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Utilizing Gnomio in Technical Vocational Education and Training (TVET): Challenges and Opportunities

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Abstract: This study probes into the effectiveness and challenges of Gnomio, an eLearning platform, in enhancing TVET programs under a hybrid education delivery framework. It was conducted at School for Academics and Industrial Technology, Inc., which is a TESDA-accredited training and assessment center located in Rosario, Batangas, Philippines, with a mixed-method approach, involving 163 participants that were students and instructors.

Findings show that 91.4 percent of respondents considered Gnomio "very effective", while 8.6 percent thought it "effective." Features most used included course management at 58.3%, followed by assessment tools with 38.7%, and the two least used features were collaboration at 1.8% and resource sharing 1.2%. Connectivity problems, reported by 91.4%, was the commonly recorded problem, followed by lack of training on how to use the platform at 8.6%. The effect-size analysis showed no significant difference in perception between students and instructors, indicating a generally positive reception. Descriptive statistics showed strong agreement on Gnomio's effectiveness in engagement, feedback, and accessibility but varied responses regarding motivation and satisfaction.

The study calls for policy reforms in enhancing technical reliability, expanding training programs, and improving feature collaboration with a view to furthering Gnomio's potential impact on TVET hybrid learning while ensuring quality vocational education.

Keywords: Gnomio, Hybrid education and training, TVET, TESDA

I. Introduction

Traditional teaching and learning approaches have been altered by the incorporation of digital platforms into education, especially in technical and vocational education and training (TVET). The demand for creative teaching resources has increased dramatically as TVET schools seek to give students real-world skills that are in line with industry norms. Gnomio is an open-source Learning Management System (LMS) that supports online and blended learning. It is based on the Moodle platform. With capabilities including interactive learning modules, online tests, and course management, Gnomio is a potentially useful tool for TVET (Jan Delcker, 2022).

Notwithstanding its encouraging possibilities, there are certain difficulties in integrating Gnomio into TVET. It can be challenging to duplicate the demands of TVET programs in a digital setting, such as the requirement for practical skill development (Shaqiri, 2024). Further obstacles that educators and institutions may face include low levels of digital literacy, poor infrastructure, and a lack of instruction in the use of digital tools like Gnomio (Chanda, 2024). The effectiveness of Gnomio's integration into TVET and its ability to satisfy the unique requirements of vocational education are called into doubt by these difficulties.

However, there are also a lot of chances to improve TVET delivery with Gnomio. Flexible learning is made possible by its interactive features, which include remote access, collaboration tools, and real-time feedback. This is especially advantageous for vocational students who must balance their studies with jobs or other obligations (Abid Haleem, 2022). Understanding how teachers and students view Gnomio and assessing its real-world use are essential to recognizing its advantages and resolving its drawbacks.

The study assessed how Gnomio, an open-source Learning Management System (LMS), in technical education and training of School for Academics and Industrial Technology Inc., in particular. With the increasing need for flexible, technology-based educational solutions, knowing how Gnomio could meet the specific needs of vocational education is vital. This study examined and assessed the effectiveness of Gnomio as a learning management system in [TVET] by identifying the challenges in its implementation and the opportunities it presented for enhancing of student learning, engagement and skill acquisition. The following objectives have been established to guide the study:

1. To examine the extent of Gnomio’s implementation in Technical Vocational Education and Training (TVET) programs.

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2. To identify the key challenges faced by the trainers in integrating Gnomio into TVET curricula.
3. To explore the opportunities that Gnomio offers in enhancing learning outcomes and student engagement in TVET.
4. To assess the perceptions of teachers, students, and administrators toward Gnomio's effectiveness in supporting TVET learning objectives.

II. Methods

Sample

This study used stratified random sampling technique to be able to represent the three qualifications under School for Academics and Industrial Technology, Inc., a TESDA accredited training and assessment center in Rosario, Batangas, Philippines — Bartending NCII, Housekeeping NCII, and Food and Beverage Services NCII — according to their true population proportions (Simkus, 2023). After controlling for the population of 198 students, the sample size was overall determined to be 153 students due to 99% confidence level with a margin of error equal to 0.5. The sample technique used allows data to be accurate and each qualification to be represented correctly, so the study is valid statistically. The sample was then allocated according to the qualifications, thus there were 38 students from Bartending NCII, 57 students from Housekeeping NCII, and 58 students from Food and Beverage Services NCII for the training calendar year 2023.

Design

The initiated research employed a mixed-methods approach to give a complete picture of the problems and the benefits of using Gnomio in Technical Vocational Education and Training (TVET). This approach incorporated both quantitative and qualitative methods, thus a full-blown analysis of the subject matter was possible (George, 2021).

The quantitative part consisted of the administration of surveys to students and trainers, which were designed to collect information about their experiences, perceptions, as well as the effectiveness of Gnomio as a pedagogical tool. Such the quantitative analysis provided in-depth information about the supports which occurred, for example, technical problems and usability issues, as well as opportunities, improved engagement, and flexibility for the learning environment.

In addition to this, the qualitative component gave an account of the interviews and focus group discussions, which in turn brought out the individual experiences, success stories, and challenges experienced in the process of implementing Gnomio. The information gained from qualitative data were used to explain and gave more weight to the quantitative findings to provide a more delicate understanding of the implications resulting from the application of Gnomio in TVET contexts. It is with this mixed-methods approach that the study sought to give insights that could be acted on to improve practice further and the integration of Gnomio in vocational education settings.

III. Results

From the survey on Gnomio's effectiveness to TVET program, it is evident that 91.4% responded by rating it "very effective," where 149 of 163 participants made that choice. Another 8.6%, or 14 respondents, described it as "effective." In all, the response rate was 100%.

Concerning features of Gnomio the respondents utilized most in your TVET programs, the "course management" received the most usage, with 58.3% of respondents, or 95. The "assessment tools" followed with 38.7%, or 63 respondents. "Collaborative features" and "resource sharing" were infrequently used at 1.8% and 1.2%, respectively. At 100% cumulative, it suggested there may be a preference for the tools that facilitate organizing of courses and assessment.

Table 1. Independent Samples Effects Sizes

		Point Estimate	95% Confidence Interval	
			Lower	Upper
Perceived Rating of the students and trainers on the implementation of Gnomio in TVET program	Cohen's d	.326	-.316	.966
	Hedges' correction	.324	-.314	.961
	Glass's delta	.	.	.

The data on table 1 revealed that Both Cohen's d (0.28107) and Hedges' correction (0.28239) are small, meaning that there is a modest difference in perceived effectiveness between students and teachers on Gnomio. In addition, the 95% confidence intervals for both measures contain zero, implying that the difference may be negligible and statistically insignificant between different samples.

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Table 2. Challenges Encountered During the Implementation of Gnomio in TVET program

Challenged Encountered During the Implementation of Gnomio in TVET program	N	%
Technical issues (e.g., connectivity, software glitches)	149	91.4
Lack of training on how to use Gnomio	14	8.6%

Table 2 showed that 91.4 percent of respondents said that the biggest problem with using Gnomio was technical difficulties, primarily related to connectivity and software errors. Others complained that the training was inadequate, suggesting that others would need additional training.

Table 3. Opportunities that Gnomio offers in enhancing learning outcomes and student engagement in TVET

Statistics

		Repondent	OBJ3_engagement	OBJ3_feedback	OBJ3_blending	OBJ3_stdautonomy	OBJ3_content	OBJ3_accessibility	OBJ3_motivation	OBJ3_collaboration	OBJ3_facilitatorsupport
N	Valid	163	163	163	163	163	163	163	163	163	163
	Missing	0	0	0	0	0	0	0	0	0	0
Mean		1.0613	1.0613	1.0798	1.0000	1.0798	1.0429	1.7669	1.0920	1.1288	1.0798
Median		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	2.0000	1.0000	1.0000	1.0000
Mode		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Table 3 showed that the mean, median, and mode values were nearly equal to 1.00 for most of the indicators, which were: Engagement, Feedback, Blending, Student Autonomy, Content Quality, Accessibility, Collaboration, and Facilitator Support. This reflected high consistency in the responses, showing that respondents basically agreed on these aspects regarding the effectiveness of Gnomio. The motivation indicator means 1.7669; Median 2.00; and mode 1.00, which depicted a spread of the responses. This could be due to the fact that there were more divergence of opinions on Gnomio's potential to motivate the users.

Table 4. Perceptions of teachers, students, and administrators toward Gnomio's effectiveness in supporting TVET learning objectives

	Respondents	Effective	User Friendly	Alignment	Engagement	Reliability	Satisfaction	Tools for Instruction
N Valid	163	163	163	163	163	163	163	163
Missing	0	0	0	0	0	0	0	0
Mean	1.0613	1.1227	1.0982	1.0429	1.0613	1.7669	1.0859	1.0859
Median	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Mode	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Table 4 showed that for all but one of the indicators-Effectiveness, User-Friendliness, Alignment, Engagement, Reliability, and Utility as an Instructional Tool-the mean, median, and mode are close to or equal to 1.00. This reflects that most of the respondents agreed that these aspects were positive aspects that characterize Gnomio. The Satisfaction indicator has a mean of 1.7669, a median of 2.00, and a mode of 1.00. The varying values indicate mixed sentiments related to being satisfied, that not everybody feels satisfied, while somebody perhaps did not.

IV. Analysis and Discussion

The survey on the effectiveness of Gnomio in TVET programs indicated a very positive response; 91.4% responded that it was "very effective," while the rest, 8.6%, rated it as "effective." This unanimous response (100% participation) underscores a generally favorable view of Gnomio among users. Considering what features Gnomio accessed the most, "management" was voted the most at 58.3%; it followed by 38.7% which is "assessment tool"; this shows he wanted tools that could either aid in organizing a course and evaluating it. Not really at least, "collaboration feature" and "resources to share" are scantily accessed at 1.8% and 1.2% respectively.

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Effect size analysis shows that the perceived effectiveness of students and teachers is slightly, though not statistically significant, different because the confidence intervals include zero. The biggest problem, at 91.4%, reported by the respondents was technical, in the form of connectivity and software problems. A relatively minor proportion (8.6%) stated that training was inadequate.

Descriptive statistics indicated that for the Engagement, Feedback, and Accessibility indicators, the value is generally high. That means there is a general agreement about Gnomio's effectiveness in these areas. More variability can be noted in responses on Motivation, whose mean was 1.7669, which may indicate that there are mixed opinions about how motivating Gnomio is. Satisfaction also showed variability, and it indicated mixed feelings about user satisfaction with Gnomio, revealing areas where improvement could potentially enhance overall user experience.

V. Conclusion

According to the results of the survey, the perception of Gnomio in TVET programs was positive, as 91.4% of respondents rated it "very effective" and 8.6% "effective." This result resonates with Kintu et al. (2017), which claims that friendly user platforms increase the user's satisfaction and effectiveness. Most respondents voted for features for course management at 58.3% and assessment tools at 38.7%. According to Tarun (2019), features like these are the basic steps for organizing and assessing a learning environment. However, technical challenges, particularly connectivity issues, have been identified by 91.4% of the respondents, a result consistent with that of Macharia & Pelser (2014), which also found that technical problems continue to be a major setback to the integration of education technology. The minimal and statistically insignificant variations in efficacy perceived by students and instructors suggest Gnomio enables different populations of users equitably. Areas with high ratings on engagement, feedback, and accessibility denote constant satisfaction, but mixed ratings on motivation and satisfaction give a sign that some users think Gnomio is less motivating or satisfying, which reflects opportunities for improvement in user support and motivational design.

VI. Recommendation

This study provides important insights regarding the positive reception of Gnomio in TVET programs, since 91.4% of the respondents rated it as "very effective." However, this study pointed out the areas that needed improvement, which were technical support and user training. Future research and policy interventions should focus on technical reliability improvement in the platform and increasing training programs to benefit all users fully from the platform. Additionally, better engagement can be promoted through the enhancement of collaboration and resource-sharing features, and mixed responses on motivation and satisfaction should be addressed for comprehensive user experience.

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Conflict of Interest

Authors declare that there is no conflict of interest regarding the publication of the paper.

Author Contribution

The authors confirm contribution to the paper as follows: study conception and design; Rachele A. Glor, MBA, Dr. Ferdinand T. Glor, CESWE; **data collection**; **analysis and interpretation of results**; **draft manuscript preparation**. All authors reviewed the results and approved the final version of the manuscript.

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