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Adaptation of innovative edge banding trimmer for technology instruction: A university case

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Abstract.
This study focuses on the adaptation of an innovative edge banding trimmer for technology instruction. This study also aimed to explore the respondent group's perceptions of the level of acceptability and effectiveness of innovated edge banding trimmer. Moreover, this study utilizes a survey to assess the perception of the faculty and student. The study used the descriptive-normative design to gather facts relevant for achieving the discussion details in planning, designing, and constructing the IEBT. The main instrument used to ascertain these parameters are the two survey questionnaires were researcher-made aligns with industry competencies, the statistician validated the reliability and consistency. Results revealed that the perceptions of the two respondent groups are statistically significant. Moreover, innovated edge banding trimmer shows a positive effect on the students' performance and output. Further, it implied that using innovated edge banding trimmer would make students work

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more efficiently and elevate quality. The research finding will allow the faculty and students to meet global needs in innovation and lifelong learning.

Keywords: Innovated edge banding, technology instruction, challenge of change

1. Introduction

Technology has Change and revolutionizes the conventional method of teaching and learning. Previous scholars reported that these advancements had made considerable impacts on educational practices. In the advent of technology in education, universities join the technology implementation race (Garone et al., 2019). In particular, the use of technology to support teaching and learning has become a modern educational paradigm, and teachers are increasingly encouraged to incorporate more Technology to improve their teaching practices (Lawless & Pellegrino, 2007; Afshari et al., 2009; Mikre, 2011; Agbo, 2015; Stosic et al., 2019; Suson & Ermac, 2020a). Similarly, technology's impact is one of the most critical issues in education (Nelson et al., 2017; Harris et al., 2019; Grion et al., 2019; Aburayya et al., 2020c; Gokbulut, 2020).

Moreover, integrating technology into the curricula to positively affect teaching and learning has been evolving (Joo et al., 2018; Dias & Atkinson, 2001; John, 2015; Lawrence & Tar, 2018; Aburayya et al., 2019a). According to the results of the study of Flanagan & Jacobsen (2003) and Mustafina (2016), showed that technology integration is meant to be cross-curricular rather than become a separate course or topic in itself. Somebody can use Technology to support educational goals such as information acquisition and assessment skills, collaboration, communication, and problem-solving that are important for students' knowledge society readiness. (Drent & Meelissen 2007; Ashfari et al., 2009; Khan et al., 2012; Inaltekin, 2020). Therefore, teachers should also use learning tools to lop their student learning in all subject areas to stimulate students' thoughts, decision-making, problem-solving, and reasoning behaviors (Grabe & Grabe, 2001; Peter, 2012; Cebrian & Junyent, 2015).

In the Philippines, the technology in education derives its strength not only from the teaching and learning process but also from the continuous development in education during the course that a student is educated to internalize not only the theoretical component but also the practical knowledge and the principle in generating a tangible production, however, despite successful efforts to provide quality education to the students in a higher education institution. There has been less success in identifying which innovative teaching practices should be utilized (Bauer & Kenton, 2005; Colvard et al., 2018; Aburayya et al., 2020a). Hence, given the prevalence of computers in education today, it is critical to understand teachers' perspectives regarding computer integration in their classrooms (Mueller et al., 2008; MacCallum & Jeffrey, 2009; Regan et al. 2019).

A similar contribution by Smith (2012) stated that the challenges of changes in higher education, educational developers' role, and the use of innovation to promote Change. As a result, educational developers' orientations shift tactically to reflect those changes (Land, 2004). Gosling (2009) stressed how the developers were more strategic. Their job activities have changed from helping individual researchers change agents for management, a 'precarious' role (Clegg, 2009). Moreover, Smith (2012) indicated that creative learning and teaching methods need to be shared and implemented through organizations to bring about progress in this way; educational leadership units with their more strategic purpose frequently lead or encourage coordination of such innovation planning A high-level strategy for introducing new ways of working is necessary (Bell & Bell, 2005; Brzycki & Dudt, 2005; Hockings, 2005; Intaganok; Peconcillo et al., 2020). It should have a continuity strategy lasting beyond launch, or creativity

will die after funding or initial excitement has expired (Elton, 2003). Data shows a need to be a shared vision for creativity (Roberts, Kelley, & Medlin, 2007) legitimized by public debate.

In connection to technology demands, the proponent conceptualizes an innovative edge banding trimmer that provides a healthy environment that is to correct posture, comfort, freshness, functional output, sophistication, economic matter, and beauty inside the shop. With the contribution of this tool, there is flexibility and maximization in handling. The functions of Innovated Edge Banding Trimmer will answer some Interior Design problems. The students can use this as a project that provides necessary skills. Moreover, private or public institutions in the Philippine settings consider as essential to have the practical ability in terms of school plants, the availability of machine and equipment, hand tools, training facilities, and the latest technology in teaching (Lall, 2004; Postlethwaite & Thomas, 2014; Suson et al., 2020b; Leoner, 2018). To augment the process of doing some technical works in the technology department, the researcher created an innovative edge banding trimmer to measure its effectiveness on students' output and instruct instructors' perception of acceptability and effectiveness and the technical requirements for constructing an Innovated Edge Banding Trimmer.

2. Methodology

This study used the descriptive-normative research method to gather facts relevant for achieving the discussion details in planning, designing, and constructing the IEBT. According to Shields and Rangarajan (2013), descriptive research was used to describe the characteristics of a population being studied. It does not define what caused a situation. The technique used under the descriptive method is a survey approach that is normally used to explore opinions according to respondents representing a whole population. The survey is appropriate in this study because it enables the researcher to formulate generalizations. The researcher conceptualizes and carries the study out at the College of Technology shop, where classes are held for Bachelor of Science in Industrial Technology and Master in Technician Education major in Civil Technology. The study subjects are determined by a randomly selected method as a requirement for the intended study. Specifically, it included first-year and second-year Bachelor of Science in Industrial Technology – Civil Technology students, Civil Technology instructors. All second-year Bachelor of Science in Industrial Technology major in civil technology students is being chosen to validate the acceptability of the IEBT.

The main instrument of the study was a researcher-made questionnaire divided into two parts. One for the students, and the other is for the instructors and professors. This was validated by the statistician and was pilot tested. The ethical procedure was carried off before the questionnaires were administered. After the research questionnaires were accomplished, they were collated and the data tabulated and statically treated with statistical software aid, then analyzed and interpreted as to their significance to the study. Mean was used to determine the respondents' perception of the applicability level and the effectiveness of the Innovated Edge Banding Trimmer. At the same time, a T-test was utilized for the significance between the mean validation of the use of the innovated Edge banding trimmer as to its performance. The statistical analysis itself was performed at a 95% confidence level. A P-value of less than 0.05 was considered statistically significant. During the data's actual gathering, the researcher ensured that the respondents were making their honest and sincere responses as they were assured of the confidentiality of their identity and responses. The researcher also confirmed no outside influence on how the respondents gave their answers; hence the researcher did not allow those who are not respondents to be present during the actual data gathering.

3. Results

Table 1. Acceptability of Innovated Edge Banding Trimmer in terms of design

Design	Acceptability			
	Faculty		Students	
	X	SD	X	SD
American National Standard Institute (ANSI) Standards are strictly followed in the drawing	2.90	0.89	2.91	0.91
Clarity of placing dimensions of different views for direct measuring	3.00	0.93	2.95	0.96
Clarity of drawing details needed for construction	3.00	1.01	3.00	0.96
Correct usage of line and symbols	2.50	0.97	2.80	0.85
Smoothness of surface	2.60	0.86	2.91	0.82
Clarity of pictorial views	2.90	0.88	2.95	0.98
Mean	2.76	0.92	2.92	0.90

The study's finding presented in table 1 shows the data analysis of the level of acceptability of the respondents of edge banding trimmer in terms of design, which achieved a mean score of 2.76 (SD=0.92) for the faculty and 2.92 (SD= 0.90) for the students. Based on the data in table 1, all perceptions were at a high level. For the faculty and students, "correction usage of line and symbols" got the lowest mean score of 2.50 (SD=0.97) and 2.80 (SD=0.85). Overall, the results show a positive effect and high acceptability level on the student's performance.

Table 2. Acceptability of Innovated Edge Banding Trimmer in terms of ergonomics

Ergonomics	Acceptability			
	Faculty		Students	
	X	SD	X	SD
Rigidity of the Edge Banding Trimmer trainer	2.50	0.84	2.90	0.88
Comfortability in using the Edge Banding Trimmer trainer	2.50	0.79	2.95	0.86
Safeness in using the Edge Banding Trimmer trainer	2.90	0.92	2.95	0.97
Durability of the Edge Banding Trimmer trainer	2.80	0.83	2.91	0.92
Mean	2.67	0.85	2.92	0.91

Table 2 reflects the acceptability level of the edge banding trimmer trainer in terms of ergonomics. The result achieved a mean score of 2.67 (SD=0.85) for the faculty and a mean score of 2.92 (SD=0.91) for the students. The data shows that all perceptions were at a high level. For the faculty, the statement "rigidity of the edge banding trimmer trainer and comfortability in using the edge banding trimmer trainer got the lowest mean score of 2.50 (SD=0.84 & 0.79), which considered highly acceptable. On the other hand, the statement "durability of the edge banding trimmer trainer" got the lowest mean score of 2.91 (SD=0.92), which considered highly acceptable. Overall, the data shows a high acceptability level in terms of ergonomics.

Table 3. Acceptability of Innovated Edge Banding Trimmer in terms of construction

Construction	Acceptability			
	Faculty		Students	
	X	SD	X	SD
Construction time frame is enough	2.80	0.95	2.91	0.96
Proper usage of tools and machine	2.90	0.86	2.90	0.78
Safety habits is being applied	3.00	0.88	2.91	0.92
Proper housekeeping of the working area	2.50	0.92	2.91	0.92
Quality of the finished Edge Banding Trimmer trainer	2.50	0.85	2.95	0.87

Steps of operations are feasible		2.50	0.82	2.95	0.87
Machine scheduling is appropriate		2.80	0.98	2.91	0.92
Preparation of machine and accessories		2.90	0.89	2.80	0.96
Availability of tools and equipment		2.80	0.93	2.90	0.82
	Mean	2.74	0.90	2.90	0.89

The third factor that measures the acceptability level of edge banding trimmer trainer was construction. The data shows that construction got an overall mean score of 2.74 (SD=0.90) for the faculty and 2.90 (SD=0.89) for the students. It shows that all perceptions were at a high level. Applied safety habits were the highest mean score for the faculty, which garnered 3.00 (SD=0.88), which was interpreted as high acceptability. Simultaneously, students, on the other hand, quality of the finished edge banding trimmer trainer and steps of operations, got the highest mean score of 2.95 (SD=0.92 & 0.87), which also interpreted as high acceptability. Overall, the data shows a high acceptability level in terms of construction.

Table 4. Summary of the Extent of Acceptability of Innovated Edge Banding Trimmer

Acceptability of the Edge Banding Trimmer Trainer	Faculty		Students	
	X	SD	X	SD
Design	2.76	0.92	2.92	0.90
Ergonomics	2.67	0.85	2.92	0.91
Construction	2.74	0.90	2.90	0.89

Table 4 shows the summary of the level of acceptability of edge banding trimmer trainer in terms of design, ergonomics, and construction. Data shows that design got the highest acceptability level for the faculty, which garnered a mean score of 2.76 (SD=0.92), while students, on the other hand, design and ergonomics were tied with a mean score of 2.92 (SD= 0.90 & 0.91), which also described as highly acceptable. Overall, the finding shows a promising effect on the student's and faculty's performance.

Table 5. Effectiveness Innovated Edge Banding Trimmer in terms of Trimming

Trimming	Effectiveness of the Edge Banding Trimmer	
	X	SD
Neatness	2.90	0.98
Accuracy	2.50	0.86
Measurement	3.00	0.82
Safety	3.00	0.91
Mean	2.90	0.89

The finding of the study, as presented in table 5, shows the effectiveness of edge banding trimmer in terms of trimming. Measurement and safety got the highest mean score of 3.00 (SD=0.82 & 0.91), which was described as very effective. At the same time, accuracy got the lowest mean score of 2.50 (SD=0.86), which is still considered very effective. Overall, the data shows that edge banding trimmer is very effective in terms of neatness, accuracy, measurement, and safety in trimming.

Table 6. Effectiveness Innovated Edge Banding Trimmer in terms of Grooving

Grooving	Effectiveness of the Edge Banding Trimmer	
	X	SD
Neatness	2.80	0.92
Accuracy	2.80	0.84

Measurement		3.00	0.79
Safety		3.00	0.86
	Mean	2.72	0.85

Table 6 shows the effectiveness of edge banding trimmer in terms of grooving. Data shows that measurement and safety also got the highest mean score of 3.00 (SD=0.79 & 0.86), which was very effective. At the same time, accuracy and neatness got the lowest mean score of 2.80 (SD=0.92 & 0.84), which is still considered very effective. Overall, the data shows that edge banding trimmer is very effective in terms of neatness, accuracy, measurement, and safety in grooving.

Table 7. Effectiveness Innovated Edge Banding Trimmer in terms of Dovetailing

Dovetailing		Effectiveness of the Edge Banding Trimmer	
		X	SD
Neatness		2.50	0.85
Accuracy		2.50	0.88
Measurement		3.00	0.86
Safety		2.90	0.96
	Mean	2.72	0.89

The finding of the study, as presented in table 7, shows the effectiveness of edge banding trimmer in terms of dovetailing. The finding shows that measurement got the highest mean score of 3.00 (SD=0.86), which is very effective. At the same time, accuracy and neatness got the lowest mean score of 2.50 (SD=0.85 & 0.88), which is still considered very effective. Overall, the data shows that edge banding trimmer is very effective in terms of neatness, accuracy, measurement, and safety in dovetailing.

Table 8. Effectiveness Innovated Edge Banding Trimmer in terms of Rabbeting

Rabbeting		Effectiveness of the Edge Banding Trimmer	
		X	SD
Neatness		2.80	0.84
Accuracy		2.90	0.92
Measurement		3.00	0.87
Safety		2.90	0.94
	Mean	2.90	0.89

The finding of the study, as presented in Table 8, shows the effectiveness of edge banding trimmer in terms of rabbeting. The finding shows that measurement got the highest mean score of 3.00 (SD=0.87) which was described as very effective. Further, accuracy and safety got the lowest mean score of 2.90 (SD=0.92 & 0.94), which is still considered very effective. Overall, the data shows that edge banding trimmer is very effective in terms of neatness, accuracy, measurement, and safety in rabbeting.

Table 9. Effectiveness Innovated Edge Banding Trimmer in terms of Molding

Trimming		Effectiveness of the Edge Banding Trimmer	
		X	SD
Neatness		3.00	0.86
Accuracy		2.90	0.92
Measurement		3.00	0.92
Safety		2.90	0.94
	Mean	2.96	0.91

The finding of the study, as presented in Table 9, shows the effectiveness of edge banding trimmer in terms of molding. The finding shows that neatness and measurement got the highest mean score of 3.00 (SD=0.86 & 0.92), which was described as very effective. Further, accuracy and safety got the lowest mean score of 2.90 (SD=0.92 & 0.94), which is still considered very effective. Overall, the data shows that edge banding trimmer is very effective in terms of neatness, accuracy, measurement, and safety in molding.

Table 10. Summary table on the extent of the effectiveness of Innovated Edge Banding Trimmer

Indicators	Mean	SD
Trimming	2.85	0.85
Grooving	2.90	0.89
Dovetailing	2.72	0.85
Rabbeting	2.90	0.89
Molding	2.95	0.91

Table 10 shows a summary of the effectiveness of edge banding trimmer in terms of trimming, grooming, dovetailing, rabbeting, and molding. Data shows that molding got the highest mean score of 2.95 (SD=0.91), while dovetailing got the lowest mean score of 2.72 (SD=0.85), which still very effective in nature. Overall, the edge banding trimmer shows show a positive effect in terms of trimming, grooving, dovetailing, rabbeting, and molding.

Table 11. Test for the significant Mean difference between the perceptions of the respondents' group.

Acceptability	Faculty		Students		Computed	Critical
	X1	SD	X2	SD	t-value	t-value
Design	2.76	0.92	2.92	0.90	3.45	2.09
Ergonomics	2.67	0.85	2.92	0.91	3.38	2.06
Construction	2.74	0.90	2.90	0.89	3.41	2.01

Table 11 shows the differences in faculty and students' perception of the acceptability of the edge banding trimmer trainer. Data shows that the faculty and students' perception in terms of design got the computed t-value of 3.45, which is greater than the critical t-value of 2.09, which is described as statistically significant. Ergonomics, on the other hand, got the computed t-value of 3.38, which is greater than the critical t-value of 2.06, which is described as statistically significant. At the same time, construction got the computed t-value of 3.41, which is greater than the critical t-value of 2.01, which is described as statistically significant.

Table 12. Test for the significant for the effectiveness of Innovated Edge Banding Trimmer

Effectiveness	Mean	SD	Computed t-value	Critical t-value
Trimming	2.85	0.85	3.32	2.08
Grooving	2.90	0.89	3.41	2.07
Dovetailing	2.72	0.85	2.44	1.53
Rabbeting	2.90	0.89	3.46	2.16
Molding	2.95	0.91	3.42	2.10

The finding of the study, as presented in Table 12, shows the effectiveness of the Innovated Edge Banding Trimmer trainer at the level of significance ((α≤0.05). Molding with the highest mean score of 2.95 (SD=0.91) got a computed t-value of 3.42, which is greater than the critical value of 2.10. While the dovetailing got the lowest mean score of 2.72 (SD=0.85) got a computed t-value of 2.44, which is greater,

the critical value of 1.53 was statistically significant. Data shows that all variables are statistically significant.

4. Discussions

There are two phases of the study: evaluating its level of acceptability based on the perceptions of the respondent groups on innovated edge banding trimmer and faculty perception on the effectiveness of innovated edge banding trimmer. With reference to the above analysis, the data shows a statistically significant impact on the faculty and students' perceptions of the adaptability of innovated edge banding trimmer. All computed t-value was greater than the critical value; hence all variables are statistically significant. In addition, the level of acceptability of the innovated edge banding trimmer all variables were at a high acceptability level.

Moreover, in terms of the effectiveness of innovated edge banding trimmer, data analysis shows that all variables were being rated as very useful in nature, moreover, at the level of significance ($\alpha \leq 0.05$). Data shows that all variables are statistically significant in terms of neatness, accuracy, measurement, and safety. Hence, data shows that innovated edge banding trimmer is very effective. The researchers believe that it must be utilized in the university to fully provide quality learning for the students. Several scholars agree that creative learning and teaching methods need to be shared and implemented through organizations to bring about progress in this way; educational leadership units with their more strategic purpose frequently lead or encourage coordination of such innovation planning A high-level strategy for introducing new ways of working is necessary (Smith, 2012; Bell & Bell, 2005; Brzycki & Dudt, 2005; Hockings, 2005; Intaganok). Moreover, the innovative edge banding trimmer shows a positive effect on the students' performance and output of the students.

5. Conclusion

Based on the findings and after careful analysis and interpretation of the study, it concludes that the innovated edge banding trimmer meets the standards and is very functional in performing each function for Civil, IDT, and FCM instructions. It showed that the perceptions of the two respondent groups are statistically significant. Moreover, innovated edge banding trimmer shows a promising effect on the students' performance and output. This further implied a need to innovate on the materials and teaching methods to cater to the advancement of industries. This will also allow the faculty and students to meet global demands in innovation and lifelong learning.

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