very Acceptable
15	Accessibility of first aid kit	5.00	Very Acceptable
16	Provision for instructional materials	5.00	Very Acceptable
17	Circuit breaker to safeguards load capacity	5.00	Very Acceptable
18	Electrode storage bin	4.97	Very Acceptable
19	Use of incandescent lamp to maintain the electrode quality	4.97	Very Acceptable
20	Adjustable welding positioners	5.00	Very Acceptable
Grand Mean		4.97	Very Acceptable

Level of Usability of the Developed Welding Tool Storage Organizer on Wheels as Evaluated by Welder/Shop Owners

The level of usability of the different features of the developed welding tool storage organizer on wheels evaluated by the welder/shop owners. Data further showed a grand mean of 4.92 which means “Very Usable”. Data further revealed that of the 10 statements under the usability of the different features of the developed welding tool storage organizer as evaluated by the welder/shop owners, statement numbers 1, 4, and 8 got a highest mean scores of 4.97 which stated “Helps my work be more effective”, “Makes the things I want to accomplish easier”, and When using the welding storage, it enhances my skills that satisfy my costumers/clientele “verbally interpreted as “Very Usable”.

Followed closely by statement numbers 5, 6, and 10 with a mean scores of 4.93 which stated “Saves me time when I use it”, “Meets and creates a position effect on my needs”, and “It is less in cost because it is a locally made” which is interpreted as “Very Usable”. Followed by statement number 9 with a means score of 4.90 which stated “It is timely to my needs, especially on the community where I live” which is interpreted as “Very Usable”. Further, followed by number 2 with a mean score of 4.87 which stated “Helps me to be more productive” which is interpreted as “Very Usable”. Lastly, with the statement number 3 got a mean score of 4.83 which stated “Gives me more control over the task during my welding performance” was interpreted as “Very Usable”.

Table 4. Level of usability of the different features of the developed welding too storage organizer on wheels as evaluated by the welder/shop owners.

Usability of the Device		Mean	Verbal Interpretation
1.	Helps my work be more effective	4.97	Very Usable
2.	Helps me to be more productive	4.87	Very Usable
3.	Gives me more control over the task during my welding performance	4.83	Very Usable
4.	Makes the things I want to accomplish easier	4.97	Very Usable
5.	saves me time when I use it	4.93	Very Usable
6.	Meets and create a positive effect on my needs	4.93	Very Usable

7. Everything I would expect to do during the day were possible	4.87	Very Usable
8. When using the welding storage, it enhances my skills that satisfy my costumers/ clientele	4.97	Very Usable
9. It is timely to my needs, especially on the community where I live	4.90	Very Usable
10. It is less in cost because it is a locally made	4.93	Very Usable
Grand Mean	4.92	Very Usable

Level of Competency Based - Performance of the Students using the Developed Welding Storage Organizer on Wheels

The level of competency based- performance of the students using the developed welding tool storage organizer on wheels as evaluated by students. Data further showed a grand mean of 4.74 which means “Very Competent”. Data further revealed that of the 10 statements under the developed welding tool storage organizer as evaluated by the students, statement number 1 got a highest mean score of 4.90 which stated “Perform the methods of striking an arc” verbally interpreted as “Very Competent”. Followed closely by statement number 2 with a mean score of 4.80 which stated “Perform stringer or straight beads in accordance with welding standards” which is interpreted as “Very Competent”. Followed by statement numbers 3, 4, 8, 9, and 10 with a mean scores of 4.77 which stated that “Check uniformity of beads in accordance with welding standards”, “Perform finished weldment based on acceptable standards for spatters”, “Wear all necessary safety gear before working”, “Keep my workplace clear from clutter”, and Assure safety precautions and measure while working” interpreted as “Very Competent”. Followed by statement number 5 with a mean score of 4.67 which stated “Perform finished weldment based on acceptable standards for slag” which was interpreted as “Very Competent”. Followed by statement number 6 with a mean score of 4.63 which stated “perform finished weldment based on acceptable standards for uniformity of beads” interpreted as “Very Competent”. Lastly, statement number 7, got a mean score of 4.53 which stated “Use tools and other equipment very handy” interpreted as “Very Competent”.

Table 5. Level of competency-based performance of the students using the developed welding tool storage organizer on wheels.

Competency-based Performance	Mean	Verbal Interpretation
1. Perform the methods of striking an arc.	4.90	Very Competent
2. Perform stringer or straight beads in accordance with welding standards.	4.80	Very Competent
3. Check uniformity of bead ripples in accordance with welding standards.	4.77	Very Competent
4. Perform finished weldment based on acceptable standards for Spatters.	4.77	Very Competent
5. Perform finished weldment based on acceptable standards for Slag	4.67	Very Competent
6. Perform finished weldment based on acceptable standards for Uniformity of beads.	4.63	Very Competent
7. Use tools, and other equipment very handy.	4.53	Very Competent
8. Wear all necessary safety gear before working.	4.77	Very Competent
9. Keep my workplace clear from clutter	4.77	Very Competent
10. Assure safety precautions and measure while working.	4.77	Very Competent
Mean	4.74	Very Competent

Relationships among Acceptability and Usability of the Developed Welding Storage Organizer on Wheels and the Competency-Based Performance of the Students using the Developed Welding Storage Organizer

Study revealed that there were no significant relationships among acceptability and usability of the different features of the developed welding storage organizer as evaluated by teachers and welding shop owners, and the level of competency-based performance of the students using the developed welding storage organizer on wheels as evidenced by acceptability of teacher and level of competency-based that obtained r-values of 0.241, respectively with p-value of 0.200; in terms of usability of teacher and level of competency-based if it obtained r-values of 0.378, with p-value of 0.039; the acceptability of welding /shop owner and level of competency-based obtained r-values of 0.097, respectively with p-value of 0.610; and in terms of usability of welding / shop owner and level of competency-based by the students it obtained r-values of 0.154, with p-value of 0.417. This indicated that the results of the study were appreciated by the different respondents in different ways in terms of acceptability and usability of the developed welding storage organizer on wheels.

Table 6. Relationships among Acceptability and Usability of the Developed Welding Storage Organizer and the Competency-Based Performance of the Students using the Developed Welding Storage Organizer.

Variables	R	P-values	remarks
Acceptability (Teacher) and Level of competency-based	-0.241	0.200	ns
Usability (Teacher) and Level of competency-based	-0.378	0.039	ns
Acceptability (Owner) and Level of competency-based	-0.097	0.610	ns
Usability (Owner) and Level of competency-based	-0.154	0.417	ns

IV. CONCLUSIONS

Based on the findings of the study, the following conclusions were drawn:

The different features of the developed welding storage organizer on wheels are helpful to teachers and students in terms of the demand of works and the availability of the school equipment provided by the DepEd Central Office to sustain the Senior High School Program in TVL-SMAW.

The welding tool storage organizer on wheels is useful in delivering and performing competency-based activities/performances in school especially during pandemic.

The teachers, welders/shop owners and students have different appreciation of the usage of the developed welding tools storage organizer on wheels. It helps them in different ways.

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