



Driving Innovation Hybrid Mechanical Engineering Review Platform as Catalysts for Technology Diffusion

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Abstract: Responding to the imperative of keeping pace with the dynamic nature of technological innovations in the field of mechanical engineering, the integration of e-learning emerges as a promising avenue. The study used a descriptive-analytic method, a survey questionnaire, and the ISO standard model, specifically ISO 25010, and distributed it to 110 randomly selected respondents. The findings indicate a consistently high rating for effectiveness from reviewees, reviewers, and newly qualified board passers. There was strong agreement among them regarding the platform's efficacy across various dimensions, including content design, media design, visual design, feedback mechanisms, and assessment items. The performance expectancy and effort expectancy did not exert a significant influence on the behavioral intention to use the hybrid mechanical engineering review platform.

Keywords: Technology management; Hybrid mechanical engineering review platform; E-Learning in mechanical engineering; Technological diffusion; Behavioral intention

1. Introduction

The field of mechanical engineering is characterized by rapid technological advancements, necessitating continuous evolution in educational methodologies and assessment tools to ensure professionals are equipped with the latest knowledge and skills. The dynamic nature of the mechanical engineering field demands continuous evolution of the licensure examination process to effectively evaluate the competencies of aspiring engineers amid rapid technological advancements [1]. In response to the imperative of keeping pace with the dynamic nature of technological innovation in mechanical engineering, the integration of e-learning emerges as a promising avenue. This approach holds the potential to facilitate technology diffusion and enhance the efficacy of the licensure examination process. The innovative nature of e-learning not only aligns with the field's dynamic characteristics but also provides a platform for continuous learning and assessment [2]. In contrast, traditional review platforms and examination processes may struggle to adapt swiftly to rapid technological advancements. The utilization of this technological innovation is commonly known as e-learning technology, a highly sought-after tool in both developed and developing countries [3]. E-learning technology revolves around the dissemination of knowledge, transcending traditional classroom limitations [4]. It involves digital learning delivered online via

electronic media and is accessible on various devices, such as computers, laptops, tablets, or smartphones [5]. The versatility of e-learning makes it a flexible and convenient way to acquire knowledge. Resources for e-learning are available in various formats, including apps, interactive online platforms, and digital courses [6].

E-learning is commonly integrated into the blended learning framework. As emphasized by Dangwal [7], blended learning is an educational approach that introduces innovative solutions by seamlessly integrating traditional classroom instruction with mobile learning and online activities for educators, trainers, and students. The fundamental concept underlying blended learning is the recognition that education is a continuous, evolving process rather than a singular, isolated event. This holistic approach aims to synergize traditional and digital learning methods, optimizing the educational experience for all stakeholders involved. A hybrid mechanical engineering review platform integrates traditional review methods with advanced digital technologies, resulting in a more comprehensive and engaging learning experience. This fusion not only improves the accessibility and flexibility of the review process but also introduces aspiring engineers to cutting-edge technologies, fostering the diffusion of innovation within the field [7].

The potential of this hybrid platform, combining traditional teaching approaches with advanced e-learning technologies, is to revolutionize the education and assessment paradigm in mechanical engineering. The PRIME review center, a prominent Mechanical Engineering Review Center in the Philippines, has taken a pioneering step by introducing a hybrid mechanical engineering review platform. This innovative initiative was conceived during the initial stages of the pandemic, a period marked by the unavailability of physical meetings. In response to the challenges posed by the restrictions, PRIME has demonstrated forward-thinking by adopting a hybrid approach that combines traditional review methodologies with digital technologies, ensuring continued access to high-quality education for aspiring mechanical engineers. The introduction of the hybrid mechanical engineering review platform has elicited diverse responses from the clientele, prompting the review center's administrators to consider fully integrating this technology into the review program. Recognizing the importance of understanding current enrollees' behavioral intentions towards adopting the Hybrid Mechanical Engineering Review Platform, one of the researchers, who also serves as the owner of the review center, is considering an assessment to gauge receptiveness and potential acceptance of this innovative learning approach among current review class participants. This assessment aims to provide valuable insights into the feasibility and desirability of integrating the hybrid platform as a permanent, integral part of the review center's educational offerings.

The researchers are considering applying the Unified Theory of Acceptance and Use of Technology (UTAUT), a model developed by Davit Marikyan (Business School, University of Bristol, UK) and Savvas Papagiannidis (Business School, Newcastle University, UK). This theoretical framework posits that the actual utilization of technology is influenced by behavioral intention. According to UTAUT, the perceived likelihood of adopting technology is shaped by the direct impact of four pivotal constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions. Furthermore, the influence of these predictors is moderated by factors such as age, gender, experience, and the voluntariness of use [8]. The application of UTAUT in this context would provide a structured, comprehensive understanding of the factors influencing enrollees' behavioral intentions to adopt the Hybrid Mechanical Engineering Review Platform.

The researchers aim to assess the behavioral intention of respondent groups to adopt the Hybrid Mechanical Engineering Review Platform for preparing for the mechanical engineering licensure examination. This examination will dwell into the impact of incorporating innovative digital technologies, with the expectation that the platform can offer a more personalized, immersive, and accessible review experience for aspiring engineers. Simultaneously, the platform is anticipated to generate valuable data-driven insights that contribute to continuous improvement in the review process. By scrutinizing participants' behavioral intentions, this assessment gauges the perceived value and receptiveness to the Hybrid Mechanical Engineering Review Platform, providing a foundation for refining and optimizing the learning experience for future cohorts of aspiring engineers.

2. Literature review

The rapid integration of digital technologies in engineering education has reshaped traditional approaches to licensure examination preparation, particularly in highly technical fields such as mechanical engineering. While e-learning and hybrid instructional models have gained widespread attention, there remains a need to examine how such systems function not only in general educational contexts but also within discipline-specific environments that require higher-order analytical and problem-solving skills. This study is anchored in established theoretical models that explain both technology adoption and system quality, and situates them within the context of mechanical engineering review practices. At the core of this study is the Unified Theory of Acceptance and Use of Technology (UTAUT) developed by Venkatesh et al. (2003), which has been widely recognized as a comprehensive framework for understanding user acceptance of technology. The model integrates key constructs from earlier theories and identifies performance expectancy, effort expectancy, social influence, and facilitating conditions as primary determinants of behavioral intention and actual system use. In educational settings, UTAUT has been extensively applied to explain students' and instructors' adoption of digital learning platforms, particularly in higher education environments where technology-mediated instruction is increasingly prevalent [7, 37]. Recent studies have expanded the application of UTAUT across various domains, including education, healthcare, tourism, and banking [38, 39]. These investigations consistently highlight performance expectancy and effort expectancy as dominant predictors of technology use, while also recognizing the growing importance of contextual variables such as trust, system quality, and user experience. For instance, research in e-learning environments has shown that students are more likely to adopt digital platforms when they perceive them as useful, easy to use, and aligned with their learning needs [40, 41]. However, these studies also suggest that the influence of these variables may vary depending on user characteristics, technological familiarity, and learning context.

Despite the extensive use of UTAUT in evaluating technology adoption, a noticeable limitation in existing literature is its limited application to specialized professional preparation programs, particularly in engineering licensure examinations [42]. Most prior studies focus on general academic settings or broad e-learning environments, with less attention given to structured review systems that demand mastery of technical competencies [43,44]. As such, it is necessary to examine whether the same determinants of technology acceptance apply in high-stakes, discipline-specific contexts, such as mechanical engineering review programs. Complementing the UTAUT framework, this study also adopts the ISO/IEC 25010 model, which provides a structured approach to evaluating system quality. This model emphasizes key characteristics such as functional suitability, usability, reliability, performance efficiency, and security, all of which are essential in determining the effectiveness of digital platforms [45]. In the context of e-learning, system quality plays a critical role in shaping user experience and satisfaction, ultimately influencing continued use and acceptance. Prior research has shown that platforms with well-designed interfaces, reliable performance, and interactive features tend to yield better learning outcomes and higher user engagement [46].

While ISO/IEC 25010 has been widely used in software evaluation, its integration with technology acceptance models in educational research remains limited. Many studies treat system quality and user acceptance as separate areas of investigation, without fully examining how these dimensions interact within a single learning environment [47, 48]. This gap is particularly evident in engineering education, where both the technical performance of the system and the user's behavioral intention are equally important in determining the success of a review platform. In addition to these frameworks, learning theories such as self-regulated learning, cognitive load theory, and social cognitive theory provide further support for understanding how learners engage with hybrid review systems [6,49]. Self-regulated learning highlights the importance of learner autonomy, particularly in flexible learning environments where individuals manage their own pace and strategies [52]. Cognitive load theory emphasizes the need for well-structured content to prevent overload and enhance comprehension, a need that is especially relevant in technical subjects like mechanical engineering [50]. Meanwhile, social cognitive theory underscores the role of interaction, collaboration, and feedback in shaping learning behavior [51].

These theoretical perspectives collectively suggest that an effective hybrid mechanical engineering review platform must not only be technically sound but also pedagogically aligned with how learners process

information and develop competencies. While existing literature acknowledges the benefits of hybrid and e-learning systems, there remains a lack of focused investigation on how these systems support the specific demands of mechanical engineering licensure preparation [53]. Furthermore, in the Philippine context, the conduct of licensure examinations is governed by the Professional Regulation Commission (PRC) under Republic Act No. 8981, which ensures that only qualified individuals may practice their profession [54]. This underscores the importance of effective review systems that can adequately prepare examinees for rigorous assessments. Despite this, there is limited empirical research examining how digital or hybrid review platforms contribute to readiness for licensure examinations in engineering fields [55]. Given these gaps, the present study seeks to bridge the intersection between technology acceptance, system quality, and discipline-specific learning outcomes. By integrating UTAUT and ISO/IEC 25010 within the context of a hybrid mechanical engineering review platform, this research aims to provide a more comprehensive understanding of how technological and pedagogical factors jointly influence user acceptance and learning effectiveness. In doing so, it contributes to the limited body of literature that addresses technology-driven innovation in engineering licensure examination preparation.

3. Methodology

3.1 Research design

This study employed a descriptive research method to anticipate respondents' behavioral patterns by analyzing instrument findings and assessing their acceptance of the hybrid mechanical engineering review. In so doing, in the exploration of the factors that influenced behavioral intention through Structural Equation Modeling (SEM) techniques, we incorporated constructs from the Unified Theory of Acceptance and Use of Technology (UTAUT). In addition, the researchers used the product quality model outlined in ISO 25010 software quality assurance standards, as ISO 25010 is essential for determining the system's quality characteristics and ensuring it meets the explicit and implied requirements of diverse stakeholders, thereby delivering value. The quality model organizes product quality into distinct characteristics and sub-characteristics aligned with stakeholders' needs, encompassing functionality, performance, security, and maintainability. Through this model, the researchers have appropriately assessed the hybrid mechanical engineering review platform for the review center. To examine the relationships among variables in the UTAUT framework, the study employed Structural Equation Modeling (SEM) as the primary analytical technique [42]. SEM was selected because it allows simultaneous analysis of multiple relationships among latent constructs, such as performance expectancy, effort expectancy, social influence, and behavioral intention. Unlike simple correlation or regression methods, SEM provides a more comprehensive approach by accounting for measurement error and evaluating both direct and indirect effects among variables. To interpret the relationships, standardized path coefficients (β) were used to assess the strength and direction of influence between constructs. A positive coefficient indicates that an increase in one variable leads to an increase in another, while a non-significant coefficient suggests a weak or negligible predictive relationship. Statistical significance was evaluated using p-values, with a threshold of 0.05. In this study, results revealed that performance expectancy and effort expectancy did not significantly predict behavioral intention, whereas social influence did. These findings were interpreted within the context of technology adoption behavior, suggesting that external and social factors may play a more influential role than individual perceptions of usefulness or ease of use in this particular setting.

The research objectives and the type of data collected guided the selection of statistical tools in this study. Descriptive statistics, including frequency counts, percentages, and weighted means, were first utilized to summarize respondents' perceptions regarding the effectiveness and acceptability of the hybrid platform. These measures provided a clear, straightforward description of the data's general trends. For the analysis of relationships among variables, Structural Equation Modeling (SEM) was deemed appropriate due to its capability to handle complex models involving multiple dependent and independent variables. Given that the UTAUT framework consists of interrelated constructs rather than isolated variables, SEM offers a more suitable analytical approach compared to traditional regression techniques. Additionally, ANOVA was used to examine differences in responses across groups, allowing the researchers to determine whether variations

in perception were statistically significant. The combination of these statistical methods ensured both depth and accuracy in the analysis. Descriptive statistics established the overall pattern of responses, while SEM and inferential techniques provided a deeper understanding of how and why certain variables influenced behavioral intention. This integrated approach strengthens the study's technical rigor and supports the validity of the conclusions.

3.2 Research Participants

The study involved the entire population of professors/reviewers, selected Mechanical Engineering (ME) board passers, and selected ME reviewees at Prime Review Center, totaling 110 participants. Among them were 10 professors/reviewers, representing 9.09% of the population; 50 selected ME board passers, comprising 45.45%; and 50 ME reviewees, also comprising 45.45% of the total respondents. A complete enumeration method was used, ensuring that all members of the target population were included in the study.

3.3 Research Instruments

The researchers utilized the survey questionnaires as a tool to collect information from both reviewers and reviewees. The questionnaire used for data collection was derived from and adjusted to the survey instrument associated with the Unified Theory of Acceptance and Use of Technology. Modifications were made to align it with the specific focus of this study on the adoption of technology within a hybrid mechanical engineering platform [37]. The survey questionnaire comprises three components. The first section of the questionnaire focuses on the respondent's profile, including gender, age, level of computing experience, and employee type. The second section, derived from the ISO/IEC 25010 Software Quality Assurance Standard, is designed to ensure the model's quality through testing. It aims to assess the acceptability of hybrid mechanical engineering review by gauging the perceived level of interrelated constructs within the framework. This tool comprises eight domains with 31 determinants, covering functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability. The third section of the questionnaire delves into the perceived interrelationships among the constructs within the framework, including Performance Expectancy, Effort Expectancy, Social Influence, and Behavioral Intention.

3.4 Reliability and Validity of the Instrument

To ensure methodological rigor, the reliability and validity of the survey questionnaire were carefully established before full-scale data collection. Content validity was ensured through expert evaluation, in which three subject-matter experts in mechanical engineering education and educational technology reviewed the instrument to assess the relevance, clarity, and alignment of each item with the constructs of the ISO 25010 model and the Unified Theory of Acceptance and Use of Technology (UTAUT). Necessary revisions were incorporated based on their recommendations. Furthermore, a pilot test was conducted with a small group of respondents ($n = 20$) who were not included in the final sample to evaluate the instrument's internal consistency. The reliability of each construct was determined using Cronbach's alpha coefficient, with values ranging from 0.82 to 0.94, indicating high to excellent reliability. These results confirm that the instrument is both consistent and dependable in measuring the intended variables. Additionally, construct validity was supported through factor analysis, which showed that the questionnaire items loaded appropriately onto their respective domains. Overall, these procedures affirm that the research instrument is both valid and reliable for assessing the effectiveness and acceptability of the hybrid mechanical engineering review platform.

4. Results and Discussion

This section presents the research outcomes derived from the examination of study samples and survey questionnaires. Each of the collected data is substantiated by relevant literature, providing support for the information presented in the tables below.

Table 1. Profile of the respondents in terms of age and gender, N = 110.

Demographic Characteristics		Frequency	Percentage %
Age	50 and Above	2	1.82
	41 - 50	4	3.64
	31 - 40	9	8.18
	21 - 31	95	86.36
	20 and Below	-	-
Gender	Male	96	87.27
	Female	14	12.73

Table 1 presents a summary of the participants' demographic characteristics, including age. The predominant age group among respondents is 21-31 years, making up 86.36% of the total sample. The 50+ age category is the smallest, accounting for 1.82%. This inclusive age distribution ensures a holistic understanding of acceptance of the Hybrid Mechanical Engineering Review Platform, encompassing perspectives from individuals at different career stages and with diverse experiences within the academic institution. Another crucial aspect of respondents' profiles that significantly influences behavioral intention is gender. Research shows that teams with diverse gender representation offer notable advantages. A study by Zhang et al. [9] found that teams comprising both males and females tend to generate more innovative, widely recognized scientific concepts. The study conducted by Pham & Lo [10] demonstrated how gender composition impacts group decision-making and subsequent performance across various situations. Additionally, a field experiment by Kiefer et al. [11] found that teams with a balanced gender composition outperformed predominantly male teams in sales and earnings. The success of a team is closely linked to its openness to diversity, particularly when the gender composition approaches numerical balance [12]. These findings support the notion that teams with a mix of men and women excel in their roles and achieve superior results. Table 1 delineates the gender breakdown of the survey participants. Out of the 110 respondents, 87.27% are male, and 12.73% are female. This distribution of gender is pivotal to fostering diverse and inclusive perspectives in the assessment of the Hybrid Mechanical Engineering Review Platform.

Table 2. Institutions graduated by the respondents (reviewees)

Types of Institution	Frequency	Percentage %
SUC	40	40
Private	60	60

Table 2 illustrates that 40% of the chosen reviewees from PRIME Review Center originated from State Universities and Colleges (SUC), whereas the remaining 60% were affiliated with private universities or institutions offering Mechanical Engineering. This distribution highlights the diverse educational backgrounds of the reviewees participating in the assessment of the Hybrid Mechanical Engineering Review Platform. Meanwhile, one crucial aspect for assessing the effectiveness of the hybrid mechanical engineering review platform was content design. In the academic setting, content design encompasses a set of knowledge, skills, and concepts essential to meet learners' needs by delivering information in a curriculum-aligned, easily digestible manner. Lewis [13] endorses the idea that content design should be presented in diverse formats (such as audio, video, and text), align with goals and objectives, and employ various pedagogical techniques to engage, motivate, and stimulate learners. This design involves organizing and pacing the material and visually presenting specific instances with appropriate vocabulary and language to support learners' comprehension.

Table 3. The level of effectiveness of the hybrid mechanical engineering review platform

Effectiveness Criteria	Professors / Reviewers (10)	Selected ME Board Passers (50)	Selected ME Reviewees (50)	Overall Mean and Interpretation
Content Design	4.49	4.49	4.49	4.49 – Very Highly Effective
Media Design	4.60	4.70	4.74	4.68 – Very Highly Effective
Visual Design	4.50	4.64	4.70	4.61 – Very Highly Effective
Feedback Mechanism	4.40	4.50	4.60	4.50 – Very Highly Effective
Assessment Items	4.55	4.66	4.72	4.64 – Very Highly Effective
Navigation	4.60	4.70	4.76	4.69 – Very Highly Effective
Grand Overall Mean	—	—	—	4.60 – Very Highly Effective

Table 3 shows that the Hybrid Mechanical Engineering Review Platform is very highly effective, as rated by professors, board passers, and reviewees. The overall mean score across six areas—content design, media design, visual design, feedback mechanism, assessment items, and navigation—is 4.60, which falls under the “Very Highly Effective” category. This means that most respondents strongly agreed that the platform meets their expectations for design, functionality, and learning support. The content design of the platform received a mean score of 4.49, indicating that the modules are well-organized, relevant to learners’ needs, and presented in a way that is easy to understand. Respondents found the content engaging, well sequenced, and supported by visuals and interactive elements that facilitate learning key concepts. This suggests that the platform provides information in a structured and motivating manner [14]. In terms of media design, the platform scored 4.68, the highest among all categories. This reflects the effective use of multimedia such as videos, graphics, and interactive content, which enhance understanding and retention. Using different media formats allows learners to process information in ways that suit their preferences. The visual design scored 4.61, showing that the platform has a user-friendly layout, with readable text, pleasing visuals, and easy-to-follow instructions. This makes the platform visually appealing and accessible, which helps users focus on learning without distractions. The feedback mechanism earned a score of 4.50, indicating that users are satisfied with how the platform provides comments, ratings, and suggestions after completing quizzes or modules. This timely feedback helps learners to correct their mistakes and improve their performance.

For assessment items, the platform received a 4.64 rating. This means that the practice tests, quizzes, and evaluation tools are clear, relevant, and aligned with the goals of the licensure exam. Learners believe that these assessment tools help them measure their readiness and improve their skills. Lastly, navigation was rated 4.69, reflecting that the platform is easy to use. Users can move smoothly from one section to another, use menus effectively, and track their progress. This ease of navigation reduces confusion and makes the learning experience more efficient. In conclusion, the high ratings across all categories confirm that the Hybrid Mechanical Engineering Review Platform is well-designed, engaging, and effective in helping students prepare for the board exam. Its user-friendly interface, strong content, and interactive features contribute to its success as a tool for technology-based learning and innovation in review programs.

Table 4. Level of effectiveness of the hybrid mechanical engineering review platform as to content design

Indicators	Professors / Reviewers (10)		Selected ME Board Passers (50)		Selected ME Reviewees (50)		Overall Mean and Interpretation	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD		
The degree of content supplied is appropriate and pertinent to the intended audience, making the content design effective.	4.60	0.516	4.70	0.463	4.74	0.443	4.68	VHE
The information is "scaffolded" effectively to help learners complete the module, making the content design effective.	4.60	0.516	4.50	0.678	4.74	0.443	4.61	VHE
The information is interesting, engaging, inspiring, and pertinent to the learners who are its intended audience, making the content design effective.	4.60	0.516	4.50	0.678	4.70	0.463	4.60	VHE
The informative and learning-promoting nature of the information makes the content design effective.	4.10	0.316	4.16	0.584	4.50	0.678	4.25	VHE
The module's use of various interactive teaching techniques, including scenarios, videos, problem-based learning, exploration, and testing, makes the content design effective.	4.70	0.483	4.50	0.678	4.70	0.463	4.63	VHE
The vocabulary and terminology used in the module are understandable and backed by references or glossaries, which makes the content design effective.	4.60	0.516	4.70	0.463	4.50	0.678	4.60	VHE
Including visuals in the content, such as graphs, photos, and illustrations, makes the content design effective.	4.10	0.316	4.16	0.584	4.70	0.463	4.32	VHE
The module summarizes the information displayed at the start, making the content design more efficient.	4.10	0.316	4.10	0.678	4.50	0.678	4.23	VHE
The module summarizes its information at the end, making the content design more efficient.	4.60	0.516	4.50	0.678	4.50	0.678	4.53	VHE
<i>Grand Overall Mean Interpretation</i>					4.49 Very Highly Effective			

Table 4 shows that, on average, respondents strongly agreed with the high effectiveness of the Hybrid Mechanical Engineering Review Platform in content design, with an overall mean of 4.49. The standard deviation, within 68% of the normal distribution, indicates that all respondents perceived the platform's content design as closely aligned. This suggests that the module successfully incorporates relevant, suitable content for the intended audience, with information scaffolded effectively to guide learners through the module sections. Furthermore, the data indicates that the module's content is not only informative but also conducive to learning, with review techniques such as scenarios, videos, problem-based learning, exploration, and testing, while incorporating visuals and employing vocabulary and terminology that are comprehensible and supported by references or glossaries. Additionally, the module adeptly summarizes the information presented at the beginning and end. Consequently, the module is deemed effective in terms of content design. The findings align with Lewis's [13] research study, in which respondents rated their module very positively, describing it as excellent in terms of content design. These results also substantiate the UX Design Institute's assertion, emphasizing the influential role of content design in user experience and user interface design [15]. Content holds the potential to enhance user experience, elevate conversion rates, and increase brand exposure, with its presence spanning various elements of a user interface.

Moreover, content design establishes the assessment criteria from a pedagogical standpoint. The criteria in this content underscore the importance of instructional and learning strategies. Instead of relying on dependable technologies, content design delivers interactivity. Every aspect within the content, ranging from the selection of action verbs to the theoretical framework employed, is intricately connected to the content theme [16]. By employing a combination of hardware and software technologies, the platform enhances and facilitates engagement with the content across various media. The Media Richness Theory serves as a useful guide to cultivate interaction and communication, thereby improving learning outcomes through interactive e-books [17].

Table 5. Level of effectiveness of the hybrid mechanical engineering review platform as to media design

Indicators	Professors / Reviewers (10)		Selected ME Board Passers (50)		Selected ME Reviewees (50)		Overall Mean and Interpretation	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD		
The module provides narrated presentations during the content delivery, which makes the media design effective (if applicable).	4.80	0.422	4.70	0.463	4.88	0.328	4.79	VHE
The narrator introduces the speaker and briefly describes the module, including the subsections, making the media design effective.	4.60	0.516	4.70	0.463	4.74	0.443	4.68	VHE
The clear, straightforward instructions and suggestions the narrator provides make the media design effective.	4.70	0.483	4.70	0.463	4.70	0.463	4.70	VHE
The module's audio, written text, and visual elements are perfectly timed, making the media design effective.	4.60	0.516	4.50	0.678	4.70	0.463	4.60	VHE
The audio of the narrators and/or the videos can be entirely controlled by the student, which makes the media design effective (e.g., pause, rewind to a specific segment, or stop and start).	4.10	0.316	4.50	0.678	4.16	0.584	4.25	VHE

Table 5. Level of effectiveness of the hybrid mechanical engineering review platform as to media design (continue)

Indicators	Professors / Reviewers (10)		Selected ME Board Passers (50)		Selected ME Reviewees (50)		Overall Mean and Interpretation	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD		
The audiovisual content/videos function correctly on various web browsers, a testament to the effectiveness of the media design.	4.70	0.483	4.70	0.463	4.70	0.463	4.70	VHE
The media design is effective because it incorporates all components into a multimodal presentation that clearly explains the module's central ideas.	4.60	0.516	4.50	0.678	4.50	0.678	4.50	VHE
<i>Grand Overall Mean Interpretation</i>							4.60	Very Highly Effective

Table 5 indicates that, on average, respondents strongly affirmed the effectiveness of the Hybrid Mechanical Engineering Review Platform in media design, with an overall mean of 4.60. The narrow standard deviation within 68% of the mean suggests consensus among respondents. This outcome implies that the module delivers narrated presentations effectively during content delivery, as the narrator introduces the speaker and provides a concise overview of the module, including subsections, with clear, straightforward instructions or suggestions. Additionally, it indicates that the timing of the module's written text and visual elements is synchronized with the narrators' audio and/or videos, allowing students full control and proper functionality across various web browsers. Lastly, the module integrates all components into a multimodal presentation that effectively elucidates its central ideas. Consequently, the module is deemed effective in terms of media design.

According to Su et al. [18], to enhance and facilitate interaction with content, interactive e-books incorporate diverse media elements. The Media Richness Theory serves as a valuable guide for designing interaction and communication within interactive e-books. Moreover, media design involves crafting content for dissemination across multiple platforms and in various formats. A fitting analogy is found in magazine design, as newspaper layout often adheres to strict guidelines and time constraints [19]. The graphic design implemented by the e-book creator ensures a consistent color coding system for the module title, text body, and assessment activities. This approach enhances the readability of the module text by maintaining uniformity in font size, color, and formatting. Additionally, each page in the module is organized with an attractive aesthetic balance between audiovisual and text content. Lastly, it ensures a clear representation of screen names, symbols, or icons for easy identification. Visual design employs appropriate images, typography, spacing, layout, and color to enhance the attractiveness and functionality of a design or product. Beyond mere aesthetics, visual design serves additional objectives. Designers strategically position elements to craft interfaces that optimize user experience and promote conversion, as highlighted by Bhatti et al. [20].

Table 6. Level of effectiveness of the hybrid mechanical engineering review platform as to visual design

Indicators	Professors / Reviewers (10)		Selected ME Board Passers (50)		Selected ME Reviewees (50)		Overall Mean and Interpretation	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD		
Every page in the module uses consistent color coding for the title, body text, and evaluation activities, which makes the visual design effective.	4.60	0.516	4.70	0.463	4.70	0.443	4.67	VHE
The module's constant use of font size, color, and easily readable text format makes the visual design effective.	4.60	0.516	4.70	0.463	4.74	0.443	4.68	VHE
The module's use of captions and/or bold, italic, and underscored text to emphasize hierarchy or critical information makes the visual design effective.	4.70	0.483	4.70	0.463	4.70	0.463	4.70	VHE
The visual design is effective because each page in the module features a visually pleasing organization (not crowded and text-heavy).	4.70	0.483	4.50	0.678	4.74	0.443	4.65	VHE
Text and audiovisual components are balanced with the right amount of whitespace, which makes the visual design effective (e.g., aesthetically pleasing).	4.60	0.516	4.50	0.678	4.50	0.678	4.53	VHE
The visual design is effective because of the appealing, simple-to-follow placement of the audiovisual assets on the screen.	4.60	0.516	4.50	0.678	4.50	0.678	4.53	VHE
The screen names, symbols, or icons accurately convey the associated message, which makes the visual design effective.	4.70	0.483	4.50	0.678	4.74	0.443	4.65	VHE
The absence of grammar, capitalization, punctuation, and spelling mistakes in the module makes the visual design effective.	4.60	0.516	4.50	0.678	4.50	0.678	4.53	VHE
The uniform language throughout the module contributes to the visual design's effectiveness.	4.70	0.483	4.70	0.463	4.32	0.621	4.57	VHE
<i>Grand Overall Mean Interpretation</i>							4.61	Very Highly Effective

Table 6 indicates that the Hybrid Mechanical Engineering Review Platform was successful in visual design, yielding a grand overall mean of 4.61. The standard deviation within 68% of the normal distribution suggests that all respondents evaluated the hybrid mechanical engineering review platform similarly, indicating close alignment in their evaluations. This implies that the platform effectively maintains consistent color coding for the title, text body, and assessment activities, employing a uniform font size, color, and easily readable text format. Additionally, it indicates the use of captions and/or bold, italic, and underscored text to emphasize hierarchy or critical information, ensuring a visually pleasing organization. Furthermore, the results suggest that the text and audiovisual components are well-balanced, with an appropriate amount of whitespace, and that audiovisual assets are positioned on the screen in an appealing and easy-to-follow manner to effectively convey the intended message through screen names, symbols, or icons. Lastly, the module employs uniform language throughout, free from grammar, capitalization, punctuation, and spelling errors. In summary, the module is deemed effective in terms of visual design. The outcomes align with Lewis's [13] findings, which showed that participants consistently rated their interactive module as highly satisfactory and excellent. Similarly, the emphasis on visual design centers around enhancing the aesthetics of a module and its associated materials by thoughtfully incorporating elements such as images, graphics, colors, fonts, spacing, as well as features like screen titles, symbols or icons, audio narration, and videos to enhance the learner's experience throughout the learning process [13]. The feedback mechanism is a platform that informs students, upon completion, whether their responses to tasks within a module are correct or incorrect. Utilizing questions, visual cues, or textual prompts, its purpose is to guide students in comprehending the subject matter, as outlined by Lewis [13].

Table 7. Level of effectiveness of the hybrid mechanical engineering review platform as a feedback mechanism

Indicators	Professors / Reviewers (10)		Selected ME Board Passers (50)		Selected ME Reviewees (50)		Overall Mean and Interpretation	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD		
The module immediately provides feedback after completing the pretest, including correct and incorrect responses, making the feedback mechanism effective.	4.80	0.422	4.70	0.463	4.88	0.328	4.79	VHE
The effectiveness of the assessment item stems from the fact that the assessment questions immediately explain why the chosen response is accurate or incorrect.	4.60	0.516	4.70	0.463	4.74	0.443	4.68	VHE
The module challenges learners to find the correct answer by providing guided feedback, making the evaluation item more effective.	4.70	0.483	4.70	0.463	4.70	0.463	4.70	VHE
The effectiveness of the assessment item is attributed to the module's use of visual cues that indicate whether a learner's response is correct or incorrect.	4.70	0.483	4.70	0.463	4.32	0.621	4.57	VHE

Table 7. Level of effectiveness of the hybrid mechanical engineering review platform as a feedback mechanism (continue)

Indicators	Professors / Reviewers (10)		Selected ME Board Passers (50)		Selected ME Reviewees (50)		Overall Mean and Interpretation	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD		
The feedback technique works well because the module provides distinct explanations for each incorrect response.	4.70	0.483	4.50	0.678	4.74	0.443	4.65	VHE
The learning modules direct students to outside sources as feedback to further their understanding, making the feedback system effective.	4.70	0.483	4.70	0.463	4.70	0.463	4.70	VHE
Overall, the feedback system works well because it is interactive, efficient, and uses questions to direct learners toward understanding the subject matter.	4.60	0.516	4.50	0.678	4.50	0.678	4.53	VHE
<i>Grand Overall Mean</i>							4.66	
<i>Interpretation</i>							Very Highly Effective	

Table 7 indicates a strong agreement among respondents regarding the effectiveness of the Hybrid Mechanical Engineering Review Platform as a feedback mechanism. With a grand overall mean of 4.66 and a standard deviation within 68% of the normal distribution, the evaluation of the hybrid mechanical engineering review platform and the feedback mechanism closely aligns among respondents. This suggests that the platform provides effective feedback after pretest completion, elucidating both correct and incorrect responses with immediate explanations of the accuracy or inaccuracy of chosen answers. Consequently, the platform proves effective in assessing items. Moreover, it implies that the platform challenges learners to identify correct answers by offering guided feedback through visual cues that highlight or indicate whether a learner's response to an assessment item is accurate or inaccurate, accompanied by distinctive justifications for each incorrect answer. These results affirm Lewis's [13] findings that the interactive module's evaluation score was very good to excellent, particularly regarding the feedback mechanism. Furthermore, the results acknowledge the study by Gaertner [21], which, in addition to the tools mentioned above, also recommends that several professors incorporate self-evaluation to gather feedback on students' learning experiences at the conclusion of the course [22].

Assessment Items. One approach to evaluating the effectiveness of learning involves using assessments. Various tools, such as questionnaires, exams, tests, and other tasks, are used to assess the proficiency of key content components within a module. The objective is to determine whether learners have successfully achieved the predetermined learning goals [23]. The assessment process aims to evaluate critical content aspects integrated into the module, using evenly distributed questions and a format that aligns with the modules' interactive nature, enabling measurable progress.

Table 8. Level of effectiveness of the hybrid mechanical engineering review platform as to assessment items

Indicators	Professors / Reviewers (10)		Selected ME Board Passers (50)		Selected ME Reviewees (50)		Overall Mean and Interpretation	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD		
The pretest and posttest sections of the module make the assessment item valuable.	4.70	0.483	4.70	0.463	4.70	0.463	4.70	VHE
The module's pretest, posttest, and other assessment items align with its aims and content, making them effective.	4.60	0.516	4.70	0.463	4.74	0.443	4.68	VHE
Assessment items allow for repeated or multiple attempts when necessary, which makes them successful.	4.70	0.483	4.70	0.463	4.70	0.463	4.70	VHE
Knowledge assessment questions that include interactive visuals, photos, or videos relevant to the module's central idea make the assessment item effective.	4.60	0.516	4.50	0.678	4.50	0.678	4.53	VHE
The use of many question types, including drag-and-drop, matching, true-false, multiple-choice, multiple-response, fill-in-the-blank, and quick-check questions, makes the assessment item effective.	4.70	0.483	4.70	0.463	4.32	0.621	4.57	VHE
The assessment is effective because it measures a variety of learners' thinking and comprehension at an appropriate level of rigor and/or shows a progression of cognitive complexity.	4.60	0.516	4.70	0.463	4.74	0.443	4.68	VHE
The assessment is effective because it aims to gauge key module-integrated content.	4.70	0.483	4.70	0.463	4.32	0.621	4.57	VHE
The assessment item is effective because the module's questions are evenly distributed (not just at the end).	4.70	0.483	4.50	0.678	4.74	0.443	4.65	VHE
The assessment format complements the interactive modules' nature with verifiable progress, making the assessment item effective.	4.60	0.516	4.70	0.463	4.74	0.443	4.68	VHE
<i>Grand Overall Mean</i>							4.64	
<i>Interpretation</i>							Very Highly Effective	

Table 8 reveals a strong consensus among respondents regarding the effectiveness of the Hybrid Mechanical Engineering Review Platform in assessment items. With a grand overall mean of 4.64 and a standard deviation within 68% of the normal distribution, it is evident that all respondents were closely aligned in their ratings of the platform for hybrid mechanical engineering review across assessment items. This indicates that the module effectively aligns the pretest, posttest, and other assessment items with its objectives and content, making the assessment valuable while allowing repeated attempts. It also suggests that the platform incorporates numerous knowledge assessment questions featuring interactive visuals, photos, or videos relevant to the module's central idea, effectively measuring diverse learners' thinking and comprehension at an appropriate level of rigor. Hence, the module proves to be practical for assessment items.

Table 9. Summary on the effectiveness of the hybrid mechanical engineering review platform

Criteria	Mean Score	Interpretation
Content Design	4.49	Very Highly Effective
Media Design	4.60	Very Highly Effective
Visual Design	4.61	Very Highly Effective
Feedback Mechanism	4.66	Very Highly Effective
Assessment Items	4.64	Very Highly Effective
Navigation	4.64	Very Highly Effective
<i>Overall Weighted Mean</i>	<i>4.61</i>	<i>Very Highly Effective</i>

Table 9 indicates strong consensus among respondents, demonstrating their robust agreement on the platform's high effectiveness. Across all specified dimensions, the platform demonstrates noteworthy effectiveness, yielding an overall mean of 4.61 and a standard deviation within 68% of the normal distribution, signifying close alignment among respondent ratings. Further analysis reveals that the content design received a mean score of 4.49, followed by media design at 4.60, visual design at 4.61, the feedback mechanism at 4.66, and both assessment items and navigation at 4.64. In terms of the acceptability of the hybrid mechanical engineering review platform, the reception of an innovation or technology serves as an indicator of its acceptance among the general public. This investigation specifically assesses the acceptability of the hybrid mechanical engineering review platform by examining key elements outlined in the UTAUT Model developed by Venkatesh et al. [24]. These elements include performance expectancy, effort expectancy, social influence, facilitating conditions, behavioral intention, and user behavior. Venkatesh et al. [24] identify performance expectancy as the foremost explanatory factor in the UTAUT model. This aspect concerns how individuals perceive the benefits of e-learning technology, including improvements in performance and increased productivity. Users are inclined to embrace e-learning when they are persuaded that this novel technology offers increased effectiveness and efficiency [25]. This concept, also known as perceived usefulness, reflects the user's belief in the technology's capacity to enhance performance and efficiency, as outlined by Park [25].

Table 10. The level of acceptability of the hybrid mechanical engineering review platform: performance expectancy

Indicators	Professors / Reviewers (10)		Selected ME Board Passers (50)		Selected ME Reviewees (50)		Overall Mean and Interpretation	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD		
I would find the Hybrid Mechanical Engineering Review Platform useful in my course/review.	4.70	0.483	4.70	0.463	4.70	0.463	4.70	VHA
Using the Hybrid Mechanical Engineering Review Platform enabled me to comprehend and accomplish the task more quickly.	4.60	0.516	4.70	0.463	4.74	0.443	4.68	VHA
Using the Hybrid Mechanical Engineering Review Platform increases my productivity.	4.60	0.516	4.70	0.463	4.74	0.443	4.68	VHA
If I use the Hybrid Mechanical Engineering Review Platform, will it increase my chances of passing the licensure exam?	4.60	0.516	4.70	0.463	4.74	0.443	4.68	VHA
<i>Grand Overall Mean</i>							4.67	
<i>Interpretation</i>							Very Highly Acceptable	

Legend: 4.21–5.00 – Very Highly Acceptable; 3.41–4.20 – Highly Acceptable; 2.61–3.40 – Acceptable; 1.81–2.60 – Less Acceptable; 1.00–1.80 – Not Acceptable

Table 10 shows that, on average, the respondents strongly agreed that the Hybrid Mechanical Engineering Review Platform was Very Highly Acceptable as to performance expectancy. The grand overall mean is 4.67, and the standard deviation within 68% of the normal distribution indicates that respondents evaluated the Hybrid Mechanical Engineering Review Platform as similar to one another. This means that the platform is highly acceptable, as users can find it useful in their review classes, comprehend and complete tasks more quickly, increase their productivity, and improve their chances of passing the licensure examination at a high rate. The results align with Stoyanova & Markova's [26] findings, indicating that performance expectancy is the key factor influencing students' inclination to use electronic books. This assertion holds across all models examined. For students with no prior experience, it is evident that performance expectancy is the sole significant variable influencing their decision to choose digital textbooks. This suggests that individuals without prior familiarity tend to prefer printed books over e-books, finding traditional methods more efficient in achieving their learning objectives. To encourage greater usage of e-books among this group, designers must create user-friendly designs and provide information that boosts performance expectations [27]. This demonstrates that students will embrace e-learning only when they perceive its relevance to their learning requirements. Performance expectancy, as defined by Mitchell and Albright [28], is "the extent to which the user expects that using the system would assist him/her in attaining gains in job performance" and plays a crucial role in shaping their willingness to adopt this mode of learning. The concept of effort expectancy, as defined by Venkatesh et al. [24], pertains to the comfort level associated with utilizing a system and is rooted in the ease of use. This concept, also known as perceived ease of use, represents the degree to which a user feels at ease with the technology's features, as articulated by Park [25].

Table 11. The level of acceptability of the hybrid mechanical engineering review platform: effort expectancy

Indicators	Professors / Reviewers (10)		Selected ME Board Passers (50)		Selected ME Reviewees (50)		Overall Mean and Interpretation	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD		
My interaction with the Hybrid Mechanical Engineering Review Platform is clear and understandable.	4.60	0.516	4.70	0.463	4.74	0.443	4.68	VHA
It would be easy for me to become skillful using the Hybrid Mechanical Engineering Review Platform.	4.70	0.483	4.70	0.463	4.32	0.621	4.57	VHA
I would find the Hybrid Mechanical Engineering Review Platform easy to use and navigate.	4.60	0.516	4.70	0.463	4.74	0.443	4.68	VHA
Using the Hybrid Mechanical Engineering Review Platform would make performance activities easier for me.	4.60	0.516	4.50	0.678	4.50	0.678	4.53	VHA
<i>Grand Overall Mean</i>							4.62	
<i>Interpretation</i>							Very Highly Acceptable	

Table 11 indicates a robust consensus among respondents, with strong agreement on the very high acceptability of the Hybrid Mechanical Engineering Review Platform in terms of effort expectancy. The platform demonstrates a notable overall mean of 4.62 and a standard deviation within 68% of the normal distribution, indicating that all respondents assessed the platform in a closely aligned manner. This suggests a high level of acceptability, as users were able to comprehend the module clearly, develop proficiency in using the platform, navigate it with ease, and efficiently perform activities on the platform. This demonstrates that the acceptance of e-learning systems is markedly influenced by effort expectancy. The ease of use, accessibility, and user-friendliness of e-learning systems contribute to their attractiveness to end users, thereby influencing their perception of them as beneficial. An important predictor of the intention to use e-learning technology is the expectation of effort. Research has highlighted that effort expectancy plays a significant role in shaping the utilization of e-learning systems [29].

Table 12. Summary on the acceptability of the hybrid mechanical engineering review platform

Criteria	Mean Score	Interpretation
Performance Expectancy	4.67	Very Highly Acceptable
Effort Expectancy	4.62	Very Highly Acceptable
Social Influence	4.67	Very Highly Acceptable
Behavioral Intention	4.67	Very Highly Acceptable
<i>Overall Weighted Mean</i>	4.66	<i>Very Highly Effective</i>

Table 12 indicates strong consensus among respondents regarding the Hybrid Mechanical Engineering Review Platform's high acceptability, as reflected in the summary and overall averages. This indicates a high level of approval, as users were able to incorporate the platform into their class activities

effectively. Specifically, the performance expectancy, effort expectancy, and social influence items scored notably high at 4.67, 4.62, 4.67, and 4.67, respectively. Drawing on the aforementioned results, it is evident that the primary determinant of digital textbook adoption is performance expectancy, as indicated by Wan Sulaiman and Mustafa [30]. Additionally, the significance of performance expectancy extends to tertiary students' intentions to use e-books, as emphasized by Bulur and Gönül [31]. Furthermore, users' acceptance of e-books is shaped by various factors, including effort expectancy, social influence, facilitating conditions, environmental concern, perceived benefit, and benevolence. Consequently, this research underscores the implications of these findings for initiatives aimed at fostering enthusiastic adoption of e-books among university students. It was found that the UTAUT construct has a significant relationship with acceptability. The study found that the effects of performance expectancy and effort expectancy on behavioral intention to use the hybrid mechanical engineering review platform were not statistically significant. Conversely, social influence significantly influenced behavioral intention to use the hybrid mechanical engineering review platform. These results are succinctly depicted in the following diagram.

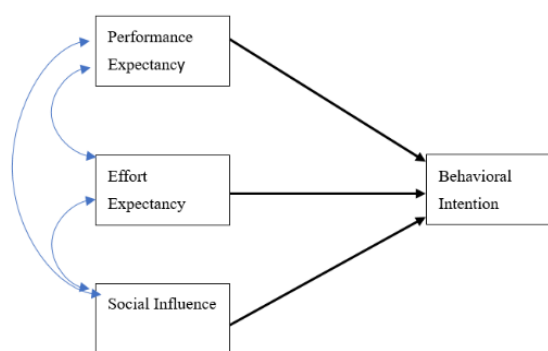


Figure 1. Relationship and Hypothesized Model

Table 13. Relationship and hypothesis testing result of the UTAUT construct

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	4	18.74	4.685	0.0001
Column 2	4	18.46	4.615	0.0059
Column 3	4	18.74	4.685	0.008166667
Column 4	4	18.74	4.685	0.008166667

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.0147	3	0.0049	0.8776	0.47990	3.4903
Within Groups	0.067	12	0.0055			
Total	0.0817	15				

Legend: Column 1 – Performance Expectancy
 Column 2 – Effort Expectancy
 Column 3 – Social Influence
 Column 4 – Behavioral Intention

Table 13 shows that there is no noteworthy difference in the acceptability levels of performance expectancy (column 1), effort expectancy (column 2), social influence (column 3), and behavioral intention

(column 4) across the respondent groups. The P-value of 0.08776 indicates a p-value above 0.05, suggesting a lack of statistical significance.

H01: There is no significant influence of performance expectancy on behavioral intention to use the Hybrid Mechanical Engineering Review Platform.

In the context of this research, Performance Expectancy (PE) is defined as the user's belief that a particular technology will enhance their performance and lead to the realization of professional benefits, as defined by Izuagbe [32]. Within the confines of this study, PE specifically refers to the expectations held by both reviewers and reviewees, including the anticipation that the platform will streamline the execution of their tasks, thereby enhancing efficiency and effectiveness.

Ho2: There is no significant influence of effort expectancy on behavioral intention to use the hybrid mechanical engineering review platform.

The assessment of end-users' inclination to adopt the platform, with a focus on perceived benefits such as the user-friendly nature of e-learning programs, serves as a measure of effort expectancy. Effort expectancy is defined by Kolli and Achuthan [33] as end users' perceptions of the potential advantages of using technology. According to Ogemdi Uchenna and Uzoma Oluchukwu [34], effort expectancy significantly influences the behavioral intention to employ e-learning tools. Additionally, the study by Jameel et al. [35] demonstrates that effort expectancy plays a substantial role in shaping behavioral intention to use e-learning technology. On the contrary, the findings of this investigation reveal that effort expectancy is not statistically significant, indicating that this construct fails to predict behavioral intention. Consequently, in this study, effort expectancy exerts no significant influence on behavioral intention to use the hybrid mechanical engineering review platform. The research aimed to evaluate the behavioral inclination of reviewees towards adopting a hybrid mechanical engineering review platform. Specifically, it aimed to assess the platform's adherence to ISO 25010 standards for quality assurance. The effectiveness of the hybrid mechanical engineering review platform was examined through respondents' perceptions of content design, media design, visual design, feedback mechanisms, assessment items, and navigation. The study also investigated the platform's evaluation by reviewees and professors/reviewers based on the UTAUT model constructs, including performance expectancy, effort expectancy, social influence, and behavioral intention. Furthermore, the research explored the connection between the effectiveness and acceptability of the hybrid mechanical engineering review platform.

The hybrid mechanical engineering review platform received consistently high ratings for effectiveness from reviewees, reviewers, and newly qualified board passers. There was strong agreement among them regarding the platform's efficacy across various dimensions, including content design, assessment items, feedback mechanisms, media design, visual design, and navigation. Moreover, in terms of effectiveness, all five interactive modules garnered positive ratings from respondents, reflecting a high level of full e-learning interactivity or full simulation. Regarding the acceptability of the hybrid mechanical engineering review platform concerning the UTAUT Model constructs—namely, performance expectancy, effort expectancy, social influence, and behavioral intention—reviewees and reviewers strongly concurred that it is highly acceptable. Furthermore, upon examination of the hypothesized model and the relationships between constructs, it was observed that performance expectancy and effort expectancy did not exert a significant influence on the behavioral intention to use the hybrid mechanical engineering review platform. In contrast, social influence was found to significantly affect behavioral intention to use the hybrid mechanical engineering review platform. The relationship between the effectiveness and acceptability of the hybrid mechanical engineering review platform showed a strong positive correlation, as indicated by the high correlation coefficients. This indicates a strong, positive, and significant relationship between the effectiveness and acceptability of the hybrid mechanical engineering review platform. The correlation analysis revealed a robust positive relationship between the effectiveness and acceptability of the hybrid mechanical engineering review platform, as indicated by the elevated correlation coefficients. This indicates a compelling, statistically significant association between the platform's effectiveness and its acceptability [36].

While the findings indicate that performance expectancy and effort expectancy did not significantly influence behavioral intention, this outcome invites closer reflection rather than being treated as a mere

statistical result. One possible explanation is that the respondents, particularly reviewees and board passers, may already possess a baseline familiarity with digital learning platforms. In such cases, the perceived usefulness and ease of use are no longer decisive factors, as these are already expected features of modern review systems. This suggests that when a technology becomes normalized, its functional benefits may no longer serve as strong motivators for adoption. Another perspective relates to the context in which the hybrid platform was implemented. Since the platform emerged during a period when online and blended learning became necessary rather than optional, users may have adopted it out of circumstance rather than personal evaluation of its efficiency or usability. This condition can reduce the predictive power of performance and effort expectancy, as the decision to use the platform is influenced less by individual preference and more by situational demand. Moreover, the composition of the respondents may have contributed to the observed results. The majority of participants belong to a younger age group, which is generally more adaptable to technology. For these users, navigating digital systems may not pose a significant challenge, thereby minimizing the impact of effort expectancy. Similarly, their familiarity with online tools may lead them to perceive most platforms as equally useful, thereby weakening the influence of performance expectancy on behavioral intention.

In contrast, the significant influence of social factors highlights the importance of external factors in shaping user behavior. This suggests that recommendations from peers, instructors, and review center administrators may carry more weight than individual perceptions of the system itself. In a review center environment, where collaboration and shared experiences are common, social dynamics can strongly affect decision-making. This finding underscores the idea that technology adoption, particularly in educational settings, is not purely an individual process but is often shaped by collective attitudes and institutional practices. Taken together, these insights suggest that the adoption of the hybrid mechanical engineering review platform is influenced more by contextual and social conditions than by traditional usability factors. This provides a deeper understanding of user behavior and highlights the need to consider environmental and demographic factors when applying the UTAUT model in similar settings. Beyond general measures of effectiveness and acceptability, the findings of this study offer meaningful implications for mechanical engineering education, particularly for discipline-specific learning outcomes. The consistently high ratings across content design, assessment items, and feedback mechanisms suggest that the hybrid review platform is not only technically functional but also aligned with the cognitive and analytical demands of mechanical engineering. These include problem-solving, application of theoretical principles, and the ability to interpret technical data—skills that are essential for success in licensure examinations and professional practice.

The platform's strong performance in areas such as assessment and feedback indicates that it supports iterative learning, which is critical in engineering education, where mastery is often achieved through repeated exposure to complex problems. The availability of immediate feedback allows learners to identify gaps in their understanding of core topics such as thermodynamics, fluid mechanics, and machine design, and to make timely adjustments in their study approach. This type of guided reinforcement is particularly valuable in preparing examinees for board-level questions that require both accuracy and conceptual depth. Moreover, the integration of multimedia elements and structured navigation contributes to the development of visualization skills, which are central to mechanical engineering. The ability to interpret diagrams, simulations, and graphical data is enhanced through well-designed digital content, thereby supporting spatial reasoning and technical comprehension. In this regard, the platform moves beyond traditional review methods by offering a more interactive and applied learning environment. The findings also suggest that the platform encourages self-directed learning, an important outcome in engineering education where continuous professional development is expected. By providing flexible access to materials and allowing learners to progress at their own pace, the system fosters independent study habits while still maintaining alignment with standardized competencies required for licensure. To sum up, these results demonstrate that the hybrid mechanical engineering review platform contributes not only to general user satisfaction but also to the development of key disciplinary competencies. This reinforces its value as a tool that supports both academic preparation and the broader goal of producing competent and industry-ready mechanical engineers.

5. Conclusions

In summary, the hybrid mechanical engineering review platform is found to be both effective and acceptable. Its effectiveness is evident across various dimensions, including content design, assessment items, feedback mechanisms, media design, visual design, and navigation. Moreover, the platform is highly acceptable, as indicated by respondents' perceived evaluations of performance expectancy, effort expectancy, social influence, and behavioral intention. However, there is no significant difference in the effectiveness and acceptability of the hybrid mechanical engineering review platform across the respondent groups. Despite these promising results, the study has several limitations. First, the sample was limited to selected participants from the PRIME Review Center, which may not fully represent the broader mechanical engineering student and professional population. Second, the study relied primarily on self-reported perceptions, which may be subject to response bias or limited by the participants' familiarity with the platform. Third, the study focused on a specific period and location, which may affect the generalizability of the findings. Future research may explore the long-term impact of hybrid review platforms on board exam performance and actual learning outcomes. It is also recommended to expand the study across multiple review centers and academic institutions to increase sample diversity and size. Furthermore, future studies could incorporate experimental or longitudinal methods to measure improvements in skills and knowledge acquisition over time. Integrating user analytics and tracking engagement data could also provide more objective insights into the platform's usage and effectiveness.

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