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RESEARCH ARTICLE

Development of an AI-Based System to Enhance School Counseling Models for Asian Elementary Students With Emotional Disorders

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ABSTRACT In Asia, the availability of school counselors is significantly lower than global standards recommend, particularly in elementary education settings. This shortage is exacerbated by rising mental health concerns among young students, particularly those with emotional disorders. Considering the critical gap in the provision of mental health services in Asia, this paper studies a digital intervention approach with an AI-driven supportive system developed by adopting OpenAI to enhance the effectiveness of counseling in elementary education. Twenty-two students with ADHD, autism spectrum disorder, and emotional disorders undergoing counseling at a primary school in Taiwan were recruited as participants for a three-month experiment, with the five Social-Emotional competencies as dependent variables. The treatment group utilized the proposed system with a digital journaling platform to help students reflect on their emotions, thoughts, and actions after counseling sessions, fostering an ongoing dialogue with their counselors through the system. Conversely, the control group received standard counseling without integrating the use of the proposed platform. The results of a two-factor mixed design ANOVA revealed that students who did not use the supportive system showed significant improvement in self-awareness. In contrast, students who went through the new model demonstrated significant changes in all competencies. These findings highlight the value of the proposed intervention approach for students with emotional disorders and suggest broader applications for AI technologies in school counseling, offering valuable insights for educators and policymakers.

INDEX TERMS Cognitive behavioral therapy (CBT), artificial intelligence, school counseling, social-emotional learning (SEL), OpenAI.

I. INTRODUCTION

School counseling is important in nurturing students' psychological and academic development. Especially for students with emotional disorders, school counselors provide targeted interventions that help them navigate their educational experiences more successfully. Emotional disorders, which include conditions like anxiety and depression, can significantly hinder a student's ability to perform academically. School counselors play a pivotal role in helping these students cope with their conditions by offering counseling and therapeutic strategies.

In addition to direct intervention, school counselors implement preventive programs such as Social and Emotional Learning (SEL) to enhance their self-awareness, self-management, social awareness, communication skills, and responsive decision-making competencies. Past research has indicated that enhancing students' abilities in SEL can help them regulate their emotions and achieve better academic performance [1], [2], [3], [4]. Additionally,

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SEL interventions have shown promise in addressing the unique challenges faced by students with special needs, including those with autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD), and emotional disorders [5], [6]. Numerous studies have shown that effective SEL education enables these students to manage their emotions better, establish positive relationships, and enhance their engagement and academic achievements [7], [8], [9], [10].

The practice of school counseling in East Asia presents unique challenges that differ from those in the United States. Many students with potential emotional or behavioral disorders remain undiagnosed, leading to worsen symptoms and more significant educational and social challenges. Additionally, the need for more school counselors places an increased burden on existing school counseling models, which must address a wide range of student needs with limited resources. According to a survey by the American School Counselor Association (ASCA), the student-to-school-counselor ratios in the United States stand at 408:1, meaning there is only one counselor available for every 408 students, which exceeds the recommended standard of 250:1. In Taiwan, the data indicates a ratio of 1200:1, clearly illustrating the issue of insufficient human resources. This situation stresses the need for more substantial educational policies and increased investment in school psychology to build a more supportive educational environment [11], [12], [13], [14].

According to the current literature, the application of technology in school counseling primarily focuses on automated emotion recognition, behavior prediction, and personalized support strategies [15], [16]. However, specific studies on AI support for elementary students with emotional disorders in Asia are relatively limited. Most research focuses on the preliminary applications of AI, such as chatbots and learning analytics tools, which can provide real-time feedback and counseling suggestions when processing large amounts of data [17], [18]. In Asia, the development of AI applications in assisting elementary school counseling has been challenging due to the concerns of data privacy protection, cultural sensitivity issues, and low technology acceptance [19], [20]. However, following the pandemic, as national budgets for primary education in digital devices and software have increased and issues of children's mental health on campuses have gained more attention, the AI applications have expanded beyond fundamental data analysis and learning assistance to more complex assessments and behavioral interventions. It provides data support for school counselors when dealing with students' emotional issues and makes the counseling process more efficient and precise.

This study proposes an asynchronous counseling mechanism that introduces a digital intervention strategy on top of the traditional school counseling model and develops a management platform with AI-based functions for schoolteachers and school counselors as a supportive system to improve the counseling effectiveness for children with emotional disorders. As a self-regulation learning tool, the proposed digital intervention strategy was adopted to extend the effectiveness of traditional school counseling. We utilize an online journaling platform developed from our previous study to provide an additional resource during fixed weekly counseling sessions to enhance students' metacognition and emotional regulation abilities. This digital journaling platform was developed based on cognitive-behavioral therapy (CBT) processes and incorporating text input with GAN algorithm techniques to generate comics to guide students in completing an emotional journal entry. In this study, we developed a web-based application for school counselors to collect and analyze students' journal entries, using OpenAI's large language models and its APIs to provide supportive comments for school counselors to provide immediate and personalized feedback suggestions.

In addition, due to the unique cultural context in Asia, many people hold stigmatized or incorrect attitudes towards mental health, which affects their willingness to seek counseling resources. This phenomenon not only affects adults but also impacts children in schools, especially in family-oriented and collectivist Asian societies. Therefore, school counselors in Asia need more engaging, interactive, and private digital tools to enhance students' willingness to seek counseling resources. At the same time, digital tools can be combined with AI to improve counseling effectiveness. Based on the above concepts, this study will empirically investigate the effectiveness of an AI-based digital journaling platform in enhancing counseling efficiency. We expect that the experimental group using the digital journaling platform will show better performance on social-emotional learning indicators.

The rest of this paper is composed of the following chapters. In Chapter Two, we will explore the current development trends of digital counseling tools and technology, including case studies on the application of AI in the mental health field and its specific impacts on counseling practices. Chapter Three will focus on the proposed methodology, describing the specific design of the model adopted in this study, including the digital intervention strategy combined with the online journaling platform, the structure of the AI management platform, and how to test the effectiveness of this model through experimental design. Chapter Four will present the experimental results; Chapter Five will discuss the research findings. In the final chapter, we will summarize the core findings of the entire study and provide prospects for the digital transformation of school counseling services in the future.

II. LITERATURE REVIEW

A. ENHANCING THE EFFECTIVENESS OF SCHOOL COUNSELING AND SOCIAL-EMOTIONAL LEARNING THROUGH AI TECHNOLOGY

School counseling is a multifaceted professional field that supports students' academic achievement, career

development, and socio-emotional needs [13]. School counselors play various roles, including educators, mental health counselors, crisis interveners, and liaisons between students. Generally, the responsibilities of school counselors include the following: (1) Academic Support: For students experiencing academic underachievement, school counselors assist in setting and achieving academic goals, provide guidance on learning strategies and time management, and help students address learning obstacles or other issues that may affect academic performance [15]. (2) Career Guidance: Counselors start assisting students in understanding different career paths from the early stages of their academic journey, conducting career exploration through psychological assessments, and guiding them in planning their future education and career pathways [16], [17]. (3) Emotional and Social Support: Counselors provide emotional support, help students develop coping skills, manage relationships, and cope with stress and challenges in life. It includes assisting with family issues, peer relationships, self-esteem, self-identity, and other personal concerns [18], [19], [20], [21]. (4) Crisis Intervention: During emergencies such as bullying, suicide risk, or other crisis events at school, counselors intervene to provide immediate support, help manage crises, and offer necessary referral services [22], [23]. (5) Family and Community Connections: School counselors also collaborate with students' families to ensure parents understand their children's educational needs and emotional states and connect with community resources to support students' overall development [24], [25]. (6) Prevention and Development Programs: Counselors implement various prevention programs aimed at promoting healthy behaviors and positive development among students, such as anti-bullying initiatives, social skills training, and career planning [2], [26], [27].

The transformative power of Social-Emotional Learning (SEL) in today's educational ecosystem is increasingly recognized as a fundamental element for student success. Past research has indicated that enhancing students' abilities in SEL can help them regulate their emotions and achieve better academic performance [1], [2], [3], [4]. A pertinent example is the study by Wong, et al. [28], where the result of an SEL intervention with 27 primary school students in Hong Kong showed significant improvements in anxiety and enhanced self-identity in the treatment group. Transitioning from emotional to academic benefits, Durlak, et al. [2] found an 11% gain in academic achievement among SEL program participants compared to their non-participating peers.

SEL not only offers academic support but also positively affects the long-term development of students, with these benefits becoming increasingly evident over time. For example, the study by Taylor, et al. [4] shows statistically significant associations between kindergarten SEL skills and critical adult success metrics, including mental health, education, employment, criminal activity, and substance use. Columbia University researchers highlight a remarkable return on investment [1], where they found that every dollar invested in SEL programming returns an average of $11 in economic benefits. Furthermore, the adaptability and effectiveness of SEL programs across different cultural contexts have been explored, with a meta-analysis in Korea revealing that program adhering to specific quality and implementation criteria (Sequenced, Active, Focused, and Explicit - SAFE) showed larger effect sizes. This study also pointed out the importance of considering cultural adaptability and the need for further research to understand SEL's effectiveness across diverse educational settings. Interestingly, SEL programs implemented in Korea have shown positive effects in improving both academic attitudes and social-emotional competences, indicating the universal applicability of SEL interventions [3]. This finding underscores not just the social and emotional gains but also the substantial fiscal advantages of implementing SEL initiatives.

Additionally, SEL interventions have shown promise in addressing the unique challenges faced by students with special needs, including those with autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD), and emotional disorders [5], [6]. Numerous studies have shown that effective SEL education enables these students to better manage their emotions, establish positive relationships, and enhance their engagement and academic achievements [7], [8], [9], [10]. These findings collectively suggest that SEL is not just beneficial but essential for students with autism, ADHD, and emotional disorders. Therefore, educators and policymakers should prioritize the implementation of quality SEL programs to support the holistic development of all students, particularly those with special educational needs.

Recent advancements in educational technology and artificial intelligence (AI) have provided potential solutions to the challenge of insufficient school counseling staffing. The integration of AI can assist school counselors in making data-driven decisions and providing personalized student support [29]. For instance, AI technology can identify at-risk students by analyzing their learning data, enabling counselors or teachers to more effectively allocate resources and implement targeted interventions [30]. Additionally, AI applied in self-exploration tools and career planning systems can help students explore career development pathways, providing personalized recommendations based on interests and abilities [31], [32].

Regarding emotional and social support, AI and machine learning algorithms can be utilized to develop emotion recognition systems, identifying students' emotional states and providing alerts when necessary [33], [34]. For crisis intervention, AI technology can assist in monitoring social media and other online platforms to detect potential signs of suicide risk or violence threats [35], [36], [37]. Prevention and development programs can be reinforced through digital games and learning platforms, which utilize AI to provide personalized learning experiences and promote the development of social and emotional skills [38]. The research of the study [39] introduced a comic and storytelling creation app called "Today I Tell," specifically designed for students with

autism spectrum disorder (ASD), aimed at improving their communication and social skills through comic creation. The study demonstrated how the app engages ASD users through well-designed user interfaces and interactivity, encouraging them to express their stories and emotional experiences. By participating in comic creation, ASD individuals could progress in understanding social situations and expressing emotions. Another digital comic creation tool, "It is Me," was designed by [40]. specifically for children with ASD to promote social skills training. "It is me" allows non-verbal ASD children to complete a comic introducing themselves by answering simple questions posed by the system. Feedback from teachers collected in the study suggested that the system could facilitate communication among students and help children clarify the differences between how they perceive themselves and others, thereby enhancing self-awareness and reflection.

The application of AI and educational technology products offers a potential solution. However, the implementation of these technologies comes with several limitations. For instance, AI systems have limited capabilities in dealing with the complexity of emotions and subtle nuances of interpersonal interactions due to their lack of human intuition and empathy [41]. Additionally, there may be barriers to cultural adaptability in educational technology, particularly in diverse, multicultural contexts like those found in Asia, where the technology may not accurately match the specific cultural or educational system's needs [42], [43]. Terzis and Economides [44] pointed out that while technology can enhance efficiency, its effectiveness is limited by user acceptance and usage frequency. Buchanan argued that excessive use of AI and automated educational technology products in today's accountability-driven education negatively impacts teachers' professional identity and autonomy [45].

From the perspective of enhancing rather than replacing counselors [41], an AI or educational technology product that connects school counselors with students should possess specific characteristics: enhancing counselors' decision-making abilities through data analysis, including student behavioral patterns and emotional states [46]—maintaining cultural sensitivity or neutrality [43], [47]. User-friendly interfaces and operations reduce usability barriers and enhance user experience [44]. Assisting counselors in handling administrative or repetitive tasks allows counselors to have more time for student interaction [45].

Nevertheless, these challenges do not negate the potential of technology in school counseling. The data analysis provided by AI and machine learning can predict students' learning outcomes and emotional needs, which is crucial for developing personalized counseling interventions [46]. Through such analysis, counselors can identify which students require special attention more effectively, thus achieving better service allocation with limited human resources [48]. Additionally, the efficiency of AI technology in providing routine and repetitive tasks, such as appointment management and resource distribution, also demonstrates the potential to alleviate the daily workload of counselors [49]. In certain situations, such as during periods of remote education or school closures due to pandemics, AI and educational technology's remote counseling tools have proven to be valuable resources [50], [51], [52]. In summary, despite facing challenges, if approached from an augmentation rather than replacement perspective, educational technology, and AI can still bring many innovations in school counseling models. This approach allows students to receive necessary support even when counseling staff is limited.

B. DIGITAL COMIC DIARY PLATFORMS IN ASIAN COUNSELING: APPLICATION AND INNOVATION

In Asian cultures, the acceptance and implementation of counseling and psychotherapy are profoundly influenced by unique cultural values, social structures, and communication patterns [53], [54]. For many Asian countries, the pressures of family and societal roles, the shame associated with mental health issues, and a preference for harmonious communication methods represent significant challenges in the counseling process [55], [56]. However, with the advancement of technology, various types of information tools, especially digital comic diary platforms, offer the possibility to overcome these challenges and innovate counseling models.

Digital comic diary platforms, by integrating visual arts with narrative therapy, provide users with an innovative and appealing way of self-expression. The respectful and harmonious communication methods emphasized in Asian cultures are critical in the counseling process. These platforms offer a communication channel that aligns with this cultural characteristic through their indirect method of expression [57]. By recording experiences in the form of comics, users can express their feelings and experiences in a more metaphorical and indirect manner. This communication method can help counselors better understand the users' emotional and psychological states without the discomfort or awkwardness that might arise in face-to-face interactions, thereby reducing the shame associated with discussing mental health issues directly [56], [58]. This design is particularly appealing for encouraging those who might be reluctant to seek face-to-face counseling due to cultural reasons.

Furthermore, the interactivity and accessibility of these platforms can effectively lower the threshold for seeking psychological help, especially in Asian cultures that emphasize family and societal image [53]. In Asia, the expectations of family and society can impose unbearable pressure on individuals, which is a significant concern in the counseling process [59]. Digital comic diary platforms, by providing a private and supportive environment, help users explore stresses and conflicts related to family expectations while maintaining privacy from the external society.

From a technological perspective, the use of digital comic diary platforms, especially in Asian urban areas with

higher educational backgrounds and technology penetration rates, can promote innovation in counseling models. These platforms, by offering templates, guidance, and psycho-educational resources, not only support individual self-expression and emotional management but also facilitate communication and interaction between counselors and users, thereby enhancing counseling outcomes. With the rapid development of technology in Asia, especially among the younger generation, digital comic diary platforms have become a powerful tool for mental health interventions due to their ease of access and use [60]. The popularity of these platforms has the potential to change people's attitudes and acceptance of mental health counseling.

The stigma surrounding mental health in Asian societies significantly hinders the widespread use of counseling services. These cultural barriers not only affect the behavior of those seeking counseling but also influence the acceptance of digital mental health tools among teachers and students in the education system. Enhancing privacy protection and providing more interactive tool designs can effectively increase user engagement and help overcome these cultural barriers. Our digital journaling platform, using comics and text as indirect forms of expression, aligns with the preference for harmonious communication in Asian cultures, reducing the stigma associated with face-to-face counseling and increasing acceptance of digital mental health tools among students and teachers.

In summary, we expect that students with special needs can enhance their performance in SEL by using a digital journaling platform that combines CBT and AI technologies, in conjunction with school counseling resources. This study is designed based on this hypothesis, and the methodology will be explained in the subsequent chapter.

III. METHODOLOGY

This chapter outlines the research methodology used to investigate the effectiveness of the Asynchronous School Counseling Model (ASCM) with an online platform designed for this study. The chapter details the integrated digital intervention strategy, the architecture of the AI-driven management platform, and the experimental design used to evaluate the model's efficacy.

A. ASYNCHRONOUS SCHOOL COUNSELING MODEL (ASCM)

In Taiwan, identifying elementary school students with emotional disorders involves a multi-stage assessment and screening, starting with initial observations by teachers of the student's behavior and emotional expression in the classroom, complemented by feedback from parents about the child's behavior at home. Suppose a student exhibits potential emotional or behavioral issues, such as frequent signs of anxiety, depression, or social difficulties. In that case, the teacher will refer the student to a school counselor for further evaluation. The counselor conducts an initial one-on-one consultation with the student to assess whether further psychological counseling or behavioral intervention is necessary.

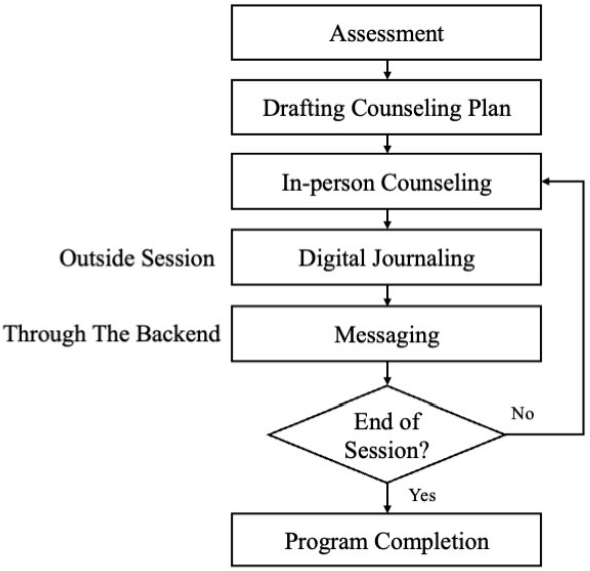


FIGURE 1. The flowchart of the proposed asynchronous school counseling model (ASCM).

Once it is determined that a student requires counseling services, the school psychologist will devise a personalized counseling plan based on the student's specific needs, which traditionally includes at least one face-to-face session per week. The decision to conclude the counseling process depends on regular psychological assessments and observed improvements in the student's behavior at school and home. Overall, this process aims to provide necessary psychological support to students with emotional disabilities, enhancing their academic and social skills and improving their overall quality of life.

Ideally, each student should receive consistent and stable psychological support; however, due to limited counseling resources, there are often challenges in allocating these resources adequately. For instance, during summer and winter breaks, the restrictions on face-to-face counseling prevent many students from receiving timely psychological services or continuing support after the counseling program has ended. The model we propose builds on the existing framework by integrating a digital diary tool as part of a self-regulation intervention strategy, combined with asynchronous interactions, to increase the frequency of students' access to professional psychological support, even with limited personnel. The service cycle of this model is illustrated in the diagram below.

According to the literature in Chapter 2, using digital tools for emotion logging can enhance students' self-awareness and facilitate the development of emotional regulation strategies. Moreover, this continuous self-monitoring mechanism helps psychologists understand students' emotional fluctuations through their recorded entries in non-face-to-face settings, allowing for more precise adjustments to subsequent

counseling or treatment plans [52], [61]. Therefore, the ASCM model not only increases the reach and efficiency of psychological support but also, supported by existing literature, has a positive impact on the long-term mental health development of students.

B. PARTICIPANTS

This study focused on school psychologists who assist with counseling programs, examining the changes in students they observed before and after introducing digital media and management systems as a basis for evaluation. The research was conducted at an elementary school in Keelung City, Taiwan, involving fifth and sixth graders. These participants were identified by counseling teachers as having emotional disorders, attention deficit hyperactivity disorder (ADHD), or autism and were enrolled in related emotional education programs. Initially, 30 participants were recruited for a pilot study. However, due to attrition, including graduations and case closures, the final dataset included 22 students (11 in the treatment group and 11 in the control group).

Given the sensitive nature of students' mental health data, we have implemented multiple layers of security measures within the system, including end-to-end encryption, data anonymization, and detailed access control mechanisms to ensure the security of data during transmission and storage. Additionally, all data handling procedures comply with GDPR and COPPA regulations, and we strictly obtain explicit consent from students, parents, and schools during the data collection process. All procedures are overseen by an Institutional Review Board (IRB) to safeguard participants' rights.

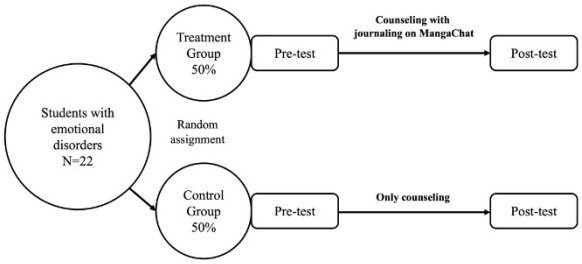


FIGURE 2. The treatment group and the control group in the study.

C. DIGITAL JOURNALING

We utilized a digital journaling tool developed in previous research as an intervention method [62]. The system transforms Cognitive Behavioral Therapy (CBT) into manageable steps using comics-based storytelling. It implements a text-to-graphics conversion by combining the term frequency-inverse document frequency (TF-IDF) method [7] and the generative adversarial network (GAN) algorithm [10]. A comic graphic's elements consist of four layers: foreground characters, speech bubbles, text, and background images, predefined in size and position to expedite image generation. Characters and speech bubbles are manually pre-drawn to fixed specifications, while background images are generated offline using the Conditional GAN (cGAN) model to maintain consistent facial expressions [56].

Initially, background images are manually drawn and tagged with text labels (emotion, scene, time) for easy substitution. We preprocess these tags using the TF-IDF method to create text vectors, used for cGAN model training and image retrieval. The images undergo standardization (resolution unification, color normalization) and are combined with text vectors as the cGAN training dataset.

During journaling, users select time and location, input content, annotate emotions, and choose backgrounds. Completed entries are vectorized and stored with other data as conditional labels for the cGAN model. In the cGAN construction phase, the generator uses random noise vectors and conditional labels to generate background images, while the discriminator distinguishes between real and generated images, improving the generator's consistency through adversarial training.

The generated background images are manually reviewed and adjusted for quality, then integrated into the platform with conditional labels for user selection during journaling. After users input diary content, the system computes vector representations using the TF-IDF method and calculates cosine similarity between the text vectors and background images, recommending the most relevant images to the user.

The interface of the journaling platform is shown in Figure 3. During the image creation process, the system interface guides the user through the following three stages:

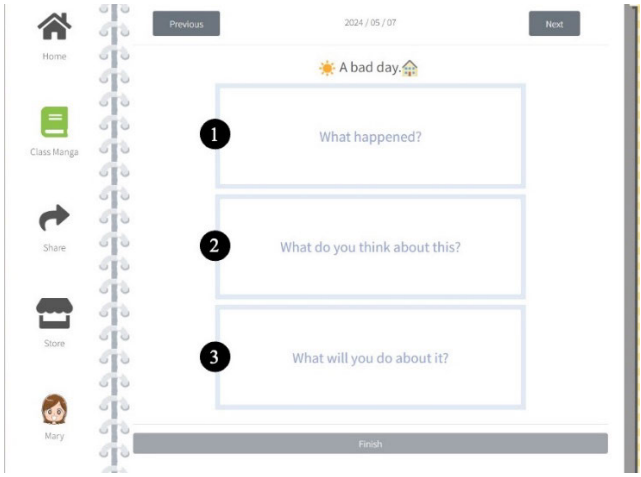


FIGURE 3. The interface of the journaling platform used in this study. The numbered panels represent the three stages of CBT: Situation description, emotion recognition, and coping strategies.

During the image creation process, the system interface guides the user through the following three stages:

1) SITUATION DESCRIPTION

As shown in Fig. 4(a), users input text describing their personal experiences. The system generates images based

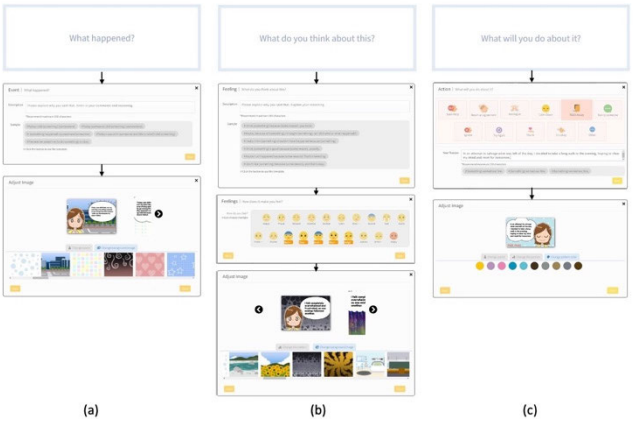


FIGURE 4. (a) The user-experience processes to complete (a) the first panel, (b) the second panel, and (c) the third panel. Note that the comic visual is automatically generated in the final step for each process, where the platform provides additional features for users to adjust the image content.

on four preset emotions (joy, anger, sadness, fear). Then, it selects an image corresponding to the text's emotion, aiding in practicing emotional awareness by recognizing expressions.

2) EMOTION RECOGNITION

As shown in Fig. 4(b), users input text describing their thoughts about the experience and mark the corresponding emotions from 20 preset emoticons (up to four emotions can be marked), enhancing the practice of emotional awareness and guiding self-reflection on personal perspectives.

3) COPING STRATEGIES

As shown in Fig. 4(c), users choose one of ten preset options to address the situation mentioned above and thoughts and enter a corresponding rationale.

In other words, upon completion, each diary entry can be represented as $\mathbf{J}(i) = \{\mathbf{S}, \mathbf{E}, \mathbf{B}\}_i$, where i is the journal's ID, and **S**, **E**, and **B** represent data vectors corresponding to the three processes described above, as shown in the following table. Tags are generated from the journal content using Python's TextBlob library, which extracts key phrases and noun phrases from the text to serve as tags.

D. BACKED MANAGEMENT PLATFORM

The backend system is a web-based platform developed using the JSP framework and Java Spring, with the frontend utilizing the Vue.js 2 framework, complemented by Node.js on the backend. The database employs MariaDB, hosted on AWS with components like the Elastic Load Balancer (ELB) and EC2 instances, along with the RDS database service. The frontend AWS ELB is equipped with two EC2 servers for the front end and two for the graphics API, while the backend AWS ELB is set up with one server, scalable as needed. Both front and back end share a single AWS RDS database. When image generation is required, the system connects to the graphics API EC2 servers. This architecture ensures scalability and flexibility to accommodate fluctuating traffic and computational demands. Considering the sensitivity of student data, our system design strictly adheres to data protection regulations like General Data Protection Regulation (GDPR) and Children's Online Privacy Protection Rule (COPPA). All data transmissions are secured with SSL/TLS encryption to ensure safety during transfer.

TABLE 1. The raw data for each journal entry.

Vectors	Raw Data	Remarks
S	*content*, **Tags**, *feeling*	*feeling* represents the emoticon chosen by the user on the interface, indicating their attitude towards the content of the diary.
E	*content*, **Tags**, **Emotions**	**Emotions** is a set of numbers that mark the user's emotional tags.
B	*content*, **Tags**, *coping*	*coping* refers to the emoticon selected by the user on the interface, which signifies their attitude towards the content of the diary.

The portal for the backend management system is structured as shown in Fig. 5. The system requires user registration and login to access, supports OAuth login, and allows users to gain access through Gmail, as shown. Upon successful login, users reach the Dashboard, which includes features like "Edit Personal Profile," "Session List," "Import Users," and "Emotional Reports." This backend platform is designed modularly to allow users customization capabilities. Key features include "Edit Personal Profile," where each user (teachers and counselors) can update personal information, login details, and work preferences (such as language). The "Session List" allows users to view "Journal Sessions" previously created; these sessions represent counseling groups or school classes. The "Notification" feature provides real-time notification services, including alerts on students' emotional abnormalities and reminders for diary receipts and messages. The system utilizes WebSocket technology for instant message delivery, ensuring users receive essential information promptly.

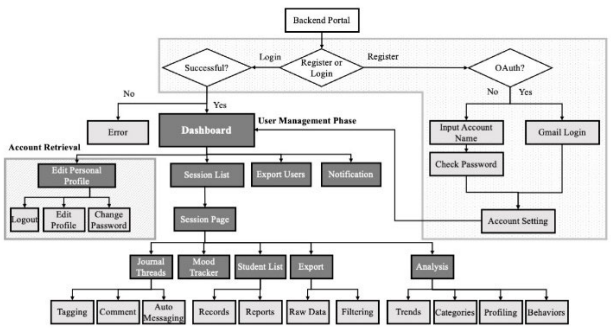


FIGURE 5. System framework of the proposed platform for ASCM.

Each "Journal Session" has its dedicated "Session Page" to display live journal entries. Additional features include "Mood Tracker," "Student List," "Export Raw Data," and "Reports." The following section will explain how users can leverage the "Mood Tracker" with an additional AI-based function to support student counseling operations.

E. MOOD TRACKER

As illustrated in Table 2, emotions in this study are categorized into four types, each comprising various emotional expressions representing different feelings. The emotional orientation for each category is classified as positive, negative, or neutral. For accurate calculations, subsequent operations use these emotional orientations tagged by student users, with the Mood Tracker being one such application.

TABLE 2. Emotional orientation.

Categories	Emotion Definition	
	Expressions	*Orientation*
Pleasant	Happy, Proud, Relaxed, Fortunate, Envious.	*Positive*
Upset	Angry, Jealous, Annoyed.	*Negative*
Insecure	Surprised, Afraid, Sad, Guilty, Disappointed, Negative, Shame, Nervous, Frustrated, Worried, Helpless.	*Negative*
Calm	Calm	*Positive*

The Mood Tracker feature informs users, such as teachers or school counselors, about students experiencing successive negative emotions based on the emotions tagged during the journaling process for the second panel. We analyzed each student's two most recent diary entries and diary entries made within three days prior to the earliest entry using a heuristic approach for grading. The higher the grade, the more attention the student requires. Each student has a Mood Tracker value, $MT(x)$. For any student x, the $MT(x)$ value is updated each time x submits a new diary entry. All students are then ranked by their $MT(x)$ values, with the sorted list displayed on the backend for teachers to review. The $MT(x)$ algorithm is outlined in Table 3.

The $MT(x)$ algorithm enables early identification of students requiring additional support, allowing educators to prioritize interventions based on this data-driven feature and to facilitate proactive mental health management.

F. AUTOMATED FEEDBACK GENERATION

We adopt OpenAI's GPT-3.5-Turbo API service in the proposed management system to provide teachers with templates for feedback on students' journal entries. Other research papers have explored similar approaches to automated feedback generation using natural language processing and AI. For example, [63] highlighted the potential of AI-powered feedback systems in educational environments, emphasizing their ability to offer personalized responses at scale [64]. In our study, we utilize OpenAI's GPT-3.5-Turbo

TABLE 3. The heuristic algorithm of the mood tracker feature.

$MT(x)$	Heuristic Rules	Implication
1	Last two journal entries both positive.	No recent negative emotions
2	Last entry positive, previous one negative.	Shifted from negative to positive
3	Last entry negative, previous one positive.	Shifted from positive to negative
4	Last two entries both negative.	Recent emotions are negative
5	Last two entries negative, one negative entry in last 3 days.	Recent emotions are negative with anger
6	Last two entries negative, with negative emotions like anger.	Persistent negative emotions, anger

model to generate responses for emotional journal entries. The process involves integrating text vectors with tagging data from each journal entry to create a standard prompt for the model. We use the 'createChatCompletion' function of GPT-3.5-Turbo to generate responses [63]. To control the response generation, we configure the *temperature* to 0.1, which reduces randomness, and the *top_p* parameter to 0.1, ensuring the model focuses on the most probable completions. These parameters help to closely align the generated responses with the desired prompt. We provide a specific prompt template when making the API call to ensure that the function's output is formatted as needed. This template includes clear instructions on how the response should be structured. Further refinement of the function's behavior is achieved by fine-tuning the prompt and response templates, guiding the GPT-3.5-Turbo model toward the desired output. The illustration of the Automated Feedback Generation feature is shown in Fig. 6.

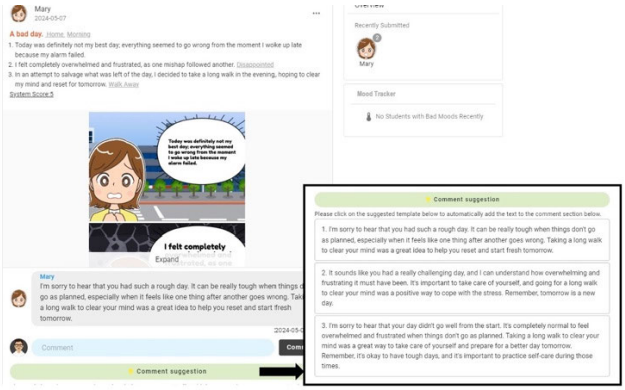


FIGURE 6. The image on the left-hand side shows the original interface when the auto review function is not activated. After clicking the lower button labeled 'Comment suggestion,' OpenAI's API is called to review the journal and generate suggested options, as shown in the image on the right-hand side.

G. EXPERIMENTAL DESIGN

Data collection was divided into two main parts: teacher assessments and digital platform data. Firstly, the teacher

assessments were adapted into a 4-point behavioral rubric based on the five dimensions of SEL, aimed at determining the students' maximum performance in specific dimensions. The five dimensions of SEL competencies include: Self-Awareness, Self-Management, Social Awareness, Relationship Skills, and Responsible Decision-Making. Taking Self-Awareness as an example, the 4-point behavioral rubric includes: 1 point for students who cannot express their emotions or do so very limitedly, lacking reflection on their emotions and consideration of their impact on others and group discussions; 2 points for students who express their emotions but not clearly enough, lacking deep reflection on their emotions and clear impact on others and group discussions; 3 points for students who can express their emotions and emotional states but may lack deep reflection on their emotions, and the impact on others and group discussions may not be obvious; 4 points for students who can clearly express their emotions and emotional states, and consciously consider the impact of their emotions on others and group discussions. Considering the physical and mental states of children with special needs and the objectivity of the measurements, the above indicators are assessed by school counselors, with pre-tests and post-tests conducted before the experiment begins and three months later. Appendix A shows the scoring criteria corresponding to all SEL competencies.

After obtaining consent from the head of the counseling room and the counseling teachers, we conducted a one-hour training workshop aimed at teaching school counselors how to use the journaling platform and the proposed AI-based management system. Through guidance provided by these counselors, students were able to learn how to navigate the journaling on PCs or tablets, typically managing to complete both registration and familiarization with the platform in about 20 minutes. The school counselors encouraged students to make at least one journal entry each week, particularly following instances of intense emotions or significant events.

Due to ethical considerations, this study was unable to adopt a double-blind design. However, reducing the subjective bias of counseling teachers is an important issue, so this study employed several methods. First, standardized guidance procedures were implemented to ensure that all the school counselors used the same procedures and guidance techniques when instructing students, thus reducing the impact of personal bias on the results. Second, objective behavioral assessment tools were utilized, focusing on the behaviors exhibited by students rather than relying solely on the subjective perceptions of the school counselors.

This study utilized SPSS version 21 for the statistical analysis, including descriptive statistics and analysis of experimental data. The experiment in this study used the SEL Rubric as the dependent variables (DV), with the method of analysis being a two-way ANOVA (mixed design). If the interaction term reaches significance, then a test for simple main effects is conducted to confirm the effectiveness of the digital journaling platform usage.

IV. EXPERIMENT RESULTS

Over three months, the 22 participants in the treatment group completed a total of 468 journal entries with an average of 3.5 entries per week, each receiving feedback at least once from the school counselors. Our study incorporated a between-subjects factor—whether the journaling platform was used and a within-subjects factor of pre-test and post-test. The five dependent variables were the five indicators of SEL, including Self-Awareness, Self-Management, Social Awareness, Relationship Skills, and Responsible Decision-Making.

Next, we examined the journaling platform's contribution to improving students' SEL indicators during counseling sessions. The experimental data analysis utilized a two-factor mixed design. The variance analysis procedure began with examining whether the interaction term was significant. If significant, a simple main effects analysis was conducted. If the interaction was not significant, the main effects of individual factors were explored.

There were five dependent variables (DVs) in this study. Thus, a two-factor mixed-design analysis of variance was performed separately for each. The results showed that when Self-awareness was the dependent variable, the F-value for the interaction term was 6.154, reaching significance ($p = .022$), with an effect size (eta squared) of 23.5%, indicating a high effect size. The mean profile plot revealed little difference between the experimental and control groups during the pre-test phase. However, during the post-test phase, the treatment group significantly improved compared to the control group. It indicates that pairing emotional diary writing with counseling sessions can help improve Self-awareness.

Similarly, when Self-control was the dependent variable, the F-value for the interaction term was 9.643, reaching significance ($p = .006$), with an effect size of 32.5%, indicating a high effect size. The mean profile plot showed a similar pattern of results as with Self-awareness, indicating that emotional diary writing alongside counseling sessions can contribute to improving Self-control.

For Social Awareness as the dependent variable, the F-value for the interaction term was 6.923, reaching significance ($p = .006$), with an effect size of 25.7%, indicating a high effect size. The mean profile plot indicated that the treatment group had slightly lower scores than the control group during the pre-test phase. However, during the post-test phase, the treatment group significantly improved compared to the control group. It suggests that the counseling process alone did not significantly enhance Social Awareness, but it can be beneficial when paired with emotional diary writing.

When Relationship Skills were the dependent variable, the F-value for the interaction term was 6.125, reaching significance ($p = .022$), with an effect size (eta squared) of 23.4%, indicating a high effect size. From the mean profile plot, it can be observed that there was not much difference between the experimental and control groups during the pre-test phase.

TABLE 4. Two-way mixed design ANOVA of DVs.

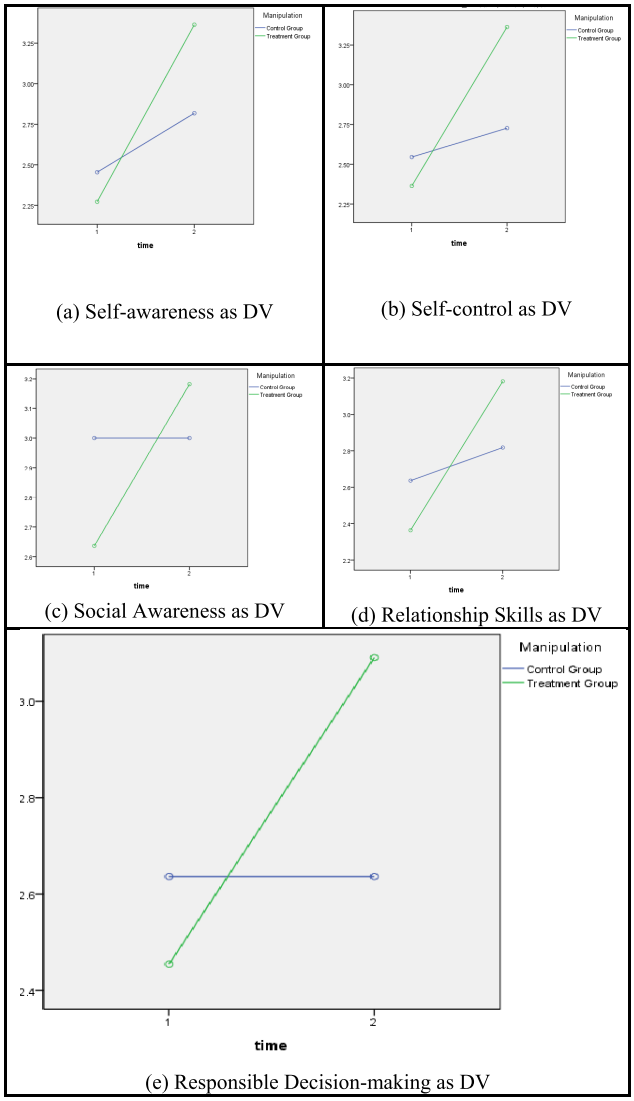
DV			Self-awareness			
SV	SS	df	MS	F	p	η^2
MangChat(A)	.364	1	.364	.506	.485	.025
Error(S/A)	14.364	20	.718			
Pre-Post(B)	5.818	1	5.818	24.615	.000	.552
A*B	1.455	1	1.455	6.154	.022	.235
Error(B*S/A)	4.727	20	.236			
DV			Self-control			
SV	SS	df	MS	F	p	η^2
MangChat(A)	.568	1	.568	.702	.412	.034
Error(S/A)	16.182	20	.809			
Pre-Post(B)	3.841	1	3.841	20.119	.000	.501
A*B	1.841	1	1.841	9.643	.006	.325
Error(B*S/A)	3.818	20	.191			
DV			Social Awareness			
SV	SS	df	MS	F	p	η^2
MangChat(A)	.091	1	.091	.154	.699	.008
Error(S/A)	11.818	20	.591			
Pre-Post(B)	.818	1	.818	6.923	.016	.257
A*B	.818	1	.818	6.923	.016	.257
Error(B*S/A)	2.364	20	.118			
DV			Relationship Skills			
SV	SS	df	MS	F	p	η^2
MangChat(A)	.023	1	.023	.031	.862	.002
Error(S/A)	14.727	20	.736			
Pre-Post(B)	2.750	1	2.750	15.125	.001	.431
A*B	1.114	1	1.114	6.125	.022	.234
Error(B*S/A)	3.636	20	.182			
DV			Responsible Decision-making			
SV	SS	df	MS	F	p	η^2
MangChat(A)	.205	1	.205	.357	.557	.018
Error(S/A)	11.455	20	.573			
Pre-Post(B)	1.114	1	1.114	6.806	.017	.254
A*B	1.114	1	1.114	6.806	.017	.254
Error(B*S/A)	3.273	20	.164			

However, during the post-test phase, the treatment group showed a significant improvement, surpassing the control groups. These results suggest pairing emotional diary writing with counseling sessions can help enhance relationship skills.

When Responsible Decision-making was the dependent variable, the F-value for the interaction term was 6.806, reaching significance ($p = .017$), with an effect size of 25.4%, indicating a high effect size. From the mean profile plot, during the pre-test phase, the treatment group's scores were slightly lower than those of the control group. However, during the post-test phase, while the control group remained unchanged, the treatment group's improvement significantly surpassed that of the control group. These results indicate that the counseling process did not have a significant effect on improving Responsible Decision-making. However, pairing emotional diary writing with counseling sessions can enhance Responsible Decision-making. For a detailed analysis of variance data, please refer to Table 4 .

After confirming significant interaction effects for all five DVs, we proceeded with a simple main effects analysis to clarify the sources of these effects. The data were first divided into experimental and control groups, and then paired-sample t-tests were conducted for each of the five DVs before and after the intervention.

The results for the control group indicated a significant improvement in self-awareness ($t > 1.96$). The counseling process alone can enhance self-awareness even without the journaling platform. However, there were no significant differences between the pre-test and post-test scores for the other DVs. It indicates that over three months of counseling, relying solely on counseling did not significantly improve self-management, social awareness, interpersonal skills, responsible decision-making, and other indicators ($t < 1.96$).



(a) Self-awareness as DV (b) Self-control as DV

(c) Social Awareness as DV (d) Relationship Skills as DV

(e) Responsible Decision-making as DV

FIGURE 7. The interaction effect of using the proposed model with time factor on DVs.

In contrast, the results for the treatment group showed significant improvements in all DVs after three months ($t > 1.96$). Pairing the journaling platform with counseling sessions as a communication, expression, and interaction tool can enhance all indicators more effectively. For detailed data, please refer to the Table 5 .

In the power analysis, although this study only had 22 participants, the ANOVA analysis showed a high effect

size for the model, with all DVs ANOVA achieving the standard of power > 0.8. This data can also serve as evidence related to experimental validity.

TABLE 5. Paired t-tests for pre-test and post-test.

ASCM			Mean	SD	SE	t
Control group	Self-Awareness	pro-test	2.45	.52	.16	2.39
		post-test	2.82	.75	.23	
	Self-Management	pro-test	2.55	.52	.16	1.49
		post-test	2.73	.65	.20	
	Social Awareness	pro-test	3.00	.63	.19	1.54
		post-test	3.00	.63	.19	
	Relationship Skills	pro-test	2.64	.51	.15	1.73
		post-test	2.82	.75	.23	
	Responsible Decision-Making	pro-test	2.64	.51	.15	1.00
		post-test	2.64	.67	.20	
Treatment group	Self-Awareness	pro-test	2.27	.79	.24	3.07
		post-test	3.36	.67	.20	
	Self-Management	pro-test	2.36	.92	.28	2.63
		post-test	3.36	.67	.20	
	Social Awareness	pro-test	2.64	.67	.20	2.63
		post-test	3.18	.41	.12	
	Relationship Skills	pro-test	2.36	.67	.20	2.89
		post-test	3.18	.75	.23	
	Responsible Decision-Making	pro-test	2.45	.69	.21	3.46
		post-test	3.09	.54	.16	

Although the effectiveness of the journaling platform as an intervention tool in counseling has been validated, its applicability to students of different age groups, cultural backgrounds, and other special education needs still requires further research. By expanding the research scope, we can better understand the application effectiveness of the platform among different demographics, providing more guidance for future practices. Moreover, integrating the journaling platform with existing educational curricula should be explored. While our model can be an independent learning tool, integrating it into existing curricula may be more effective. Educators and policymakers must collaborate to ensure that this platform aligns with teaching goals and standards. For example, functionalities such as correction features, uploading photos, or sharing multimedia content may be necessary for various subject instruction scenarios.

This study still has some limitations, and it is suggested that future research could make improvements to achieve better internal validity. First, the sample size of the study was relatively small, consisting of only 22 students receiving counseling at a primary school in Taiwan, mainly with ADHD, autism spectrum disorder, and emotional disorders. It may limit the generalizability and generalization of the results. Next, the study only lasted for a three-month experimental period, which may not be sufficient to observe long-term effects or sustained changes. For such educational interventions, long-term tracking and research may be more valuable.

To more clearly present the results of the experiment, we will use a bar chart to show the pre- and post-test differences between the experimental and control groups. A larger difference indicates a greater improvement in SEL indicators. Overall, the experimental group using MangaChat showed higher improvements across all indicators compared to the control group that did not use MangaChat. Statistically, the differences in the experimental group were all significant, whereas in the control group, only self-awareness reached a significant level. This means that for the other indicators in the control group, the differences can be statistically considered as zero, indicating no improvement in the post-test conducted three months later.

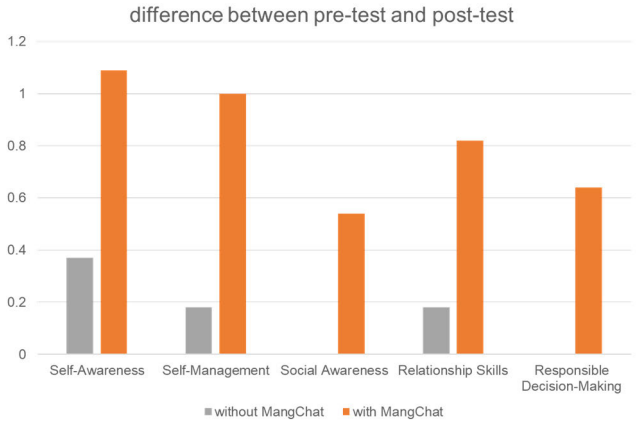


FIGURE 8. The pre- and post-test differences between the experimental and control groups in SEL indicators.

Furthermore, the study used self-report questionnaires as the primary measurement tool, which may be influenced by memory and subjective feelings. Although self-report questionnaires are standard research methods, their objectivity and accuracy are still limited. Incorporating objective behavioral data or academic performance could provide better tool validity. Finally, the subjective expectations of the school counselors may still influence the experimental results, suggesting adopting a double-blind design in future studies to reduce subjective bias.

V. CONCLUSION AND IMPLICATIONS

To examine whether the ASCM mechanism can serve as a model to enhance counseling effectiveness, this study recruited 22 elementary school students with emotional disorders, autism spectrum disorder (ASD), and ADHD for experimentation. Only students receiving counseling comprised the control group, while students receiving counseling paired with the journaling platform used constituted the treatment group. They were required to complete at least one emotional diary entry per week for three months. The experiment used the five dimensions of social-emotional metrics as assessment indicators and dependent variables, assessed through teacher observation. Pretests were conducted before

the experiment began, followed by post-tests three months later. Data analysis was conducted using a two-factor mixed-design ANOVA, revealing significant interaction effects between the experimental manipulation and pre/post-tests for all five DVs. Data segmentation and analysis showed that the control group without the platform use showed significant improvement only in the self-awareness dimension. Conversely, the platform treatment group demonstrated significant improvement in all dimensions.

The findings and implications drawn from this study offer significant insights grounded in comprehensive statistical analysis. Based on CBT, the journaling platform used in this study facilitates the process of students expressing their emotions, which helps them objectively observe how they think, feel, and act. In the past, students did not write down these experiences, leading to a mix-up of emotions without clarity on the characters, timing, process, and outcomes of events. They also lacked interpretations of how their feelings arose, thus missing opportunities to understand how their coping actions led to unwanted consequences. Nevertheless, digital journaling allows students to transform their emotional diaries into comics engagingly, enhancing their expressive and observational abilities. Building on this foundation, the platform's ability to deliver AI-assisted, empathetic feedback from school counselors enhances the student-counselor connection, fostering a supportive environment for emotional growth. Such advancements point towards our proposed method's potential in improving social-emotional competencies.

In the second observation, the universal appeal of comics among elementary school students is harnessed by the proposed intervention model to transform them into creators, sparking their interest and motivation for self-directed learning. This allows them to express their thoughts and feelings naturally via the comic platform, keeping the process engaging and away from becoming a tedious task. The platform's structured three-stage guidance (what happened, how it feels, and future actions) promotes reflective thinking and self-regulation, making it an effective tool for emotional education. This approach led to superior emotional learning outcomes compared to the control group.

Overall, the experimental group that used the digital journaling platform achieved significant improvements in all SEL indicators. In contrast, the control group only showed improvement in the most basic self-awareness. Obtaining such results in a short-term three-month experiment exceeded our expectations. To explain these results, we can look at it from the perspectives of expressive arts therapy and CBT. Additionally, the digital platform indeed helped students in Asian cultures to have a higher willingness to discuss internal psychological issues.

Expressive arts therapy, a therapeutic approach that integrates visual arts, writing, drama, music, and dance, aims to facilitate individual emotional expression and psychological healing. It has been utilized as a powerful tool for stress relief, self-soothing, and emotional expression [65], [66], [67]. Among all forms of expressive arts therapy, writing is actually the simplest to implement [68].

In literature discussing how expressive writing and writing therapy can assist clients or patients in improving cognition, emotions, interpersonal relationships, or other aspects, related research findings highlight the simplicity of writing yet its numerous positive effects, underscoring the potential of writing therapy. Reiter and Wilz [69] demonstrated positive writing interventions, particularly in the form of resource diaries, which can enhance adolescents' well-being and prevent depression. Their study, a randomized controlled trial, compared the effects of writing resource diaries and traditional diaries on adolescent well-being and depression prevention. Their research indicated that reflecting on and documenting positive daily experiences through writing can effectively boost individuals' emotional states and psychological resilience. This is similar to the findings of Sin and Lyubomirsky [70], who, through a meta-analysis examining studies of adults and adolescents, found that writing and other positive psychology interventions are effective in enhancing individual well-being and alleviating symptoms of depression. These studies emphasize the long-term impact of sustained positive behavior practices on mental health, particularly advocating for the adoption of writing exercises as a strategy to promote psychological well-being in clinical and educational processes.

Travagin, et al. [71] focused their literature review on assessing the effects of expressive writing on adolescents. Through analyzing multiple studies, they found that expressive writing can have a positive impact on adolescent mental health, especially in improving emotional regulation, self-esteem, and social skills among other mental health metrics. Toepfer, et al. [72] exploring the underlying mechanisms behind positive and expressive writing through both qualitative and quantitative methods, approached the research from a resource-oriented perspective with an adult sample. The results indicated that individuals could effectively enhance self-efficacy and psychological resilience through self-reflection and resource integration during the writing process. This aligns with the resource diary format advocated by Reiter and Wilz [69], with both studies considering writing exercises as strategies for promoting personal growth and psychological resilience.

When engaging in expressive writing, an essential step is to externalize memory. Since the scope of human memory is limited, merely thinking about something internally lacks completeness, which hinders a comprehensive reflection on one's behavior. Additionally, psychological defense mechanisms may arise during reflection, making it difficult for individuals to objectively evaluate their actual behavior and outcomes, thus obstructing self-awareness and behavioral change. However, by writing down what happened, one's thought processes, emotional experiences, and actions taken, these externalized pieces of information can be approached more objectively, reducing the influence of defense mechanisms.

Furthermore, the immediacy of the digital platform allows students to continuously engage in dialogues with their counselors about negative experiences. Counselors can apply CBT principles to challenge students' irrational beliefs and guide them toward adopting positive coping behaviors, resulting in better outcomes and emotional experiences. Lastly, the comic journal format encourages students to express their difficulties through role-playing without feeling ashamed or judged. This approach proves particularly effective in Asian cultures, where such externalization facilitates significant positive effects.

The MangaChat platform utilizes specific AI technologies, including TF-IDF, GAN, and OpenAI's GPT-3.5-Turbo. The reasons for choosing these AI technologies are their stability and speed. However, there are also corresponding potential limitations. One of the primary concerns with AI technologies is ensuring data privacy and security. Therefore, we have implemented strict data protection protocols and obtained necessary consent from participants to address these concerns. Moreover, the effectiveness of AI technologies can vary across different cultural contexts. Our study focuses on an Asian population, and while we have made efforts to adapt the AI tools to be culturally sensitive, there may still be nuances that are not fully captured. While OpenAI's model offers powerful generative capabilities, the content it produces may be influenced by biases inherent in its training data, particularly in culturally sensitive contexts. To mitigate such biases, we have implemented two measures. First, we conducted bias testing on the model and plan to continue optimizing it to ensure that its responses are appropriate for diverse cultural contexts. Second, we have engaged external psychology experts to regularly review the system-generated responses to ensure that they accurately identify children's emotional disorders and avoid cultural misinterpretations. Consequently, further research is needed to generalize these findings across diverse cultural settings. Additionally, the acceptance and usability of AI tools among school counselors and students can influence the outcomes. Resistance to adopting new technologies may limit the effectiveness of the interventions. To mitigate this issue, we have included training sessions for counselors, but it remains a potential limitation.

This study assessed students' social-emotional skills through teacher ratings for ethical reasons but acknowledged potential biases due to not having a double-blind design, which might skew outcomes. It noted that SEL skills affect areas like school, family, and relationships, recommending further exploration. Although the sample size is small, considering that the number of students with special needs is inherently low compared to the total student population, and given that this study serves as a preliminary investigation into the integration of AI technology in counseling settings, obtaining expected results with a smaller sample can justify expanding the study's scale in the future to enhance the generalizability.

TABLE 6. Rubric for social-emotional learning assessment.

Self-Awareness	The ability to accurately recognize one's own emotions and thoughts and their impact on behavior, including accurately assessing one's strengths and limitations and having a solid sense of self-confidence and optimism.
4 Pts	Students can clearly express their emotions and emotional states, consciously considering the impact of their emotions on others and group discussions.
3 Pts	Students can express their emotions and emotional states, but may lack deep reflection on their emotions, and the impact on others and group discussions may not be as evident.
2 Pts	Students express their emotions, but not clearly enough, and lack deep reflection on their emotions. The impact on others and group discussions is also not very evident.
1 Pts	Students fail to express their emotions or express them very limitedly, lacking reflection on their emotions and failing to consider the impact on others and group discussions.
Self-Management	The ability to effectively regulate one's emotions, thoughts, and behaviors in different situations, including managing stress, controlling impulses, motivating oneself, and setting and working towards personal and academic goals.
4 Pts	Students can effectively manage their emotions and handle difficulties and challenges in a positive manner. They can demonstrate calmness and self-control in individual conversations or group discussions.
3 Pts	Students can manage their emotions, but may lack self-control or adopt less proactive coping strategies in certain situations. There may be some emotional fluctuations in individual conversations or group discussions.
2 Pts	Students can manage their emotions at a basic level, but lack proactive strategies to cope with challenges, or may appear more emotional or out of control in individual conversations or group discussions.
1 Pts	Students fail to effectively manage their emotions, showing significant emotional fluctuations or maladaptive behaviors.
Social Awareness	The ability to understand and empathize with the perspectives and emotions of others from different backgrounds and cultures, understand social and ethical norms of behavior, and be aware of resources and support available from family, school, and community.
4 Pts	Students can understand the emotions and needs of others, and can respect and understand different perspectives and cultural backgrounds. They can demonstrate empathy and respect for others' views in individual conversations or group discussions.

TABLE 6. *(Continued.)* **Rubric for social-emotional learning assessment.**

3 Pts	Students can understand the emotions and needs of others, but may lack the ability to respect and understand different perspectives in certain situations. Some prompts or guidance may be needed in individual conversations or group discussions to demonstrate empathy.
2 Pts	Students can understand the emotions and needs of others at a basic level, but lack the ability to respect and understand different perspectives. More prompts and guidance may be needed in individual conversations or group discussions to demonstrate empathy.
1 Pts	Students fail to understand the emotions and needs of others, lack respect and understanding of different perspectives, and demonstrate a lack of empathy and respect in individual conversations or group discussions.
Relationship Skills	The ability to establish and maintain healthy and beneficial relationships with different individuals and groups. This includes clear communication, active listening, collaboration, resisting inappropriate social pressures, constructive conflict resolution, and seeking and providing help when needed.
4 Pts	Students can establish healthy, positive relationships with others and handle conflicts and challenges appropriately in group discussions.
3 Pts	Students can establish basic relationships, but may lack proactive strategies to handle conflicts and challenges. More guidance and support may be needed in individual conversations or group discussions.
2 Pts	Students can establish some relationships, but lack proactive strategies in handling conflicts and challenges. More guidance and support may be needed in individual conversations or group discussions.
1 Pts	Students fail to establish positive relationships and demonstrate significant difficulties in handling conflicts and challenges.
Responsible Decision-Making	The ability to make constructive and respectful personal behavioral and social interaction choices based on moral standards, safety considerations, social norms, and practical assessments of the consequences of different behaviors for oneself and others.
4 Pts	Students can make wise and responsible decisions based on their understanding of themselves and others. They demonstrate a positive and responsible attitude in group discussions.
3 Pts	Students can make some wise and responsible decisions, but may need more thought and guidance in certain situations. Some prompts or guidance may be needed in individual conversations or group discussions to demonstrate a proactive attitude.
2 Pts	Students can make some decisions, but show weaknesses in responsibility and wisdom. More prompts and guidance may be needed in individual conversations or group discussions to demonstrate a proactive attitude.
1 Pts	Students fail to make wise and responsible decisions, showing clear irresponsibility or lack of proactive attitude, and demonstrating a lack of performance in individual conversations or group discussions.

The research focused on elementary students with emotional, ASD, and ADHD issues, urging future studies to include a wider student population to evaluate the system's effectiveness in counseling and classroom management more broadly. In addition to research on students with special needs, future studies can also explore applications for teachers in classroom management and class operation. Methodologically, it is recommended that future research extend the measurement period, particularly to track the sustainability of subsequent emotional states and coping behaviors. Including more behavioral data or actual academic performance would help confirm that the system can bring about long-term effective behavioral changes in users. Alternatively, variables such as user satisfaction and willingness to use can be incorporated to delve deeper into users' perceptions of the system.

APPENDIX

See Table 6.

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