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Innovative E-Module Development Through Flipped Book and Employability Skill Learning Integration: Advancing Competency Spa Therapy in Vocational High School

Murni Astuti¹⁾, Rahmiati Rahmiati²⁾, Siska Miga Dewi³⁾, Arasinah Kamis⁴⁾, Rahmat Desman Koto⁵⁾, Adisty Akhoma Ummah⁶⁾

 ¹⁾ Faculty of Tourism and Hospitality, Universitas Negeri Padang, Indonesia

E-mail: murniastuti@fpp.unp.ac.id

²⁾ Faculty of Tourism and Hospitality, Universitas Negeri Padang, Indonesia

E-mail: rahmiati@fpp.unp.ac.id

³⁾ Faculty of Tourism and Hospitality, Universitas Negeri Padang, Indonesia

E-mail: siskamigadewi@fpp.unp.ac.id

⁴⁾ Universiti Pendidikan Sultan Idris, Malaysia

E-mail: arasinah@ftv.upsi.edu.my

⁵⁾ Faculty of Engineering, Universitas Negeri Padang, Indonesia

E-mail: rahmatdkoto@student.unp.ac.id

⁶⁾ Faculty of Tourism and Hospitality, Universitas Negeri Padang, Indonesia

E-mail: adisty@student.unp.ac.id

 Correspondence Author

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Abstract

This research presents the development and implementation of an innovative e-module that integrates flipped book technology with employability skills learning for body spa material in a Vocational High School. Using Partial Least Squares-Structural Equation Modeling (PLS-SEM) with SmartPLS 4, this study examines the relationships between Integrated E-Modules, Learning Motivation, Self-Efficacy, Body SPA Skills, and Employability Skills. Data were collected from 64 vocational high school students specialising in the Body Spa subject (32 in the experimental group and 32 in the control group) using validated instruments. Results show that Integrated E-Modules significantly enhance students' learning motivation and Self-Efficacy, with the experimental group demonstrating a 21.6% increase in skills compared to the control group (7.7%). Self-efficacy proved to be a key mediator in the relationship between Integrated E-Modules and Body Spa Skills, while Learning Motivation did not show a significant mediating role. This research contributes to educational technology literature by identifying the psychological mechanisms underlying the effectiveness of learning technology in supporting quality education in practical vocational fields.

INTRODUCTION

The global health and wellness industry has experienced unprecedented growth, with the spa sector alone valued at IDR 1.785 trillion in 2023 and projections showing continued expansion (Naidoo et al., 2023). This growth has intensified the demand for qualified spa therapy professionals with strong technical expertise and employability skills (Astuti et al., 2024; Astuti & Thaitami, 2023). Traditional vocational education in spa competencies often emphasizes technical competencies while neglecting the development of essential soft skills required by industry employers (Kamis et al., 2019; Rahmiati et al., 2023).

Simultaneously, the educational landscape has been transformed by digital technology, creating opportunities for innovative teaching and learning approaches (Wagino et al., 2023; Wagino, Nasution, et al., 2024). The integration of flipped book technology with the employability skill learning model is a promising yet under-researched approach for Spa Therapy learning. Flipped books offer interactive, visually appealing digital content that can increase student engagement with complex practical procedures. Meanwhile, the integration of employability skills meets the industry's demand for professionals with strong communication, problem-solving, and self-management skills (Mulya et al., 2021; Rojas, 2023).

This study addresses significant gaps in the educational technology literature by investigating the effectiveness of integrated e-modules that combine flipped book technology with the development of employability skills in SPA learning. This research aims to answer the following research questions:

- How does the integration of the flipped book technology model impact students' employability skills and learning motivation in SPA learning?
- What is the relationship between the implementation of this innovative e-module and students' self-efficacy in Body Spa skills?
- How do students' learning motivation and self-efficacy mediate the relationship between the implementation of e-modules and the development of job skills?

LITERATURE REVIEW

1. Theoretical framework

Social Cognitive Theory provides a basis for understanding the development of self-efficacy through mastery experiences, vicarious learning, verbal persuasion, and emotional states. The Technology Acceptance Model provides insight into how students adopt and engage with educational technology (Abuhassna et al., 2023). In addition, the study referred to the Revised Bloom Taxonomy to structure the learning objectives in the e-module, ensuring progress from basic knowledge acquisition to high-level application and creation skills (Adijaya et al., 2023).

2. Development of E-Modules in Vocational Education

Research on the implementation of e-modules in vocational education shows positive outcomes for student engagement and skill acquisition (Arsih et al., 2024; Wagino, Maksum, et al., 2024). Interactive digital learning materials enhance the development of practical skills in vocational health education (Astuti et al., 2019; Forde & OBrien, 2022). Multimedia-rich e-modules improve knowledge retention and application in the context of technical training (Adhayanti & Pakadang, 2025; Bacio, 2025). However, few studies have specifically examined the

implementation of e-modules in spa therapy education (Hapizah et al., 2025; Supraptono et al., 2025).

3. Flipped Book Technology in Educational Settings

Flipped book technology provides interactive, visually appealing digital content that mimics the experience of reading a physical book, incorporating multimedia elements. Flipped books increase student engagement with complex visual content compared to traditional digital texts (Meyliana et al., 2022). The implementation of flipped books improves knowledge retention and application in the context of procedural learning (Zhao et al., 2021). The application of this technology in spa learning, which requires detailed procedural knowledge, is a promising area for research (Bilotta et al., 2021; Winkler et al., 2021).

4. Body SPA Skills

Body Spa is a productive subject at SMKN 6 Padang. The learning outcomes of Body Spa subjects include being able to explain the basic concepts of body care and spa, preparing for work with customers, consulting and analyzing body SPA treatments, and performing massage treatments using basic movements of scrubs and masks (Astuti, 2020; Astuti et al., 2024; Astuti & Thaitami, 2023). Able to clean and tidy up the work area. This subject was attended by grade 11 students, comprising two classes. Each class consists of 32 students. Students must understand body Spa procedures, Body Spa engineering skills, and technical applications.

5. Job Skills Development

Employability skills, which encompass communication, teamwork, problem-solving, and self-management, are increasingly valued by employers across various sectors (Tushar & Sooraksa, 2023). The explicit integration of employability development in vocational curricula improves graduate outcomes in the hospitality industry (Yende, 2025). However, there is limited research on practical approaches to employability development in Spa learning specifically.

6. Learning Motivation and Self-Efficacy in Vocational Education

Learning motivation and self-efficacy have been identified as important factors in the success of vocational education (Chuang et al., 2022). Learning motivation significantly predicts skill mastery in practical health education (Akpokiniovo & Ogbuanya, n.d.). Self-efficacy is strongly associated with the development of practical skills and career confidence in beauty therapy students (Lim, 2022). This research builds on previous research by examining how innovative e-modules affect these psychological constructs in Spa learning.

METHODS

1. Research Design

This research utilises a mixed-methods framework with a quasi-experimental design. The quantitative component utilises a pre-test/post-test design with a control group to evaluate alterations in student learning motivation, self-efficacy, body spa skills, and work skills after the deployment of the integrated e-module (Juhong et al., 2022). The qualitative component includes semi-structured interviews and focus groups to gather in-depth insights into the students' experience with the e-module (Jafini et al., 2024).

2. Samples and Locations

A study was undertaken at State Vocational High School 6 Padang, Department of Beauty in Indonesia, concentrating on students in the Body Spa class at the XI level. The sample included 64

students, evenly divided between the experimental group ($n = 32$) and the control group ($n = 32$). The sample size was determined by power analysis calculations utilising G*Power, employing a medium effect size ($f^2 = 0.15$), a significance threshold of $\alpha = 0.05$, and a power of $(1 - \beta) = 0.80$ for the PLS-SEM model with four primary predictors (Kang, 2021).

The sample's demographic profile consists mainly of women (85%), with an age range of 16 to 19 years ($M = 17.6$, $SD = 0.9$). Assignments to experimental or control groups were carried out using matched-pairs techniques based on previous academic grades to ensure group equivalence at the beginning of the study (Lijuan, 2024).

3. E-Module Development

Integrated e-modules are developed through a systematic process involving (Herlina & Abidin, 2024):

- Needs analysis through industry consultation and curriculum mapping
- Content development that combines body spa procedures and job skills
- Integration of flipped book technology features
- Expert validation by spa industry professionals and educational technology specialists
- Testing and refinement

The final e-module includes interactive demonstrations of body spa techniques, self-assessment tools, job skills development activities, and reflection triggers.

4. Instruments

The variables in this research were measured using tools that have been established and validated within the realm of vocational education. The instrument is developed by integrating many pertinent measuring scales and has been subjected to a content validation procedure by specialists in vocational education and educational technology (Antonietti et al., 2022). Each variable is assessed using multiple indicators identified through a literature review and preliminary research. All questionnaire questions utilize a Likert scale with answer alternatives designed explicitly for the construct being assessed. The instrument's reliability has been evaluated in early trials, yielding Cronbach's alpha levels between 0.85 and 0.92, which indicates strong internal consistency (Apriandi et al., 2022).

This study employs five main variables, each measured through a series of specific indicators. This e-module has three main indicator dimensions, namely usability perception, convenience perception, and content quality. In this model, there are two mediation constructs: Learning Motivation (LM) (Maulana & Purnomo, 2021) and Self-Efficacy (SE) (Kholifah et al., 2025) which mediate the relationship between integrated e-modules and learning outcomes. Learning Motivation is measured through five dimensions: enthusiasm for learning, interest in the material, satisfaction with achievements, desire for a career, and perceived benefits (Täht et al., 2024). Meanwhile, Self-Efficacy is measured through four dimensions of self-confidence, enthusiasm, resilience, and self-efficacy (Yin & Zhou, 2023). The learning outcomes are represented by two endogenous constructs: Body SPA Skills (BSS) (Rahmadan et al., 2022) and Employability Skills (ES) (Romanova, 2022). Body SPA Skills include knowledge, technical skills, and practical application, while Employability Skills include communication, problem-solving, teamwork, and self-management (Tushar & Sooraksa, 2023). Table 1 provides a detailed operationalization of the research variables and their corresponding measurement indicators.

Table 1. Operationalization of Research Variables and Measurement Indicators

Variable	Indicator	
Integrated E-Modules (IM)	IM.1	Usability Perception
	IM.2	Perception of Ease of Use
	IM.3	Content Quality
Learning Motivation (LM)	LM.1	Enthusiasm for Learning
	LM.2	Interest in the Material
	LM.3	Satisfaction in Achievement
	LM.4	Career Desire
	LM.5	Perceived Benefits
Self-Efficacy (SE)	SE.1	Confidence in Self-Ability
	SE.2	Enthusiastic Nature
	SE.3	Ability to Survive Obstacles
	SE.4	Task Difficulty Level
	SE.5	Ability to work independently
Body SPA Skills (BSS)	BSS.1	Procedural Knowledge
	BSS.2	Technical Skills
	BSS.3	Practical Application
Employability Skills (ES)	ES.1	Communication
	ES.2	Troubleshooting
	ES.3	Teamwork
	ES.4	Self-Management

5. Conceptual framework

The conceptual framework in the PLS-SEM model illustrates the relationship between the development of an innovative e-module of the employability skill model in Subject Body Spa and various research variables. Integrated E-Modules (IM) as exogenous constructs act as independent variables that affect both mediated and endogenous constructs (Hair Jr. et al., 2021).

This approach is based on Social Cognitive Theory, which emphasizes that learning is influenced by cognitive, environmental, and behavioral factors (Almulla, 2023). The use of integrated e-modules creates a learning environment that can affect students' psychological perceptions (Delita et al., 2022). The Technology Acceptance Model also supports the relationship between the perception of usability and ease of use of technology and user motivation (Abuhassna et al., 2023). Interactive digital learning materials increase student engagement and prove that flipped book technology improves knowledge retention (Antonietti et al., 2022; Zhao et al., 2021).

The relationship between learning motivation, self-efficacy, and skill development shows motivation as a predictor of skill mastery, a strong correlation between self-efficacy and practical skills (Delita et al., 2022; Romanova, 2022). The development of job skills integrated into vocational curricula results in more job-ready graduates, supporting the relationship pathway to Employability Skills in this model (Romanova, 2022; Tushar & Sooraksa, 2023).

The model presents ten primary hypotheses (H1-H10), with six (H1, H2, H3, H4, H5, H6) indicating direct effects, and the other four (H7, H8, H9, H10) illustrating indirect or mediated effects. The H1 and H2 hypotheses assert that Integrated E-Modules (IM) have a positive influence

on students' Learning Motivation (LM) and Self-Efficacy (SE). Hypotheses H3 and H4 examine the impact of Learning Motivation (LM) on Body SPA Skills (BSS) and Employability Skills (ES). Conversely, H5 and H6 examine the influence of Self-Efficacy (SE) on the two conceptions of learning outcomes. Hypotheses H7 to H10 elucidate the mediating role of Learning Motivation (LM) and Self-Efficacy (SE) in the interaction between Integrated E-Modules (IM) and the two dimensions of learning outcomes, therefore establishing a mediating route within the model.

This conceptual framework illustrates how the integration of e-modules with flipped book technology, combined with the incorporation of job skills models, can enhance student learning outcomes by strengthening psychological factors related to motivation and confidence. This model will be examined using SmartPLS 4 to determine the significance and strength of the relationships between variables, while also evaluating the mediating effects of learning motivation and self-efficacy within the framework of SPA learning. The suggested PLS-SEM model is shown in Figure 1 (Hair Jr. et al., 2021).

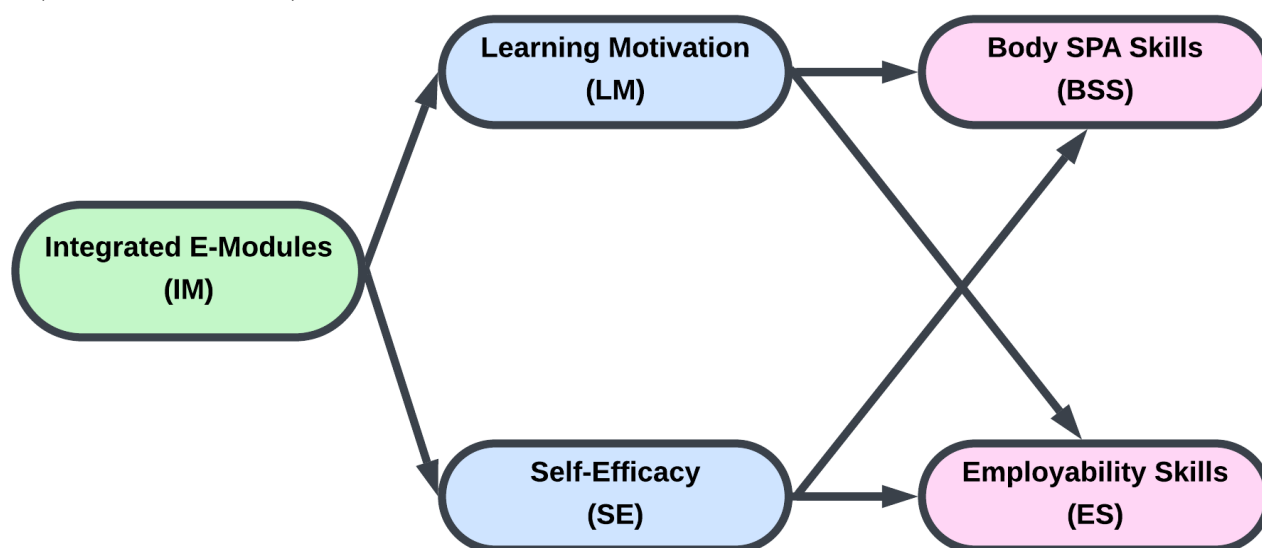


Fig 1. Conceptual Framework

The hypothesis being tested:

- H1: Integrated E-Modules (IM) have a positive effect on Learning Motivation (LM)
- H2: Integrated E-Modules (IM) have a positive effect on Self-Efficacy (SE)
- H3: Learning Motivation (LM) has a positive effect on Body SPA Skills (BSS)
- H4: Learning Motivation (LM) has a positive effect on Employability Skills (ES)
- H5: Self-Efficacy (SE) has a positive effect on Body SPA Skills (BSS)
- H6: Self-Efficacy (SE) has a positive effect on Employability Skills (ES)
- H7: Learning Motivation (LM) mediates the relationship between Integrated E-Modules (IM) and Body SPA Skills (BSS)
- H8: Learning Motivation (LM) mediates the relationship between Integrated E-Modules (IM) and Employability Skills (ES)
- H9: Self-Efficacy (SE) mediates the relationship between Integrated E-Modules (IM) and Body SPA Skills (BSS)
- H10: Self-Efficacy (SE) mediates the relationship between Integrated E-Modules (IM) and Employability Skills (ES)

To accommodate smaller sample sizes, the model has been simplified from its initial version by reducing the number of indicators per construct, while maintaining theoretical integrity. This model was analyzed using SmartPLS 4 to assess the significance and strength of these pathways, as well as to evaluate the mediating role of learning motivation and self-efficacy (Hair et al., 2021; Hair Jr. et al., 2021).

6. Data Collection Procedure

Data collection occurred over a semester (16 weeks). Pre-test measurements of learning motivation and self-efficacy were administered to both groups at the beginning of week 1. The experimental group then received instructions using an integrated e-module, while the control group received traditional instructions that included duplicate content. Post-test measurements were given at week 16, followed by qualitative data collection through interviews and focus groups. To ensure data integrity with a smaller sample size, additional data collection procedures include training data collection officers to standardize procedures, implementing strict protocols to minimize data loss, flexible scheduling of data collection sessions to maximize participation, and conducting thorough data checks immediately after collection.

7. Data Analysis

SmartPLS 4 software was used to analyze quantitative data using Partial Least Squares Structural Equation Modeling (PLS-SEM). Due to its suitability for small to medium sample sizes, ability to handle non-normal data distributions, and applicability for exploratory research using sophisticated models, the PLS-SEM was chosen.

PLS-SEM analysis has an advantage over CB-SEM (Covariance-Based SEM), which often requires a higher sample size, considering the sample size of 64 individuals. Even with small sample sizes, PLS-SEM can provide reliable parameter estimates, particularly when reflective markers are used (Dash & Paul, 2021; Hair Jr. et al., 2021). The sample size of 64 meets the least requirement of "10 times the number of paths leading to the construct with the most predictors" in our structural model, according to the standards set by Hair et al. (2021).

The analytical process is carried out systematically in many stages. Assess the measurement model (outer model) first in order to determine the validity and reliability of the construct. This includes confirming the discriminant validity (Fornell-Larcker criterion < 0.9), convergent validity (AVE > 0.5), internal consistency (composite reliability > 0.7), and reliability of the indicators (outer loadings > 0.7). Second, the determination coefficient (R^2), the path coefficient's significance (as determined by bootstrapping with 5000 samples), and the mediation effect are all part of the evaluation of the structural model (inner model). Third, do measurement invariance testing (MICOM), compare the experimental and control groups using a Multi-Group Analysis (MGA), and pinpoint particular route differences between the groups (Hair et al., 2021; Hair Jr. et al., 2021).

RESULT AND DISCUSSION

1. Comparative Evaluation of Students' Skills

a. Test Results

Figures 2 and 3 show a comparison of the results of pre-test and post-test students' skills in a body spa. In the pre-test results, it was observed that both groups had relatively equal initial scores, with an average score of 70.5 for the experimental group and 69.8 for the control group. These

initial equivalent conditions suggest that the matched-pairs technique in sample grouping has successfully created an initial balance of abilities between the two groups.

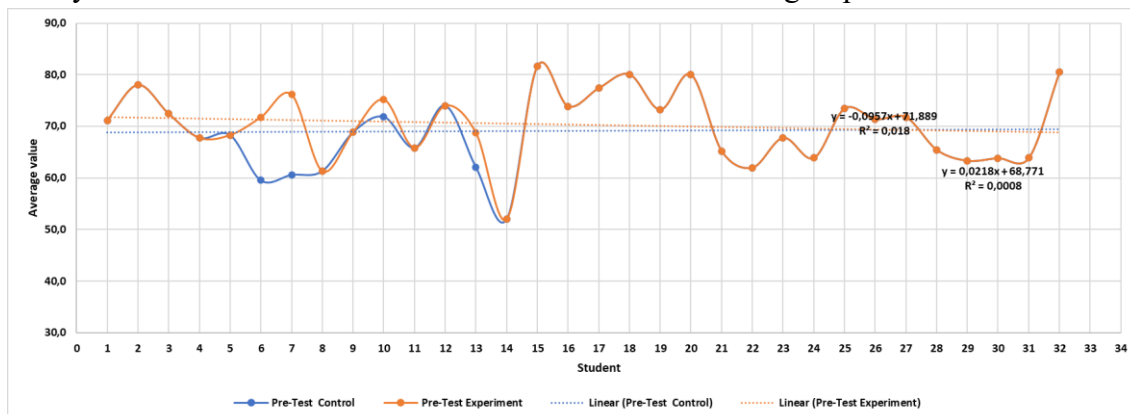


Fig 2. Pretest Results for Test

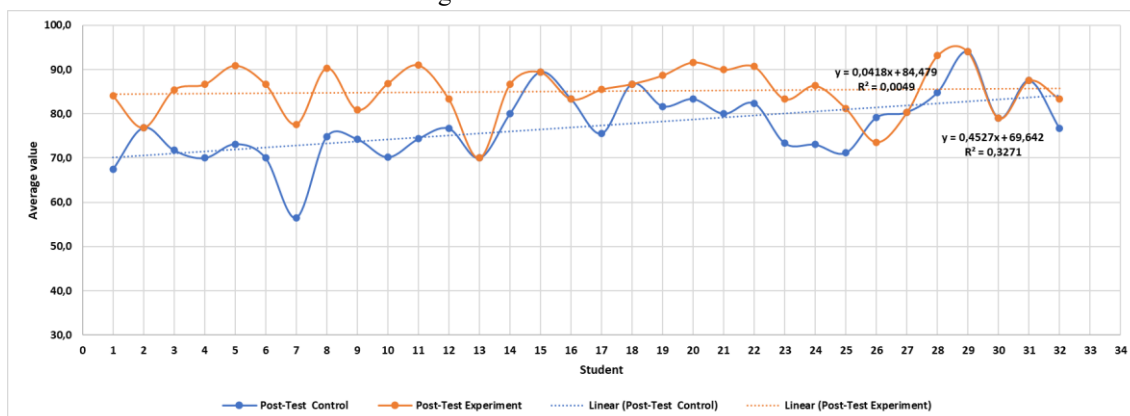


Fig 3. Posttest Results for Test

The post-test results showed that both groups had significantly improved after the 16-week intervention. With an average score of 85.7 (a 21.6% increase), the experimental group that used the integrated e-module demonstrated significantly better improvement than the control group, which achieved a score of 75.2 (a 7.7% increase). The difference in improvement suggests that using flipped book technology in conjunction with e-modules greatly enhances students' body spa abilities. The results of the t-test showed a statistically significant difference ($p < 0.001$), confirming the idea that integrated e-modules are superior to traditional teaching methods.

b. Learning Motivation Results

A comparison of the experimental and control groups' levels of student learning motivation is shown in Figures 4 and 5. Both groups demonstrated a level of learning desire in the pre-test that was comparable to the control group's (3.10) and experimental group's (3.12) average scores on a 4-point scale. This supports the initial need for the two groups to have equal incentives for learning.

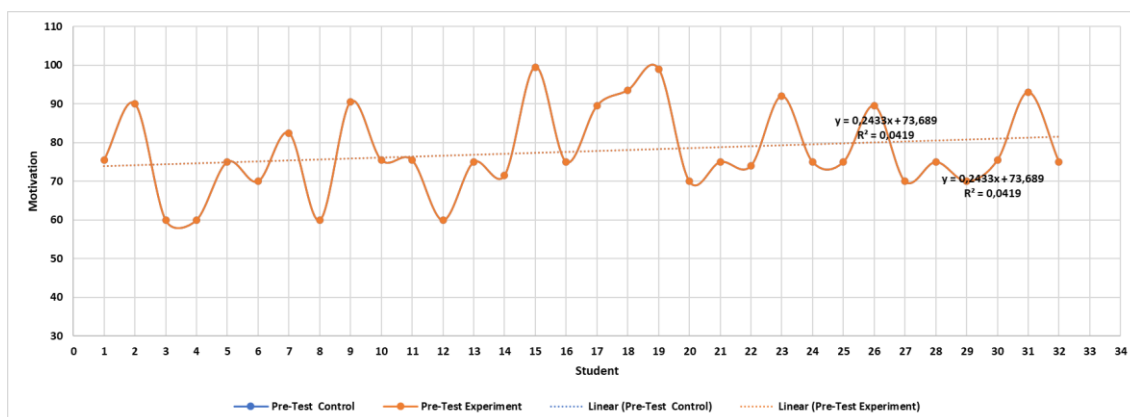


Fig 4. Pretest Results for Learning Motivation

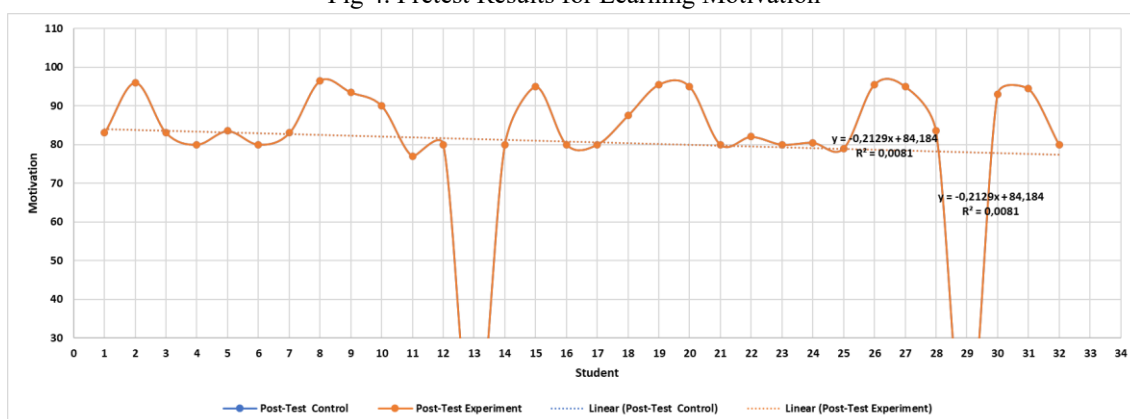


Fig 5. Posttest Results for Learning Motivation

Post-test findings indicated an enhancement in learning motivation in both groups; however, the increase in the experimental group was significantly more pronounced. The experimental group had an average score of 3.78, reflecting a 21.2% rise, while the control group earned 3.26, indicating a 5.2% gain. The notable disparity in enhancement suggests that the integrated e-module has a significant impact on students' learning motivation. Subsequent research revealed that the parameters of "Interest in Material" and "Career Desire" exhibited the most critical rise, demonstrating that the integrated e-module effectively enhanced students' engagement with the learning material and bolstered their career ambitions in the Spa sector.

c. Self-Efficacy Results

Figures 6 and 7 show a comparison of students' self-efficacy between the experimental and control groups. In the pre-test stage, both groups showed a level of self-efficacy comparable to the experimental group's average score of 3.22 and the control group's 3.19 on a 5-point scale, confirming the equivalence of the initial condition in this psychological aspect.

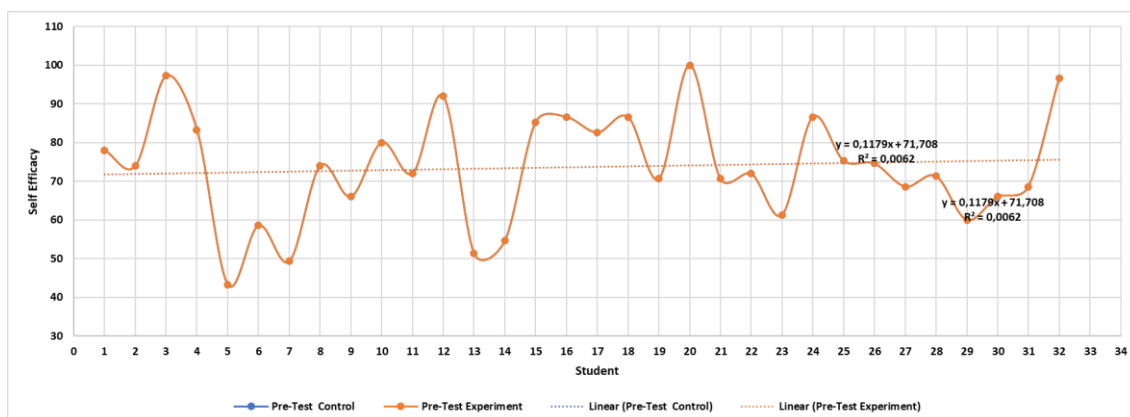


Fig 6. Pretest Results for Self-Efficacy

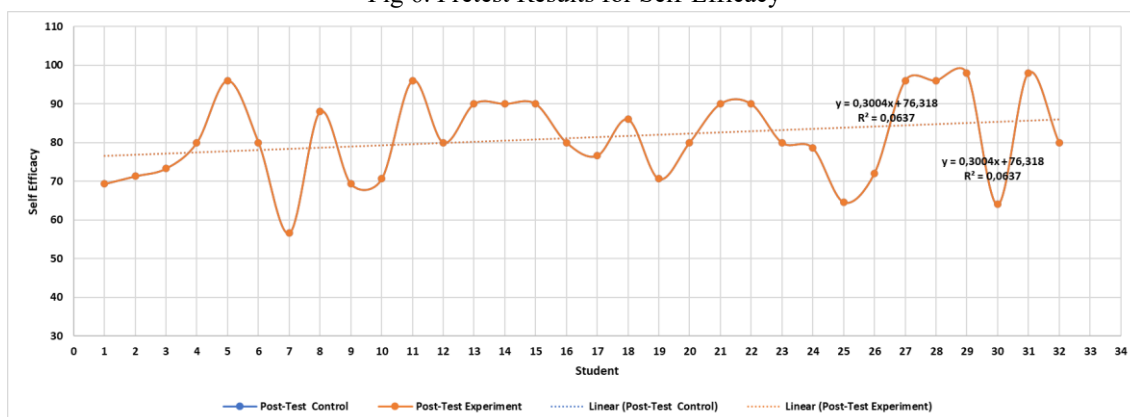


Fig 7. Posttest Results for Self-Efficacy

The self-efficacy of students in the experimental and control groups is contrasted in Figures 6 and 7. The equivalency of the first condition in this psychological component was confirmed by the pre-test stage, when both groups showed a degree of self-efficacy equivalent to the experimental group's average score of 3.22 and the control group's 3.19 on a 5-point scale.

The use of e-modules combined with flipped book technology significantly improved students' body spatial abilities, learning motivation, and self-efficacy, according to a comparative study of pre-test and post-test data. The experimental group's significant improvement over the control group supports the effectiveness of this innovative approach in spa instruction at Vocational High School.

2. Variable Relationship Model Testing

a. Validity and Reliability Results

The outcome of the PLS-SEM method, comprising the structural model and related route coefficient values, is shown in Figure 8. With a route coefficient of 0.442 and a path coefficient of 0.230, respectively, the Integrated E-Modules (IM) construct has a strong effect on Learning Motivation (LM) and Self-Efficacy (SE), as illustrated in this visualization. Additionally, with a path coefficient of 0.639, Self-Efficacy (SE) has a significant effect on Body SPA Skills (BSS). In contrast, its path value of 0.379 indicates a small influence on Employability Skills (ES). At the same time, a relatively low path coefficient indicates that Learning Motivation (LM) has little effect on Employability Skills (ES) and Body SPA Skills (BSS). This graphic provides a first evaluation of the degree of correlation between the variables in the model under study.

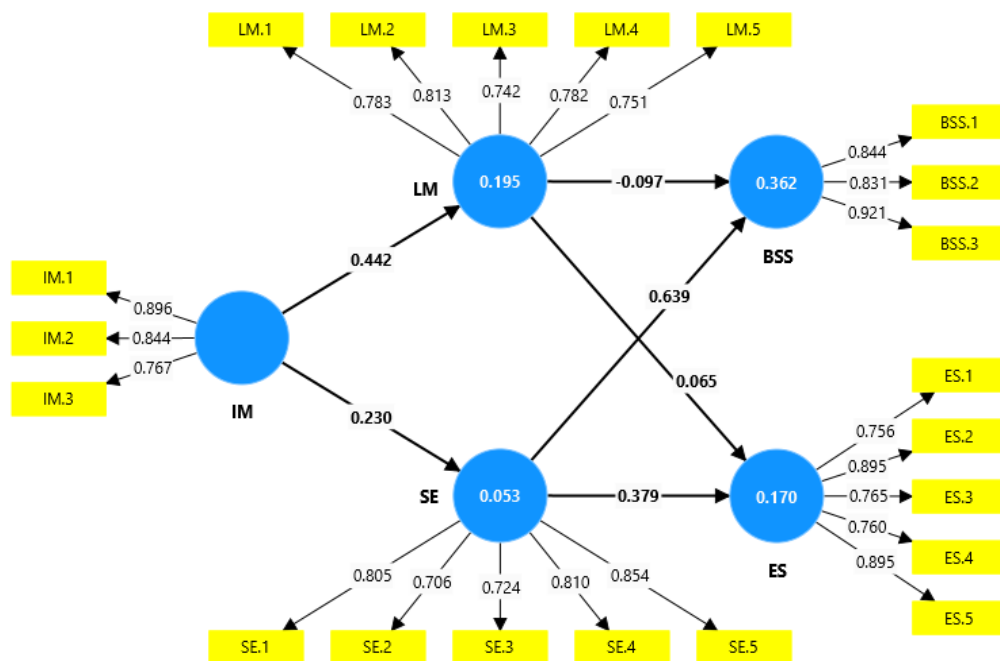


Fig 8. Output PLS-SEM algorithm

This model illustrates how the use of integrated e-modules tends to have a greater impact on students' motivation to study than on their self-efficacy. Nonetheless, self-efficacy has a greater impact on how students build their employability and body SPA abilities. This suggests that learning motivation is less important in the practical learning process than students' self-confidence (Hair et al., 2021; Hair Jr. et al., 2021).

The findings of the validity and reliability tests for the research model's constructs are shown in Table 2. According to the data, every indication has an outer loading value more than 0.7, demonstrating its applicability in evaluating the pertinent idea. The whole construct's Cronbach's alpha score was higher than 0.7, suggesting that the research tool had high internal consistency. The excellent dependability of the construct measures was confirmed by the composite reliability scores for all constructs, which were above 0.8. Concurrently, all constructs' Average Variance Extracted (AVE) values were more than the 0.5 threshold, suggesting that the constructs had strong convergent validity (Almanasreh et al., 2019; Hair Jr. et al., 2021).

Tabel 2. Construct Validity and Reliability

Construct	Outer Loadings	Cronbach's alpha	Composite reliability	AVE
IM	IM.1 0.896	0.792	0.875	0.701
	IM.2 0.844			
	IM.3 0.767			
ES	ES.1 0.756	0.875	0.909	0.667
	ES.2 0.895			
	ES.3 0.765			
	ES.4 0.760			
	ES.5 0.895			
LM	LM.1 0.783	0.835	0.882	0.600
	LM.2 0.813			
	LM.3 0.742			

Construct	Outer Loadings	Cronbach's alpha	Composite reliability	AVE
SE	LM.4	0.782	0.887	0.611
	LM.5	0.751		
	SE.1	0.805		
	SE.2	0.706		
	SE.3	0.724		
	SE.4	0.810		
BSS	SE.5	0.854	0.900	0.751
	BSS.1	0.844		
	BSS.2	0.831		
	BSS.3	0.921		

These findings attest to the sufficient psychometric properties of the study's measuring tools. The dependability of the findings from structural model analysis is ensured by the indicators' ability to consistently and precisely assess the construct. The BSS.3 indication (0.921) for the Body SPA Skills construct has the highest loading value, suggesting that the "Practical Application" indicator is an effective way to measure the construct.

b. Validity Discrimination Results

The degree to which the constructs in a model are unique and reflect unique events is measured by discriminant validity. Using two criteria suggested in the PLS-SEM literature, the findings of the discriminant validity evaluation are shown in Table 3. The square root of the Average Variance Extracted (AVE) on the main diagonal (bolded) indicates the Fornell-Larcker requirements, which must be greater than the correlations between the constructs indicated below the diagonal. Above the diagonal, in italics, is the Heterotrait-Monotrait (HTMT) ratio. For conceptually distinct items, a cutoff value of less than 0.90 is recommended. When these two criteria are combined, the validity of the discriminant model is thoroughly assessed (Afthanorhan et al., 2021).

Table 3. Discriminant Validity

Constructs		I	II	III	IV	V
		IM	ES	LM	SE	BSS
I	IM	0.837	0.242	0.487	0.277	0.282
II	ES	0.185	0.817	0.302	0.418	0.445
III	LM	0.442	0.237	0.775	0.559	0.243
IV	SE	0.230	0.408	0.453	0.782	0.667
V	BSS	0.228	0.388	0.193	0.595	0.866

The HTMT ratio is shown above the diagonal (in italics). At the same time, the Fornell-Larcker criteria are represented by the square root of the AVE along the diagonal (in bold), with construct correlations displayed below the diagonal.

The discriminant validity test findings showed that the model satisfied both predetermined requirements. Each construct has a higher variance with its indicators than the others, as confirmed by the fact that all of the AVE square root values on the main diagonal (ranging from 0.775 to 0.866) are greater than the correlations between the constructs below the diagonal according to the Fornell-Larcker criteria. The most excellent HTMT value between Self-Efficacy and Body SPA Skills, 0.667, was within acceptable bounds, but all other HTMT values fell below the 0.90 criterion. Intriguingly, the relatively high correlation between Body SPA Skills and Self-Efficacy (0.595) and the correspondingly high HTMT value (0.667) show that, despite their conceptual differences, these

two constructs have a close relationship when it comes to learning practical skills. This is consistent with the idea that self-confidence has a significant impact on the performance of technical skills. These findings support the adequate discriminant validity of the study tool for further structural analysis (Afthanorhan et al., 2021; Hair et al., 2021; Hair Jr. et al., 2021).

c. R-Square

The determination coefficient (R-squared) value for the model's endogenous variables is shown in Table 4. The percentage of variance in endogenous variables that the model's predictor variables can explain is indicated by the R-squared value. The findings demonstrated that the model could account for 17.0% of the variance in Employability Skills (ES), 19.5% of the variation in Learning Motivation (LM), 5.3% of the difference in Self-Efficacy (SE), and 36.2% of the variation in Body SPA Skills (BSS).

Table 4. R-Square

Construct	R-square
ES	0.170
LM	0.195
SE	0.053
BSS	0.362

The highest R-squared value was found in the Body SPA Skills (BSS) construct, at 0.362, indicating that the model is quite effective in explaining variations in students' practical skills. Meanwhile, the relatively low R-squared value for Self-Efficacy (SE) indicates that other factors outside the model are more dominant in explaining the variation in student Self-Efficacy. Although some R-square values are moderate, they are still acceptable in exploratory research in the field of education, where many complex factors influence human behavior (Hair Jr. et al., 2021).

d. Hypothesis

The output of the bootstrapping algorithm is shown in Figure 9, which also displays the t-statistical value for each structural model route. This visualization provides an overview of the statistical significance of the correlations between the model's variables. At a 5% significance level, pathways are deemed statistically significant if their t-statistic is higher than 1.96 (Hair et al., 2021; Hair Jr. et al., 2021).

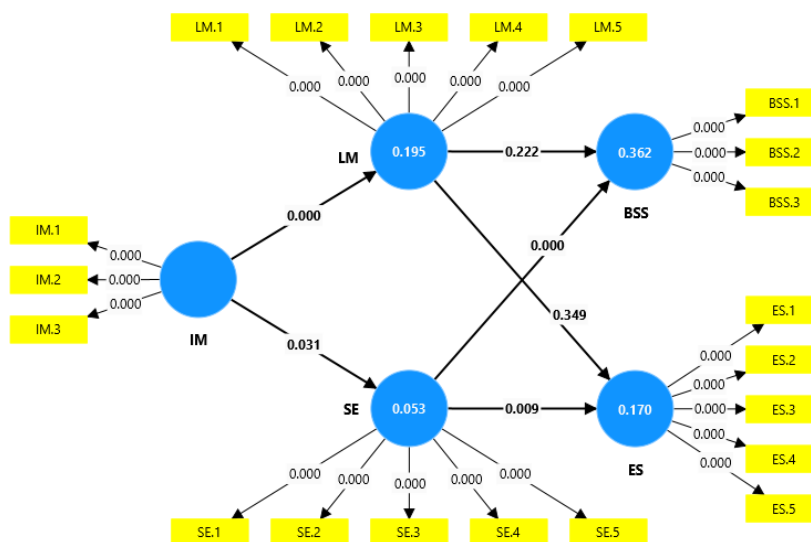


Fig 9. Output bootstrapping algorithm

In this image, it can be seen that some paths exhibit high t-statistical values, such as those from SE to BSS (5,231) and from IM to LM (3,964), indicating that these relationships are highly significant. Meanwhile, some other pathways have lower t-statistical values, such as pathways from LM to ES and LM to BSS, showing a statistically insignificant relationship. This visualization provides visual confirmation of the hypothesis test results presented in the following tables.

The findings of the direct effects analysis, presented in Table 5, are shown. With a path coefficient of 0.442 and a p-value of 0.000, the results demonstrated that Integrated E-Modules (IM) had a significant and favourable impact on Learning Motivation (LM). Likewise, a path coefficient of 0.230 and a p-value of 0.031 demonstrated that IM had a positive and statistically significant impact on Self-Efficacy (SE). This supports the H1 and H2 assumptions that students' learning motivation and self-efficacy are increased when Integrated E-Modules are used.

Table 5. Direct Effect

Direct Paths	Original sample	Sample mean	Standard deviation	T value	P values	Decision
IM -> LM	0.442	0.468	0.111	3.964	0.000	Accepted
IM -> SE	0.230	0.244	0.123	1.863	0.031	Accepted
LM -> ES	0.065	0.067	0.168	0.387	0.349	Rejected
LM -> BSS	-0.097	-0.090	0.127	0.767	0.222	Rejected
SE -> ES	0.379	0.397	0.159	2.380	0.009	Accepted
SE -> BSS	0.639	0.643	0.122	5.231	0.000	Accepted

Additionally, it was found that Self-Efficacy (SE) had a significant and favourable effect on Body SPA Skills (BSS), with a path coefficient of 0.639 and a p-value of 0.000, as well as on Employability Skills (ES), with a path coefficient of 0.379 and a p-value of 0.009. These findings underscore the importance of self-efficacy in the development of technical and professional skills. On the other hand, with p values of 0.349 and 0.222, respectively, Learning Motivation (LM) showed no discernible effect on Employability Skills (ES) or Body SPA Skills (BSS). According to the results, learning motivation has no direct bearing on students' skill improvement in the context of this study.

The results of specific tests for indirect effects, which examine how mediation operates within the model, are presented in Table 6. A path coefficient of 0.147 and a p-value of 0.047 demonstrated the significant indirect impact of Integrated E-Modules (IM) on Body SPA Skills (BSS) via Self-Efficacy (SE). This supports the H7 hypothesis, which states that the relationship between the use of integrated e-modules and body SPA skills is mediated by self-efficacy.

Table 6. Specific Indirect Effect

Indirect Paths	Original sample	Sample mean	Standard deviation	T value	P values	Decision
IM -> SE -> BSS	0.147	0.158	0.087	1.680	0.047	Accepted
IM -> LM -> BSS	-0.043	-0.044	0.062	0.692	0.244	Rejected
IM -> SE -> ES	0.087	0.091	0.060	1.455	0.073	Rejected
IM -> LM -> ES	0.029	0.030	0.085	0.339	0.367	Rejected

Other paths of mediation, however, did not exhibit statistical significance. P-values are greater than 0.05 for the indirect effects from IM to BSS via LM, from IM to ES via SE, and from IM to ES via LM. These results suggest that when it comes to describing how the use of Integrated E-Modules impacts students' skill development, Self-Efficacy mediates the relationship more significantly than Learning Motivation. These outcomes support earlier research indicating that self-efficacy is a crucial psychological component that should be considered when developing instructional materials for hands-on vocational training.

DISCUSSION

The research on the development of innovative e-modules with the integration of flipped book technology and employability skill learning in Body Spa learning yields some important findings that can be discussed in depth in the context of previous literature and their implications for educational practice.

1. The Effect of Integrated E-Modules on Learning Motivation and Self-Efficacy

The study's findings showed that Integrated E-Modules (IM) had a positive and significant influence on students' Learning Motivation (LM), with a path coefficient of 0.442 ($p < 0.001$). These results align with the research of Wagino et al. (Wagino, Nasution, et al., 2024), who found that interactive digital learning materials increase student engagement in vocational health education. Furthermore, these results reinforce the findings of Wagino, et al. (2024), who demonstrated that multimedia-rich e-modules can improve knowledge retention and application in the context of technical training.

Increasing Learning Motivation through the implementation of Integrated E-Modules can be explained through several theoretical perspectives. Based on the Technology Acceptance Model, students tend to be more motivated to use learning technologies that they find helpful and easy to use. An e-module with flipped book technology that offers interactive visualization of complex Body Spa treatment procedures improves the perception of usability and ease of use, thereby increasing students' motivation to learn (Abuhassna et al., 2023; Antonietti et al., 2022).

This study also confirmed the positive influence of Integrated E-Modules on students' Self-Efficacy (path coefficient 0.230, $p = 0.031$), although with a lower power than its effect on Learning Motivation. These findings complement the research of Delita et al. (2022) which shows the importance of Self-Efficacy in Body Spa learning. Interestingly, although the R-squared value for Self-Efficacy is relatively low (5.3%), this construct plays a significant mediating role in the model. This indicates that although e-modules make only a small contribution to Self-Efficacy, they have a substantial chain impact on skill development.

2. The Role of Self-Efficacy as a Key Mediator

The mediation pathway analysis indicated that Self-Efficacy significantly mediated the association between Integrated E-Modules and Body SPA Skills (indirect route coefficient 0.147, $p = 0.047$). These results enhance the Social Cognitive Theory paradigm, highlighting that self-efficacy beliefs affect people's approaches to and engagement in learning activities (Martin & Guerrero, 2020).

This significant mediation pathway through Self-Efficacy provides important insights into the psychological mechanisms behind the effectiveness of integrated e-modules. The interactive function of the e-module, which enables students to practice skills virtually before physically doing

so, increases their confidence in their abilities, thereby improving their performance in practical skills. This process reflects the concept of “mastery experience” identified by Bandura as the most potent source of self-efficacy.

These results contrast with the research of (Delita et al., 2022) which identifies Motivation as the primary predictor of skill mastery in practical health education. In the context of Body SPA learning, this study shows that Self-Efficacy plays a more dominant role than Learning Motivation in influencing skill development. This difference may reflect a particular characteristic of Body Spa learning that requires a high level of confidence in performing hands-on procedures on clients.

3. The Relationship Between Self-Efficacy and Skill Development

The study’s results indicate a robust correlation between Self-Efficacy and the two skill kinds assessed in this research. Self-efficacy had a favourable and substantial impact on Body Spa Skills (path coefficient 0.639, $p < 0.001$) and Employability Skills (path coefficient 0.379, $p = 0.009$). This disparity in effect is noteworthy, suggesting that Self-Efficacy has a more robust correlation with domain-specific technical abilities than with broader job competencies.

These results build upon earlier findings by Lim (Lim, 2022), which showed a robust association between Self-Efficacy and practical abilities, as well as professional confidence, among beauty therapy students. A recent study indicates that this association persists robustly, even when accounting for variables such as Learning Motivation and the use of modern learning technology.

Based on the model of self-determination Kholifah et al. (2025), Self-Efficacy can be seen as the fulfillment of fundamental competency needs, which encourage intrinsic motivation and perseverance in learning. In the context of complex skill learning, such as spa therapy, confidence in one’s abilities may be a psychological prerequisite for approaching and accepting the challenges necessary for skill mastery.

4. Limited Role of Learning Motivation in Skill Development

One of the unexpected findings in this study was the absence of a significant influence of Learning Motivation on both Body SPA Skills ($p = 0.222$) and Employability Skills ($p = 0.349$). These results contradict the existing literature on the role of motivation in learning, as reported by Megasari et al. (2023).

However, this insignificance can be explained through several perspectives. First, there may be an overlap effect between Learning Motivation and Self-Efficacy, where Self-Efficacy already covers the variance described by motivation. The moderate correlation ($r = 0.453$) between these two constructs supports this explanation. Second, in the context of practical skills of spa therapy, confidence in ability may be a more direct predictor of performance compared to general motivation to learn.

This may also reflect the nature of the study population—students who have already chosen a beauty major may already have a high level of fundamental motivation, so variation in motivation is no longer a distinguishing factor in skill development. As proposed by Herzberg’s two-factor theory, motivation may act more as a “hygiene” factor in this context—necessary but not sufficient to drive superior performance.

5. Implications for the Development of E-Modules in Vocational Education

The findings of this study have substantive implications for the development of flipbook e-modules for the employability skills model in vocational education, particularly in fields that

involve practical skills, such as spa therapy. The results show that an effective e-module should not only focus on content delivery, but also on strengthening students' Self-Efficacy.

These results build upon the research of Zhao et al. (2021) on the effectiveness of flipped book technology in enhancing engagement and knowledge retention. Current research adds a psychological dimension by showing that this technology can also increase Self-Efficacy, which in turn increases skill development.

E-module designs that explicitly target the development of Self-Efficacy can include elements such as:

- a. Skill modeling via video with a gradual difficulty level
- b. Virtual simulations that allow risk-free training
- c. Feedback system that emphasizes progress and mastery
- d. Self-reflection feature that encourages students to recognize improvements in their abilities

This aligns with the four sources of Self-Efficacy identified by Bandura: mastery experiences, vicarious experiences, verbal persuasion, and physiological and emotional states.

6. The Relationship between Body SPA Skills and Employability Skills

The model tested in this study separates learning outcomes into two constructs: Body SPA Skills (domain-specific technical skills) and Employability Skills (more general job skills such as communication and problem-solving). Interestingly, although Self-Efficacy affects both of these constructs, its effect on students' Body SPA Skills (0.639) is much stronger than on Employability Skills (0.379).

These results have significant implications for integrating employability development into spa therapy education. As proposed by Yende (2025), the explicit integration of employability development in vocational curricula can improve graduate outcomes in the hospitality industry. Current research suggests that to maximize the effectiveness of such integrations, pedagogical approaches should consider the role of Self-Efficacy as a mediator.

It also demonstrates the potential for a positive transfer from domain-specific Self-Efficacy to more general skills. Students who develop a strong belief in their spa therapy abilities may be more likely to feel confident in applying general work skills, such as communication with clients or problem-solving in treatment scenarios.

7. Limitations and Future Research Directions

Although the results of this research provide significant insights, several limitations must be noted. The limited sample size ($n = 64$ individuals) may restrict the generalisability of the results. While PLS-SEM can handle smaller sample sizes, further studies using larger samples will enhance the reliability of the findings.

This research was conducted within the unique context of spa treatment education in Indonesia, which may limit the applicability of the results to other vocational education sectors or cultural settings. Conducting replication across several contexts will enhance external validity.

Third, although the study lasted 16 weeks, extended longitudinal research might elucidate the evolution of the link between self-efficacy and skill development over time, including the potential for positive feedback effects wherein enhanced skill growth bolsters self-efficacy.

Future research may explore:

- a. Design of e-modules that specifically target the improvement of students' Self-Efficacy and test their effectiveness compared to standard e-modules

- b. Potential moderator roles, such as learning styles or early abilities, in the relationship between e-module implementation and learning outcomes
- c. Specific mechanisms by which flipped book technology enhances self-efficacy in practical skills education.
- d. Long-term effects of increased Self-Efficacy on career success in the spa and fitness industry

CONCLUSIONS

This study concludes that the use of Integrated E-Modules based on flipped book technology significantly enhances students' Body Spa skills through the strengthening of self-efficacy as the main mediator, while learning motivation does not contribute to skill development. The PLS-SEM model indicates that self-efficacy directly influences both Body Spa Skills and Employability Skills, suggesting that improvements in practical competencies are largely derived from students' confidence in their abilities. These findings highlight the importance of vocational curricula that not only emphasize technical competencies but also foster self-efficacy through incremental learning, modeling, and constructive feedback. Thus, integrating learning technology with employability skills development provides an effective strategy to prepare graduates who are competent, adaptable, and ready to meet industry demands.

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CONFLICTS OF INTEREST STATEMENT

The authors declare that there are no conflicts of interest related to this manuscript.

AUTHOR CONTRIBUTIONS

Murni Astuti (M.A.) conceptualized the research, developed the innovative e-module, led the experimental implementation, supervised the research team, and wrote the manuscript. Rahmiati (R.R.) designed the research methodology, validated research instruments, and contributed to the manuscript review. Siska Miga Dewi (S.M.D.) conducted a literature review, assisted in data collection, and contributed to the development of the spa therapy content for the e-module. Arasinah Kamis (A.K.) provided an international perspective on vocational education, contributed to theoretical framework development, and assisted in manuscript review. Rahmat Desman Koto (R.D.K.) performed data analysis using PLS-SEM, created visual representations of research

findings, and contributed to the technical writing of results and methodology sections. Adisty Akhoma Ummah (A.A.U.) assisted in data collection, participated in the development of the e-module, and contributed to data organization and preliminary analysis. All authors participated in regular discussions throughout the research process, reviewed the manuscript, approved the final version, and agreed to be accountable for all aspects of the work.

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