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A resilience–self-efficacy digital psychoeducational module for adolescent academic stress: *a single-group feasibility study*

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ABSTRACT

Academic stress represents a psychological challenge among adolescents, highlighting the need for accessible school-based support. This study aimed to develop a digital psychoeducational module integrating resilience and self-efficacy using the ADDIE framework and to examine its feasibility, acceptability, and preliminary within-group outcomes. Initial screening involved 570 students from three senior high schools in Pandeglang, Indonesia. Subsequently, 90 students with moderate to high academic stress were selected through purposive sampling. Academic stress, resilience, and academic self-efficacy were measured using 20-item scales with satisfactory internal consistency (Cronbach's α = 0.908, 0.861, and 0.867, respectively). Feasibility was rated by four experts on a four-point scale, acceptability was assessed using a 25-item student questionnaire, and preliminary outcomes were examined through a one-group pretest–posttest design. Material and media feasibility scores reached 86.5% and 86.0%, respectively, while overall student responses reached 88.5%, all within the highest interpretive category (81%–100%). Mean academic stress decreased from 64.89 to 53.23, whereas resilience increased from 41.89 to 53.79 and self-efficacy from 42.60 to 54.12 (all Wilcoxon $p < .001$; $r = 0.87$; matched-pairs rank-biserial correlation = 1.00; d_{av} = 1.89–2.40). Because no control group was included, these large within-group changes cannot be attributed to the module. The findings support the module's feasibility and acceptability as a proof of concept, and controlled trials are required to establish its effectiveness.

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Introduction

Academic stress has become a significant psychological concern among high school students, particularly during adolescence, when increasing academic demands coincide with important developmental changes. Students frequently experience pressure associated with examinations, academic achievement, assignments, parental expectations, and preparation for higher education. When these demands exceed their perceived coping abilities, academic stress may emerge and negatively affect their psychological well-being and academic functioning. Prolonged exposure to academic stress has been associated with emotional difficulties, reduced motivation, sleep disturbances, and impaired academic performance, highlighting the importance of appropriate psychological support during adolescence (Jagiello et al., 2025; Pascoe et al., 2020). A systematic review of 52 studies further found that 48 reported a positive association between academic pressure and at least one adolescent mental

health outcome, identifying academic pressure as a modifiable target for school-based prevention (Steare et al., 2023).

School-based psychological interventions have received considerable attention as an approach to preventing and managing academic stress. Schools provide accessible environments where students can receive psychological support through structured educational and developmental activities. Previous research has demonstrated that school-based programs incorporating cognitive and behavioral strategies can help students manage academic stress, although intervention outcomes vary according to program characteristics and methodological quality (Jagiello et al., 2025). A meta-analysis of randomized controlled trials also identified significant but relatively small overall effects of school-based interventions on stress reduction and coping or resilience outcomes, emphasizing the need for well-designed interventions that address students' psychological needs (Juhász et al., 2024). The evidence is, however, inconsistent. An early meta-analysis reported large pooled effects of school stress management programs, but with substantial heterogeneity and larger effects in studies of lower methodological quality (Kraag et al., 2006), whereas a later meta-analysis found that school-based stress programs did not reduce stress symptoms among adolescents overall, although targeted programs outperformed universal ones (Feiss et al., 2019). A multilevel meta-analysis likewise suggested that programs directed at selected adolescents have greater potential to reduce psychological stress (van Loon et al., 2020). These contradictory findings suggest that the modest average effects reflect not only weak interventions but also poor alignment between program content and the specific needs of the students who receive them. Within guidance and counseling services, psychoeducation offers a relevant approach by integrating psychological knowledge, self-reflection, and practical strategies to support students in responding to academic challenges.

Managing academic stress requires more than reducing external academic demands; it also involves strengthening psychological resources that enable students to respond adaptively to challenging situations. Two important psychological constructs relevant to this process are resilience and self-efficacy. Resilience refers to the capacity of a dynamic system to adapt successfully to disturbances that threaten its function or development (Masten, 2014), and it is increasingly understood as a multisystemic process that draws on personal, social, and contextual resources (Ungar & Theron, 2020), whereas self-efficacy concerns individuals' beliefs in their ability to organize and execute actions required to achieve desired outcomes. These psychological resources are relevant to how students interpret academic difficulties, maintain motivation, and respond to setbacks. Theoretical and empirical evidence indicates that resilience-oriented interventions can strengthen adolescents' adaptive capacities, while self-efficacy provides an important foundation for confidence, persistence, and goal-directed behavior (Bandura, 1977; Llistosella et al., 2023; Zimmerman, 2000).

The integration of resilience and self-efficacy into psychoeducational interventions provides a theoretical basis for supporting students' academic stress management. Resilience-oriented activities may encourage students to identify personal strengths, recognize emotional responses, and develop adaptive coping strategies when facing academic difficulties. Meanwhile, self-efficacy can be strengthened through opportunities to accomplish manageable tasks, reflect on successful experiences, and establish realistic academic goals. These activities are consistent with the view that beliefs about personal capabilities influence motivation, behavioral choices, and persistence when individuals encounter challenges (Bandura, 1977; Schunk & DiBenedetto, 2020). Furthermore, evidence from school-based resilience interventions suggests that structured and multicomponent programs can improve resilience among adolescents, although their effectiveness may depend on participant characteristics, intervention components, and follow-up duration (Llistosella et al., 2023). Nevertheless, a large cluster-randomized trial of a pragmatic school-based resilience intervention found no reduction in adolescent mental health problems, illustrating that resilience programs do not automatically translate into benefit (Dray et al., 2017b).

Alongside the importance of psychological resources, advances in digital technology have created opportunities to expand the delivery of psychoeducational support. Digital interventions offer flexible access to psychological information and learning activities, potentially allowing students to engage with educational materials according to their individual needs and learning pace. Nevertheless, the successful implementation of digital psychological interventions requires consideration of content quality, usability, engagement, and suitability for the intended population. Previous systematic reviews have identified these factors as important considerations in promoting meaningful engagement among children and young people using digital mental health interventions (Liverpool et al., 2020). Digital interventions may also improve access to mental health support, although evidence concerning their effectiveness varies across intervention types, and further evaluation remains necessary, particularly in settings with limited resources (Lehtimaki et al., 2021). Primary trials illustrate both the promise and the limits of this approach: a computerised cognitive behavioural program was non-inferior to usual face-to-face care for help-seeking adolescents (Merry et al., 2012), whereas a brief web-based acceptance

and commitment program produced only small between-group reductions in stress (d = 0.22) among ninth-grade students, with the largest gains among highly stressed participants (Puolakanaho et al., 2019).

Despite the growing body of research on academic stress interventions, resilience development, self-efficacy, and digital psychological support, a theoretical gap remains. Existing systematic reviews have primarily evaluated school-based stress management programs, resilience interventions, or digital mental health approaches as separate areas of investigation (Jagiello et al., 2025; Lehtimaki et al., 2021; Llistosella et al., 2023), and most programs target either stress reduction or a single protective resource. From a transactional perspective, academic stress arises when perceived demands exceed perceived resources; self-efficacy operates mainly at the appraisal stage by shaping whether students judge academic demands as manageable, whereas resilience operates mainly at the recovery stage by shaping how students adapt after setbacks (Bandura, 1977; Masten, 2014). Programs that strengthen only one of these resources address only one side of the demand–resource imbalance, which may partly explain the small and inconsistent effects reported in meta-analyses (Feiss et al., 2019; Juhász et al., 2024). In the Indonesian context, guidance and counseling modules for academic stress have generally been developed in print format for counselor use and evaluated only for content feasibility (Barseli et al., 2020), while group psychoeducation studies have been conducted with very small samples (Muhibbuddin & Muslikah, 2026). Therefore, the novelty of the present study lies in three features: (a) an explicit dual-resource framework that sequences self-efficacy-building and resilience-building activities within one psychoeducational program, (b) a web-based, counselor-supported delivery format designed from a documented needs analysis, and (c) its development and initial testing among senior high school students in Pandeglang Regency, a semi-rural region with limited access to school-based psychological services.

To address this need, the present study adopted the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) framework to develop a digital psychoeducational module integrating resilience and self-efficacy for academic stress management. The ADDIE model provides a systematic instructional development framework that emphasizes learner needs, structured design, product development, implementation, and evaluation (Spatioti et al., 2022). A needs-driven design process was considered appropriate because poor alignment between program content and students' needs is one plausible reason for the modest effects of existing school-based programs. The developed module incorporates psychoeducational materials, reflective exercises, and practical activities designed to support students in understanding academic stress, developing adaptive coping strategies, strengthening resilience, and improving confidence in managing academic challenges. The integration of these components represents a theoretically informed approach to developing digital resources that may complement existing school guidance and counseling services.

Accordingly, the objectives of this study were to (a) identify the academic stress levels and psychoeducational needs of senior high school students in Pandeglang Regency, (b) develop a web-based psychoeducational module integrating resilience and self-efficacy using the ADDIE framework, (c) determine the feasibility of the module through expert ratings of material and media quality, (d) determine its acceptability through student ratings, and (e) explore preliminary within-group changes in academic stress, resilience, and academic self-efficacy. To address these objectives, a research and development design was combined with a single-group feasibility study using a one-group pretest–posttest design. The target population comprised students in three public senior high schools; after screening 570 students, 90 students with moderate to high academic stress were purposively selected. The primary outcomes were expert feasibility and student acceptability ratings, and the secondary exploratory outcomes were self-reported academic stress, resilience, and academic self-efficacy. Consistent with the purpose of feasibility research, which is to determine whether an intervention is appropriate for further testing rather than to establish efficacy (Bowen et al., 2009), it was expected that the module would meet the highest feasibility and acceptability criteria and that scores would change in the intended directions. Given the absence of a control group, the findings are intended to provide proof-of-concept evidence to inform subsequent controlled evaluations rather than establish causal effectiveness.

Methods

Research Design

This study employed a research and development (R&D) approach using the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model to develop a digital psychoeducational module integrating resilience and self-efficacy for academic stress management among high school students. The ADDIE model was selected because it provides a systematic framework for identifying learners' needs, designing and developing educational products, implementing interventions, and evaluating their feasibility and suitability for the intended users (Spatioti et al., 2022).

The study incorporated expert validation, student response evaluation, and a one-group pretest–posttest design. Expert validation was conducted to assess the feasibility of the developed module, while student responses were collected to evaluate its acceptability. The pretest–posttest design was used to examine preliminary changes in academic stress, resilience, and self-efficacy following module implementation. This design was chosen because the study was positioned at the development and feasibility phase, in which the key questions concern whether an intervention can be delivered as planned and is acceptable to its recipients (Bowen et al., 2009). A control group was not formed because, at this developmental stage, the priority was to determine whether the module could be delivered and accepted in the school setting before committing resources to a controlled trial. The design is therefore vulnerable to internal validity threats, including regression to the mean, maturation, testing effects, and history (Barnett et al., 2005). To reduce these threats as far as possible within a single-group design, identical instruments and standardized administration procedures were used at both measurement points, the selection procedure was documented to allow the potential for regression to the mean to be evaluated, and effect sizes were interpreted against benchmarks from controlled trials. As the study did not include a control group, the analysis focused on within-group changes rather than establishing causal effectiveness.

Research Setting and Participants

The study was conducted at three public senior high schools in Pandeglang Regency, Banten Province, Indonesia: SMA Negeri 6 Kabupaten Pandeglang, SMA Negeri 2 Kabupaten Pandeglang, and SMA Negeri 10 Kabupaten Pandeglang.

The initial screening involved 570 students to identify their academic stress levels. Total scores on the academic stress scale were classified into three categories: low ([cut-off score]), moderate ([cut-off score range]), and high ([cut-off score]). The screening scores had a mean of [M] (SD = [SD]) and ranged from [minimum] to [maximum]. The screening results indicated that 545 students (95.6%) experienced moderate academic stress, 13 students (2.3%) experienced high academic stress, and 12 students (2.1%) experienced low academic stress.

Based on the screening results, 90 students with moderate to high academic stress levels were selected through purposive sampling to participate in the implementation and evaluation of the developed module. The participants consisted of 30 students from each school, comprising [n] female and [n] male students in Grades [X–XI] with a mean age of [M] years (SD = [SD]); [n] participants were in the high category and [n] in the moderate category. Students in the moderate and high categories were pooled for two reasons. First, the module was designed as a selective (targeted) preventive resource for students with elevated stress rather than as a clinical treatment, and targeted school programs have been associated with larger effects than universal programs (Feiss et al., 2019; Werner-Seidler et al., 2017). Second, only 13 students were classified in the high category, which was too small for a separate subgroup analysis. All 90 participants completed the pretest and posttest assessments, allowing within-participant comparisons of academic stress, resilience, and self-efficacy. The participant flow and research stages are presented in Figure 1.

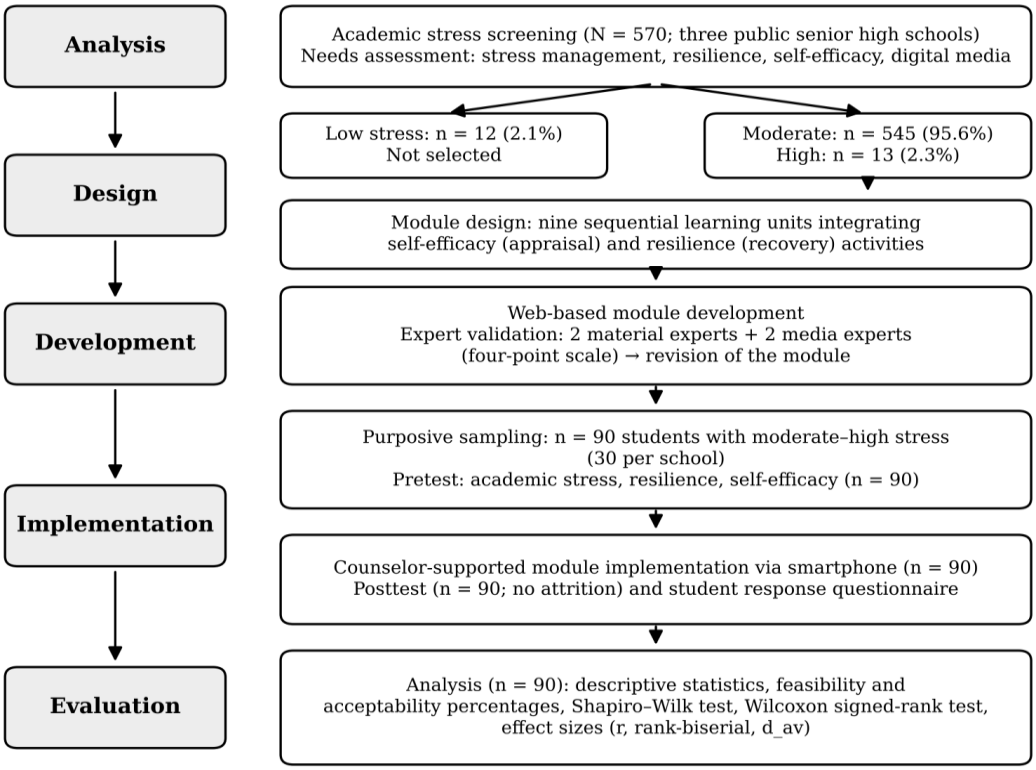


Figure 1. Research Design and Participant Flow

Development Procedure

The development process followed the five stages of the ADDIE model. During the analysis stage, an initial academic stress screening was conducted to identify students' psychological conditions and determine potential participants. A needs assessment was also carried out to identify students' requirements concerning academic stress management, resilience, self-efficacy, and digital psychoeducational media. The findings served as the basis for determining the objectives, content, and learning activities of the module.

In the design stage, the module structure, psychoeducational materials, reflective activities, and psychological exercises were organized according to the identified needs. The module was designed to integrate academic stress management with activities intended to support resilience and academic self-efficacy.

During the development stage, the designed materials were incorporated into a web-based digital psychoeducational module comprising nine sequential learning units. These units addressed understanding academic stress, recognizing academic pressure, developing emotional regulation skills, applying adaptive coping strategies, fostering optimism, recovering from academic failure, strengthening academic confidence, improving learning management strategies, and formulating personal action plans.

The developed module was subsequently evaluated by four experts, consisting of two counseling and psychological content experts and two digital media experts, who rated the module independently. Material validation focused on content relevance, conceptual accuracy, language, and suitability for high school students. Media validation examined visual design, readability, navigation, usability, and presentation quality. Expert recommendations were used to revise the module before student implementation. The revisions included simplifying instructional language, incorporating more relevant academic situations, strengthening reflection activities, improving visual consistency, and refining navigation features.

During the implementation stage, the revised module was introduced to the 90 selected students. Participants accessed the web-based module through their smartphones over [number] sessions across [number] weeks, with guidance from the researchers and support from school counselors. Pretest assessments were administered before module implementation, followed by posttest assessments after the intervention.

Finally, the evaluation stage involved examining expert validation results, student responses, and preliminary changes in academic stress, resilience, and self-efficacy. These evaluations were used to assess the feasibility and acceptability of the developed module and to provide initial evidence for further investigation.

Research Instruments
Data were collected using academic stress, resilience, and academic self-efficacy questionnaires, expert validation instruments, and a student response questionnaire.

Academic stress, resilience, and academic self-efficacy were measured using separate instruments consisting of 20 items each. Academic stress was operationally defined as students' self-reported physical, emotional, cognitive, and behavioral reactions to academic demands; resilience as students' self-reported capacity to adapt to and recover from academic adversity; and academic self-efficacy as students' beliefs in their capability to organize and execute actions required to complete academic tasks (Bandura, 1977; Masten, 2014; Zimmerman, 2000). The instruments were [developed by the authors/adapted from (source)], and each item was rated on a [five]-point Likert-type scale, yielding a possible total score range of [20–100]. Item validity was examined using corrected item–total correlations, which ranged from [value] to [value]. The reported internal consistency coefficients, assessed using Cronbach's alpha, were $\alpha = .908$ for academic stress, $\alpha = .861$ for resilience, and $\alpha = .867$ for academic self-efficacy. These coefficients indicated satisfactory to high internal consistency for the three instruments.

Expert validation was conducted using assessment instruments covering material and digital media feasibility. The instruments employed a four-point rating scale, ranging from 1 (not feasible) to 4 (highly feasible). For each validator, the feasibility percentage was calculated as the obtained score divided by the maximum possible score and multiplied by 100, and the mean of the two validators in each aspect was used as the final score. Scores were interpreted using five categories: 81.00%–100% (highly feasible), 61.00%–80.99% (feasible), 41.00%–60.99% (moderately feasible), 21.00%–40.99% (less feasible), and 0%–20.99% (not feasible). Because each aspect was rated by only two validators, agreement was described using the absolute difference between the two validators' percentages and whether both validators independently assigned the same category.

Student responses were assessed using a 25-item questionnaire covering five dimensions: module appearance, ease of use, material clarity, learning activities, and perceived usefulness. Each dimension consisted of five items. Responses were recorded using a four-point Likert-type scale ranging from strongly disagree to strongly agree. The results were converted into percentages using the same formula and interpreted using the same five-band criteria (81.00%–100% = very good; 61.00%–80.99% = good; 41.00%–60.99% = fair; 21.00%–40.99% = poor; 0%–20.99% = very poor). The needs assessment was scored and categorized in the same manner (81.00%–100% = very high; 61.00%–80.99% = high).

Data Analysis
Data were analyzed using JASP statistical software. Descriptive statistics were employed to summarize academic stress screening results, needs assessment findings, expert validation scores, student responses, and pretest and posttest measurements.

Descriptive analyses included frequencies, percentages, means, standard deviations, medians, and observed score ranges. Expert validation and student response scores were converted into percentages and interpreted using the evaluation categories described above.

Normality testing was conducted using the Shapiro–Wilk test. The Wilcoxon signed-rank test was used to compare paired pretest and posttest scores for academic stress, resilience, and self-efficacy. Statistical significance was determined at a threshold of $p < .05$. Three effect sizes were reported for each paired comparison: $r = z/\sqrt{N}$, the matched-pairs rank-biserial correlation, which represents the proportion of favorable minus unfavorable rank evidence (Kerby, 2014), and Cohen's d_{av}, calculated as the mean difference divided by the average of the pretest and posttest standard deviations (Lakens, 2013). To judge practical importance, mean changes were compared with a half-standard-deviation criterion for a minimally important difference (Norman et al., 2003). A sensitivity power analysis conducted in G*Power 3 (Faul et al., 2007) indicated that, with $n = 90$, a two-tailed α of .05, and power of .80, the Wilcoxon signed-rank test could detect within-group effects as small as $d_z = 0.31$, whereas only 35 participants would be required to detect a medium effect ($d_z = 0.50$). Given the one-group pretest–posttest design, statistically significant differences were interpreted as within-group changes and not as conclusive evidence of a causal intervention effect.

Result and Discussion

Needs Analysis
The needs analysis was conducted to identify students' academic stress levels and determine their needs regarding stress management, resilience, self-efficacy, and digital psychoeducational support. Initial screening

was administered to 570 students from three public senior high schools in Pandeglang Regency, Indonesia. The distribution of academic stress levels is presented in Table 1.

Table 1. Distribution of Students' Academic Stress Levels (n = 570)

Academic Stress Level	Frequency (n)	Percentage (%)
Low	12	2.1
Moderate	545	95.6
High	13	2.3
Total	**570**	**100.0**

The screening results indicated that most students (95.6%) were classified as experiencing moderate academic stress, while 2.3% were classified as experiencing high academic stress. Only 2.1% of the students were classified in the low academic stress category. The concentration of students in the moderate category reflects the width of the middle category rather than an absence of variability; continuous scores were therefore used for all subsequent analyses, and the selected participants showed meaningful variation in pretest academic stress scores (SD = 6.06). Based on these findings, 90 students with moderate to high academic stress levels were selected through purposive sampling for the module implementation and preliminary evaluation.

A further needs assessment was conducted to identify students' requirements for psychological support and digital learning resources. The assessment covered four aspects: academic stress management, resilience strengthening, self-efficacy enhancement, and digital psychoeducational media. Each aspect was rated on a four-point scale, and the percentages were interpreted using the criteria described in the Methods. The results are presented in Table 2.

Table 2. Students' Needs Assessment Results

Needs Assessment Aspect	Percentage (%)	Category
Academic stress management	78.0	High
Resilience strengthening	78.1	High
Self-efficacy enhancement	77.0	High
Digital psychoeducational media	77.3	High

All four aspects were classified in the high-need category, with percentages ranging from 77.0% to 78.1%. The difference between the highest and lowest aspects was only 1.1 percentage points; therefore, these results were not interpreted as indicating that any one need was more important than another. Instead, the consistently high percentages across stress management, resilience, self-efficacy, and digital media indicated that students perceived these needs as interrelated. These findings supported giving equal emphasis to resilience and self-efficacy and integrating both with academic stress management strategies within one module.

Development of the Digital Psychoeducational Module

Based on the needs analysis, a web-based digital psychoeducational module was developed using the ADDIE framework. The module was designed to provide structured psychoeducational materials and practical activities that support students in understanding academic stress and strengthening psychological resources relevant to academic adjustment.

The developed module comprises nine sequential learning units covering understanding academic stress, recognizing academic pressure, developing emotional regulation skills, applying adaptive coping strategies, fostering optimism, recovering from academic failure, strengthening academic confidence, improving learning management strategies, and formulating personal action plans.

Each unit incorporates psychoeducational content and learning activities intended to encourage students to reflect on their experiences and apply relevant strategies to academic challenges. The module was developed in a web-based format to facilitate access through students' digital devices.

The digital module is accessible at https://modulpsikoedukatif.com/. Its interface and main features are illustrated in Figure 2.



Figure 2. Interface of the Digital Psychoeducational Module

The initial module underwent expert validation before implementation. Revisions were subsequently made to improve content relevance, readability, visual presentation, and navigation. These modifications included incorporating academic situations familiar to high school students, simplifying instructional language, strengthening reflective activities, reducing excessive text, standardizing visual elements, and improving navigation features.

Expert Validation of the Digital Psychoeducational Module

Expert validation was conducted to evaluate the feasibility of the developed module before student implementation. Four validators participated in the evaluation, consisting of two material experts and two media experts.

Material validation assessed the relevance and accuracy of psychoeducational content, the integration of academic stress, resilience, and self-efficacy concepts, and the suitability of learning activities for high school students. Media validation examined visual presentation, readability, layout consistency, navigation, and usability.

The validation results are presented in Table 3.

Table 3. Expert Validation Results of the Digital Psychoeducational Module

Validation Aspect	Validator 1 (%)	Validator 2 (%)	Mean (%)	Category
Material validation	85.4	87.5	86.5	Highly feasible
Media validation	84.4	87.5	86.0	Highly feasible

The material validation obtained a mean feasibility score of 86.5%, while the media validation reached 86.0%. Both aspects were classified as highly feasible according to the evaluation criteria applied in the study. Agreement between validators was high: the two material experts differed by 2.1 percentage points and the two media experts by 3.1 percentage points, and every validator independently rated the module in the highly feasible category.

Although the module obtained high feasibility ratings, the experts recommended several improvements. Material experts suggested incorporating more contextually relevant examples, simplifying the language, and strengthening reflection activities. Media experts recommended improving visual consistency, reducing text density, and refining navigation features.

These recommendations were incorporated into the revised module before implementation with the selected students.

Student Response Evaluation

Following module implementation, student responses were collected to assess the acceptability of the developed digital psychoeducational module. The evaluation covered five dimensions: module appearance, ease of use, material clarity, learning activities, and perceived usefulness.

The student response questionnaire consisted of 25 items, with five items representing each evaluation dimension. The response scores were converted into percentages and interpreted according to the five-band criteria described in the Methods.

Table 4. Student Responses Toward the Digital Psychoeducational Module

Evaluation Aspect	Percentage (%)	Category
Module appearance	86.9	Very good
Ease of use	88.5	Very good
Material clarity	87.8	Very good
Learning activities	89.1	Very good
Perceived usefulness	90.2	Very good
Overall response	**88.5**	**Very good**

The overall student response reached 88.5%, indicating a very good level of acceptance of the developed module. Perceived usefulness received the highest rating (90.2%), followed by learning activities (89.1%), ease of use (88.5%), material clarity (87.8%), and module appearance (86.9%).

These results indicate that participating students generally reported favorable perceptions of the module's content, presentation, learning activities, and usability. The findings provide initial support for the module's acceptability as a supplementary psychoeducational resource within school guidance and counseling services.

Pretest and Posttest Evaluation

Pretest and posttest assessments were conducted with the same 90 participants to examine changes in academic stress, resilience, and self-efficacy following module implementation. Descriptive analysis indicated that the mean academic stress score decreased from 64.89 (SD = 6.06) at pretest to 53.23 (SD = 6.26) at posttest, representing a mean reduction of 11.66 points. In contrast, the mean resilience score increased from 41.89 (SD = 4.74) to 53.79 (SD = 5.18), representing an increase of 11.90 points. Similarly, the mean self-efficacy score increased from 42.60 (SD = 5.00) to 54.12 (SD = 5.37), representing an increase of 11.52 points. Median scores showed corresponding changes. Academic stress decreased from 64.00 to 52.00, while resilience increased from 41.50 to 54.00 and self-efficacy increased from 42.00 to 54.00. The reported Shapiro–Wilk normality assessments indicated deviations from normality ($p < .05$). Paired comparisons were therefore conducted using the Wilcoxon signed-rank test. The results are presented in Table 5. All three comparisons showed large within-group effect sizes ($r = .87$; $d_{av} = 1.89$ for academic stress, 2.40 for resilience, and 2.22 for self-efficacy). The matched-pairs rank-biserial correlation was 1.00 for all three outcomes, indicating that every participant changed in the expected direction. Each mean change also exceeded the half-standard-deviation criterion for a minimally important difference (approximately 2.4–3.0 points) by a wide margin.

Table 5. Wilcoxon Signed-Rank Test Results for Pretest and Posttest Scores (n = 90)

Variable	Pretest Mean ± SD	Posttest Mean ± SD	W	z	p
Academic stress	64.89 ± 6.06	53.23 ± 6.26	4095	8.239	< .001
Resilience	41.89 ± 4.74	53.79 ± 5.18	0	8.239	< .001
Self-efficacy	42.60 ± 5.00	54.12 ± 5.37	0	8.239	< .001

Note. W denotes the reported Wilcoxon test statistic, z denotes the standardized test statistic reported as an absolute value (the direction of change is indicated by the means), and SD denotes standard deviation. Effect sizes: r = .87 and matched-pairs rank-biserial correlation = 1.00 for all variables; d_{av} = 1.89 (academic stress), 2.40 (resilience), and 2.22 (self-efficacy).

The Wilcoxon signed-rank tests indicated statistically significant differences between pretest and posttest measurements for academic stress, resilience, and self-efficacy (all $p < .001$). The observed changes were consistent with the intended directions of the psychoeducational program, showing reduced academic stress scores alongside increased resilience and self-efficacy scores following module implementation. Nevertheless, these findings represent within-group changes observed during the study. The uniformity of the changes across all participants should be interpreted cautiously because it may partly reflect shared non-specific influences, such as expectancy and measurement reactivity. Because the evaluation employed a one-group pretest–posttest design without a control group, the observed differences cannot be attributed exclusively to the digital psychoeducational module. Further controlled evaluation is required to determine the intervention's causal effectiveness.

The present study developed and conducted a preliminary evaluation of an ADDIE-based digital psychoeducational module integrating resilience and self-efficacy for academic stress management among high school students. The findings demonstrated that the developed module achieved high feasibility ratings from material and media experts and received favorable responses from participating students. Furthermore, significant within-group changes were observed in academic stress, resilience, and self-efficacy following module implementation. These findings provide proof-of-concept support for the feasibility and acceptability of the

developed product, but not evidence of its effectiveness. However, the interpretation of the observed psychological changes requires consideration of the study's methodological design and the broader evidence concerning school-based interventions.

The needs analysis revealed that most students involved in the initial screening experienced moderate academic stress, indicating that academic demands represented a relevant psychological concern within the participating schools. Of the 570 students screened, 95.6% were classified as having moderate academic stress, while 2.3% were classified as having high academic stress. Although these findings reflect the characteristics of the screened population rather than the wider adolescent population, they provide a contextual basis for developing preventive and developmental psychological support. Academic stress among secondary school students has been associated with examination pressure, achievement expectations, and challenges in managing academic responsibilities. Recent systematic reviews have emphasized that interventions addressing academic stress should consider both individual psychological resources and the educational environments in which academic demands occur (González-Afonso et al., 2026; Jagiello et al., 2025). This pattern is consistent with evidence that academic pressure is associated with internalizing problems among adolescents across countries (Steare et al., 2023).

The needs assessment further demonstrated relatively high perceived needs for academic stress management, resilience strengthening, self-efficacy enhancement, and digital psychoeducational resources. These findings supported the selection of an integrated psychoeducational approach rather than an intervention focusing exclusively on stress reduction. Contemporary school-based psychological interventions increasingly recognize the importance of addressing multiple dimensions of student adjustment, including emotional regulation, coping abilities, and the development of adaptive psychological resources. Nevertheless, evidence from school-based interventions remains heterogeneous, and favorable outcomes depend on intervention characteristics, target populations, implementation quality, and the psychological constructs being assessed (Juhász et al., 2024; Lekamge et al., 2025). Because the four needs differed by no more than 1.1 percentage points, the module did not prioritize one psychological resource over another; instead, the near-identical ratings were interpreted as evidence that students experienced these needs as interconnected.

The development process adopted the ADDIE framework to ensure that the module was constructed systematically based on identified student needs, instructional objectives, expert evaluations, and implementation feedback. The resulting module consisted of nine learning units addressing academic stress awareness, emotional regulation, adaptive coping, optimism, recovery from academic failure, academic confidence, learning management, and personal action planning. These components were intended to combine psychological understanding with reflective and practical learning experiences. The systematic organization of learning materials and evaluation procedures is consistent with the principles of instructional development, in which alignment between learner characteristics, instructional activities, and intended outcomes is essential for producing suitable educational resources (Spatioti et al., 2022). Compared with an earlier Indonesian ADDIE-based guidance and counseling module for academic stress, which was evaluated through expert testing and counselor focus groups without student outcome data (Barseli et al., 2020), the present study extended the evaluation to student acceptability and preliminary psychological outcomes.

The results of expert validation demonstrated that the module achieved feasibility scores of 86.5% for material content and 86.0% for digital media. These findings indicate that the validators positively evaluated the module's conceptual relevance, instructional content, readability, presentation, and usability according to the assessment criteria employed in this study. Importantly, expert validation also identified aspects requiring improvement, including the relevance of academic examples, clarity of instructional language, reflective activities, visual consistency, and navigation. Incorporating these recommendations before student implementation represented an important component of the development process. Nevertheless, favorable expert ratings should be interpreted as evidence of product feasibility rather than proof of psychological effectiveness, since content appropriateness and intervention outcomes represent different dimensions of evaluation.

Student responses provided further information regarding the acceptability of the developed module. The overall response score reached 88.5%, with perceived usefulness receiving the highest percentage (90.2%), followed by learning activities (89.1%). These findings suggest that participating students perceived the module as relevant and that its instructional activities were generally well received. Perceived usefulness is particularly relevant to digital psychological interventions because students' willingness to engage with such resources may be influenced by the extent to which they consider the content meaningful and applicable to their needs. A systematic review of engagement with web-based mental health interventions identified perceived usefulness as an important facilitator of engagement, while insufficient perceived need, privacy concerns, and doubts regarding effectiveness may represent barriers to sustained use (Ho et al., 2025).

The favorable student responses are also relevant to the increasing use of digital technology for adolescent psychological support. Digital interventions may provide flexible access to psychoeducational materials and facilitate learning activities outside conventional face-to-face counseling sessions. However, technological accessibility alone does not guarantee meaningful engagement or beneficial psychological outcomes. An overview of 51 systematic reviews reported that digital mental health interventions for children and young people may improve accessibility and acceptability, but evidence regarding longer-term outcomes remains mixed. The review also identified practitioner readiness and ethical considerations as important implementation issues (Liverpool et al., 2025). Controlled trials of digital programs for adolescents also show that favorable acceptability does not guarantee large effects: computerised cognitive behavioural therapy achieved outcomes comparable to usual care (Merry et al., 2012), and a web-based acceptance and commitment program produced small between-group effects on stress (Puolakanaho et al., 2019). Therefore, the positive responses observed in the present study provide preliminary evidence of acceptability but should not be interpreted as demonstrating sustained engagement, behavioral change, or long-term intervention effectiveness.

Beyond product feasibility and acceptability, the preliminary evaluation showed a decrease in mean academic stress scores from 64.89 to 53.23 following module implementation. The reported Wilcoxon signed-rank test indicated a statistically significant within-group difference ($p < .001$). This pattern is consistent with the intended direction of the intervention, which incorporated stress awareness, emotional regulation, adaptive coping, and learning management strategies. Previous research has demonstrated that structured school-based psychological interventions may improve stress-related outcomes, particularly when they incorporate cognitive and behavioral components. Nevertheless, meta-analytic evidence indicates that average intervention effects on stress outcomes are generally modest and vary across program types and implementation conditions (Jagiello et al., 2025; Juhász et al., 2024). The magnitude of the present within-group change ($d_{av} = 1.89$) is many times larger than the between-group effects typically observed in controlled school-based trials, such as g = 0.20–0.23 for anxiety and depression prevention programs (Werner-Seidler et al., 2017) and d = 0.22 for a web-based stress program (Puolakanaho et al., 2019). This discrepancy indicates that a substantial portion of the observed change is likely attributable to factors other than the module itself, and it underscores why within-group effect sizes from uncontrolled designs should not be compared directly with controlled effect sizes.

A recent systematic review of interventions addressing academic stress in secondary education further demonstrated that multiple approaches, including cognitive-behavioral, socio-emotional, mindfulness-based, and stress-management interventions, have been associated with favorable psychological or educational outcomes. However, direct evidence concerning academic stress remains limited and heterogeneous, and findings concerning related psychological outcomes cannot automatically be treated as evidence of reduced academic stress (González-Afonso et al., 2026). This distinction is particularly relevant to the present study because academic stress, resilience, and self-efficacy were assessed as separate psychological constructs. Although all three outcomes changed in the expected directions, the findings do not establish that improvements in resilience or self-efficacy caused the observed reduction in academic stress.

Several alternative explanations for the observed changes must therefore be considered explicitly. The first is regression to the mean, which occurs when participants selected for extreme scores obtain less extreme scores on remeasurement (Barnett et al., 2005). This explanation is plausible for academic stress because participants were selected on this variable. However, its influence is likely limited because 97.9% of the screened students met the selection criterion, so the selected sample was close to the screened population rather than at its extreme, and because the stress scale showed high reliability ($\alpha = .908$). Moreover, regression to the mean cannot readily explain the increases in resilience and self-efficacy, which were not used as selection criteria. The second is maturation and natural fluctuation across the academic calendar. Adolescent mental health varies with the timing of examinations within the school year (Steare et al., 2023), so a posttest administered during a less demanding period could produce lower stress scores independently of the intervention. Developmental maturation is unlikely to account for changes of this size within a single implementation period, but calendar-related fluctuation cannot be excluded. A third explanation involves testing effects, expectancy, and social desirability, because the same self-report instruments were administered twice in the presence of researchers and counselors. The finding that every participant changed in the expected direction is consistent with such non-specific influences. Accordingly, the present data establish that the module was associated with favorable changes, but they cannot separate its specific contribution from these competing explanations.

The resilience findings indicated an increase in mean scores from 41.89 at pretest to 53.79 at posttest, with a statistically significant within-group difference ($p < .001$). This finding is consistent with the module's emphasis on adaptive coping, optimism, reflection, and constructive responses to academic failure. Resilience is generally conceptualized as a dynamic adaptive process rather than a fixed individual characteristic, suggesting that supportive experiences and structured activities may contribute to its development. A systematic review and

meta-analysis of school-based resilience interventions reported favorable effects among adolescents, particularly in at-risk populations and programs incorporating multiple intervention components. However, evidence regarding the maintenance of these improvements over extended follow-up periods remained limited (Llistosella et al., 2023). An earlier meta-analysis of 57 randomized trials similarly found that universal resilience-focused interventions were most promising when they used a cognitive behavioural approach and that effects were largely short term (Dray et al., 2017a), while a pragmatic cluster-randomized trial in secondary schools reported no effect on adolescent mental health problems (Dray et al., 2017b). These mixed findings are consistent with a multisystemic view of resilience, in which individual skills interact with family, school, and community resources (Ungar & Theron, 2020). A module that focuses on individual skills may therefore strengthen self-reported resilience without altering the contextual resources on which sustained adaptation depends.

More recent evidence has strengthened the empirical foundation for resilience-oriented interventions while emphasizing variation in intervention outcomes. A meta-analysis of randomized controlled trials reported that school-based interventions had positive effects on resilience among children and adolescents, although substantial heterogeneity remained across the included studies (Cai et al., 2025). Another systematic review and meta-analysis identified favorable effects of resilience-based, mindfulness-based, and sport-based interventions on stress coping abilities, while noting that the certainty of evidence varied across intervention approaches (Mei et al., 2025). These findings support the relevance of resilience as an intervention target but do not establish which specific activities within the present module contributed most strongly to the observed changes.

The self-efficacy findings also demonstrated an increase in mean scores, from 42.60 at pretest to 54.12 at posttest, with a statistically significant within-group difference ($p < .001$). Academic self-efficacy is theoretically relevant to stress management because students' beliefs about their capabilities may influence how they interpret academic demands, approach difficult tasks, and respond to setbacks. According to social cognitive theory, self-efficacy beliefs are shaped by sources of information such as mastery experiences, social modeling, verbal persuasion, and interpretations of physiological and emotional states (Bandura, 1977; Schunk & DiBenedetto, 2020). The module's activities involving academic confidence, reflection, and personal action planning were conceptually consistent with this framework, particularly with the view that academic self-efficacy is sensitive to changes in performance context and mediates students' academic functioning (Zimmerman, 2000). However, the present study did not directly examine the mechanisms through which self-efficacy changed, and the findings should therefore be interpreted as changes in self-reported self-efficacy rather than evidence that specific theoretical mechanisms were activated.

The simultaneous reduction in academic stress and increases in resilience and self-efficacy provide an encouraging pattern of preliminary outcomes. From a theoretical perspective, integrating psychological resources with coping-oriented educational activities may offer a broader approach than presenting information about stress alone. Nevertheless, improvements across multiple self-reported measures do not establish the existence of causal relationships among those constructs. Evidence from recent reviews also suggests that psychoeducational and school-based mental health interventions do not necessarily produce comparable improvements across different psychological outcomes. For example, a systematic review of universal educational interventions among adolescents reported promising findings for mental health literacy but limited effects on depression and anxiety outcomes, emphasizing the importance of incorporating practical psychological skills and evaluating longer-term changes (Yani et al., 2025). This reinforces the need to evaluate each outcome of the present module separately.

From a theoretical perspective, the present framework differs from existing resilience-building interventions in how it positions the two resources. Many school-based resilience programs are derived from cognitive behavioural depression-prevention protocols and treat self-efficacy as one of several protective factors (Dray et al., 2017a; Llistosella et al., 2023). The present module instead assigns self-efficacy and resilience complementary roles within the stress process: self-efficacy activities target the appraisal of academic demands before and during challenging tasks, whereas resilience activities target recovery after setbacks. This framework generates testable predictions that the current design could not examine, namely that changes in academic self-efficacy should precede and partly mediate reductions in academic stress, and that resilience should moderate the impact of academic failures on subsequent stress. Testing these mechanisms in controlled longitudinal designs would determine whether the integrated framework offers a theoretical advance beyond existing single-resource interventions.

The findings also have implications for the implementation of digital psychoeducation in school guidance and counseling services. A web-based module may function as a supplementary resource that allows students to review psychoeducational content and engage in structured reflection while receiving guidance from school counselors. However, successful implementation requires attention to digital accessibility, student motivation, counselor involvement, privacy, and the suitability of materials for local educational conditions. Research

examining school-based psychological interventions in low- and middle-income countries has highlighted the importance of adapting preventive approaches to contextual constraints and the needs of the target population (Dieu Yin et al., 2025). Furthermore, evidence from whole-school interventions indicates that implementation quality and responsiveness to adolescents' developmental needs are important considerations when translating psychological programs into educational practice (Lekamge et al., 2025). In Indonesia, school-based psychoeducation studies have also relied on small samples and short implementation periods (Muhibbuddin & Muslikah, 2026), indicating that larger, well-controlled local evaluations are needed.

The principal contribution of the present study lies in the development and preliminary evaluation of a context-specific digital psychoeducational product that explicitly integrates academic stress management, resilience, and self-efficacy within an ADDIE-based instructional framework. Rather than examining these psychological dimensions independently, the module organizes them into a structured sequence of psychoeducational materials, reflective exercises, and practical activities intended for high school students. The combination of needs analysis, expert validation, product revision, student responses, and preliminary psychological outcome assessment provides a foundation for further refinement and controlled evaluation. This contribution should be understood primarily as a product development and proof-of-concept contribution, accompanied by exploratory evidence of within-group psychological changes.

Several limitations should be acknowledged. First, the one-group pretest–posttest design did not include a control or comparison group, making it impossible to determine whether the observed changes resulted specifically from module use. Alternative explanations, including testing effects, regression to the mean, maturation, and other experiences occurring during the intervention period, cannot be excluded. Second, purposive sampling and the selection of participants with moderate to high academic stress may limit the generalizability of the findings and increase susceptibility to regression-to-the-mean effects. Third, the psychological outcomes were measured using self-report questionnaires, which may be affected by response tendencies and participants' expectations. Fourth, the available evaluation did not establish whether the observed changes were maintained over time. Fifth, positive usability and perceived usefulness ratings do not provide direct information about actual engagement duration, module completion, or sustained use. Finally, each validation aspect was rated by only two experts, which did not allow formal inter-rater reliability coefficients to be estimated, and the sample size was determined by the school context rather than by an a priori power analysis.

Future research should employ randomized controlled or carefully designed quasi-experimental studies to investigate the effectiveness of the digital psychoeducational module relative to appropriate comparison conditions. Where a no-treatment control group is not acceptable to schools, staggered implementation across schools, delayed-treatment comparison groups, or multiple baseline measurements before implementation would help to rule out regression to the mean, maturation, and calendar effects. Follow-up assessments would help determine whether changes in academic stress, resilience, and self-efficacy are sustained. Further investigations should also examine intervention fidelity, student engagement, module completion, and the contribution of individual psychoeducational components to psychological outcomes. Reporting validated measurement procedures, effect sizes, and transparent statistical analyses would strengthen the interpretability and reproducibility of subsequent findings. These recommendations are consistent with recent reviews emphasizing the need for more rigorous intervention designs, reliable outcome measurements, and longer-term evaluation in adolescent psychological interventions (González-Afonso et al., 2026; Jagiello et al., 2025; Liverpool et al., 2025).

Overall, the findings suggest that the developed digital psychoeducational module is feasible and well received within the participating school settings, which justifies its further evaluation. The observed within-group reductions in academic stress and increases in resilience and self-efficacy provide a preliminary basis for further investigation. By integrating psychological theory, systematic instructional development, and student-centered evaluation, the study contributes to the development of digital psychoeducational resources for school guidance and counseling. However, additional controlled research is necessary before conclusions can be drawn regarding the module's causal effectiveness or its applicability across broader educational contexts.

Conclusions

This study developed and conducted a preliminary evaluation of an ADDIE-based digital psychoeducational module integrating resilience and self-efficacy for academic stress management among high school students. The development process incorporated needs analysis, systematic instructional design, expert validation, product revision, and student evaluation. Both expert ratings and student ratings fell within the highest interpretive categories, indicating that the module can be delivered in school settings and is acceptable to

students. The preliminary evaluation revealed large within-group changes in the expected directions, characterized by decreased academic stress and increased resilience and self-efficacy. Theoretically, these findings provide initial support for the view that academic stress can be addressed by strengthening two complementary resources: self-efficacy, which shapes how students appraise academic demands, and resilience, which shapes how they recover from setbacks. The study contributes to digital psychoeducational development by integrating these constructs within a systematic instructional design process grounded in context-specific student needs. Nevertheless, the absence of a control group prevents causal conclusions regarding the module's effectiveness, and the findings should be regarded as a proof of concept requiring validation rather than as evidence of an established intervention. Future research should employ controlled experimental designs, test whether changes in self-efficacy and resilience mediate reductions in academic stress, include longitudinal follow-up assessments, and use broader participant samples to examine intervention effectiveness, the sustainability of psychological outcomes, and applicability across different educational settings.

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