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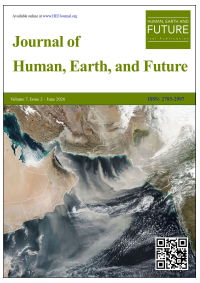

Exploring Student Preferences for Unguided Preventive Interventions for Depression: A Q-Methodology Study

Trung Tin Pham [1, 2], Charuai Suwanbamrung [3], Saifon Aekwarangkoon [4], Luu Trong Tuan [5], Thanh Nam Truong [2], Van De Tran [2], Thi Hien Nguyen [2], Doan Hoang Phu [6], Cua Ngoc Le [3*]

[1] *Walailak University, Thasala, Nakhon Si Thamarat, 86010, Thailand.*

[2] *Faculty of Public Health, Can Tho University of Medicine and Pharmacy, Can Tho 92000, Vietnam.*

[3] *EC for PHR, School of Public Health, Walailak University, Thasala, Nakhon Si Thamarat 86010, Thailand.*

[4] *School of Nursing, EC for PHR, Walailak University, Thasala, Nakhon Si Thamarat 86010, Thailand.*

[5] *Sunway Business School, Sunway University, Sunway City, Selangor 47500, Malaysia.*

[6] *Department of Community Vet Public Health, Nong Lam University, Gia Lai Campus 61125, Vietnam.*

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Abstract

Background: Depression is prevalent among health professional (HP) students, yet mental health services remain underused because of stigma and limited mental health literacy. Unguided preventive interventions for depression (UPIDs) are effective but often struggle with low engagement. Designing UPIDs based on user preferences will increase their engagement. *Objectives:* This study aims to investigate the patterns of HPs' preferences for UPID. *Methods:* This mixed-methods study employed a Q-methodology to explore preference patterns for UPID among HP students. The qualitative phase identified five themes: privacy, expected effectiveness, expert support, engagement factors, and the unguided nature. The Q-sorting phase was completed by fifty students. The data were analyzed via principal component and Q factor analyses. *Findings:* The analysis identified five preference patterns among HP students: effectiveness-oriented optimism, practical engagement, maximizing benefit and convenience, prioritizing privacy and caution, and trusting the expert. *Novelty:* This study offers the first empirically derived typology of HP students' UPID preferences, identifying unreported patterns. This typology points to two research directions for UPID programs. First, discrete choice experiments or segmentation studies should be used to determine the distribution of preference patterns. Second, examining actual preferences and behaviors in existing UPIDs can guide program modifications to improve engagement and sustainability.

Keywords: Unguided Preventive Intervention; Q-Method, Health Professional Students; Depression; Preference.

1. Introduction

Health professional (HP) students have higher rates of depression than their peers do [1], with prevalence ranging from 36% to 52.63% [2]. Among medical students, depression affects approximately 38.3% [3] to 50%, with 28%

* Corresponding author: cua.le@wu.ac.th

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experiencing minimal symptoms [4]. Rates are also high in nursing (34%) [5], dental (29%) [6], and pharmacy students, ranging widely from 4.8% to 78.8% [7]. Its high prevalence is related to psychological, academic, biological, lifestyle, social, and financial risk factors [8]. Depression negatively affects academic performance and overall well-being [9], highlighting the need for interventions.

Previous studies have shown that both medical and non-medical interventions for depression are effective when delivered face-to-face or via technology [10–14]. However, mental health services remain underutilized, even in high-income countries, due to the limited availability of on-campus professionals [15], stigma, low mental health literacy [16], delayed access, and inconvenient delivery [17].

Unguided preventive interventions for depression (UPIDs), which rely on self-help with minimal expert support, can address these barriers [18, 19] by reducing dependence on human resources and offering flexible, on-demand access. Therefore, UPID present a practical solution [20]. UPID is well suited to address current treatment gaps caused by the shortage of mental health professionals, especially in academic settings [15, 21–23]. As a scalable and low-resource approach, UPID offers a widely accepted [24] and flexible preventive option for student mental health care [25, 26]. Asian cultural norms, such as collectivism and reputation concerns, may affect preferences for privacy and self-help options [27–29]. These factors emphasize the need for UPID to improve early access to mental health support. However, UPID also has limitations, including low engagement, perceived credibility and usability, which are associated with poor adherence and high dropout rates on open-access platforms [30, 31].

Tackling these challenges requires a clear understanding of user preferences [32]. First, interventions that reflect user preferences achieve greater uptake, better adherence, and greater satisfaction [33, 34]. Moreover, early involvement of users in service design enhances the relevance and impact of interventions [34]. The incorporation of preferences into mental health systems is essential for achieving sustainable, patient-centered care.

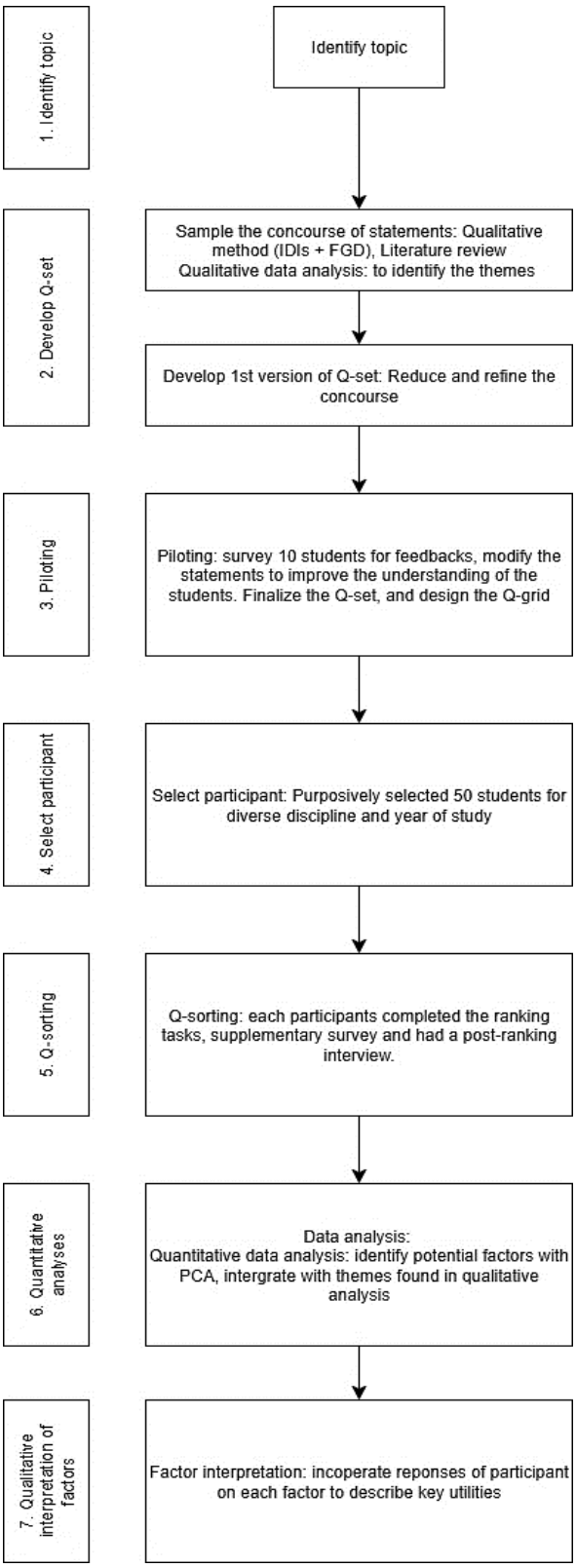
Studies examining preferences for UPIDs remain limited [34]. Although research on mental health treatment preferences is extensive, most studies do not focus on preventive interventions [35] but instead compare psychological and pharmacological treatments or evaluate general internet-based programs [36, 37]. Research on university students is also sparse. For example, one study examined students' preferences for psychotherapy [16], yet existing work does not adequately address unguided formats or preventive purposes, leaving a clear gap in the literature. Methodologically, prior studies have largely relied on survey-based approaches that report preferences as simple percentages of participants selecting a given option [35, 36, 38]. Such methods cannot capture preference strength, the trade-offs students make between intervention attributes, or their likely behavior [39].

Discrete choice experiments address trade-offs [40] but still do not reveal the holistic viewpoints or the underlying segments of preference that shape how students conceptualize UPID. Given these limitations, Q-sorting offers a suitable alternative. It enables participants to articulate integrated and subjective viewpoints, reveals distinct preference patterns, and captures qualitative reasoning that cannot be obtained from choice-based tasks alone. Therefore, this study uses Q-sorting, a mixed-methods approach, to explore undergraduates' preference patterns for unguided preventive interventions for depression. The findings can inform the development of tailored, scalable preventive programs that better align with student needs, particularly in settings with limited mental health resources.

This article is organized into four sections. The Introduction presents the background and rationale for the study. The Materials and Methods section describes the qualitative development, Q-sorting procedures, and analytical approach. The Discussion interprets the findings in relation to the literature. The Conclusion summarizes the key insights and outlines directions for future research.

2. Material and Methods

This study used a mixed-methods design that incorporated the Q-sorting method [41] (Figure 1). First, the qualitative phase explored the perspectives of undergraduate HP students on a potential UPID. A literature review was then conducted to gather opinions about UPID. Findings from the qualitative phase and the literature review provided the basis for developing the statements of the Q-set for the quantitative Q-sorting phase. Undergraduate participants sorted the statements. Q-sorting data were then analyzed to identify preference patterns for UPID among students.



IDI: In-depth interview; FGD: Focused group discussion

Figure 1. Study design for the Q-sorting method

2.1. Q-Set Development

The process of developing guides for the in-depth interviews (IDIs) and a focus group discussion (FGD) followed Yusoff's procedure [42]. These topics in IDIs and FGD focused on students' preferences for standard features of these interventions, including content, format, delivery, duration, confidentiality, support, and cost (Appendix I). The participants were recruited using purposive sampling to ensure diversity in their perspectives. A snowball sampling method was used, starting with class monitors and academic advisors to identify participants from various disciplines and academic years.

All IDIs and FGD were then audio-recorded (each lasting 45–60 minutes/record) and subsequently transcribed verbatim. The transcripts were read multiple times to ensure familiarity with the data. A content analysis followed a structured progression: initial notes were taken to capture emerging topics and ideas; the content was then condensed and coded using precoded topics related to privacy, the unguided nature, incentives, enablers and barriers, additional support, and open codes for emerging themes. Concurrently, all quotations that expressed a viewpoint related to preferences for UPID were extracted and categorized into relevant themes. These quotations were retained in a pool of concourse material, which served as the basis for developing the Q-set.

Additionally, an additional literature review was conducted to identify journal articles related to unguided interventions for mental health, including internet-based, mobile-based, and computer-based formats. In each article, opinions related to unguided interventions were extracted. The extraction focused on topics such as perceived utility, user preferences, barriers, and advantages (Appendix III). The opinions were added to the concourse pool. The authors, with experience in mental health and in the local higher-education setting, reviewed the concourse to develop the Q-set. The initial Q-set was finalized by reducing and refining the statements from the pool. Statements reflecting user preferences, perceived utility, barriers, and advantages of UPID were reviewed to ensure relevance and thematic diversity. Duplicated statements were removed, and thematically similar quotations were grouped and refined for clarity. The statements were retained if they showed a separate utility to avoid repetition and ensure coverage. After the Q-set was piloted with 10 undergraduate students, the statements were refined to improve clarity, ensure relevance, and optimize the completion time for the sorting task (Appendix III).

2.2. Q-Sorting Phase

Undergraduate students from HP programs such as general medicine, pharmacy, nursing, public health, preventive medicine, and traditional medicine were purposively selected. The participants were invited through academic advisors, class monitors, and peer referrals. Fifty HP students participated. Participants were scheduled at times they selected themselves to avoid time-related stress. Each participant was instructed to rank 56 statements on a forced quasi-normal distribution grid ranging from +5 ("most suitable to your opinion") to −5 ("most unsuitable to your opinion"). The distribution was shaped as a pyramid (Appendix IV) to encourage the prioritization of fewer extreme responses and more moderate responses in the middle categories. Sorting was conducted using physical cards. To reduce cognitive burden, participants first completed a broad, three-pile pre-sorting step (agree, disagree, neutral) before placing cards into specific cells of the forced distribution, a recommended practice for minimizing sorting pressure. After the ranking task, a brief post-sort interview and survey were conducted. The participants were asked to comment on the importance of each aspect and reflect on the key utilities that guided their choices. The supplementary survey included a structured set of variables. Sociodemographic variables included sex, academic discipline, and year of study. Depression-related experiences included whether participants personally experienced depressive symptoms, knew someone with a clinical diagnosis of depression, and had previously exhibited depressive symptoms. Academic exposure was assessed by asking about completion, enrollment, or ongoing participation in psychiatry courses. Mental health service usage was recorded across categories, including counseling services, private psychiatric clinics, psychiatric hospitals, and other mental health resources. Experience with online mental health services was categorized as usually, sometimes, rarely, or never used.

2.3. Quantitative Data Analysis

All the quantitative data were initially entered and cleaned using EpiData. Analyses were conducted in R (version 4.4.2) using the dplyr, FactoMineR, and qmethod packages [43]. Descriptive statistics were computed for the sociodemographic and study variables. Categorical variables were summarized as frequencies and percentages via the dplyr package, whereas continuous variables were summarized as means and standard deviations. The Q dataset was transposed so that participants were treated as variables and statements as observations [44]. Principal component analysis (PCA) was used to identify the underlying dimensions. Dimensions with eigenvalues above 1.0, explaining at least 4% of the variance, and collectively accounting for over 50% of the total variance, were retained. The number of factors tested in the Q analysis (typically three to ten) was then determined by combining the PCA results with the qualitative findings. On the basis of both statistical and qualitative findings, five factors were retained, corresponding to five themes: privacy, additional support, expected effectiveness, engagement factors, and the unguided nature.

Q-factor analysis was then performed via the qmethod function, with varimax rotation applied to these dimensions. The analysis resulted in factor loadings for each participant, indicating the degree of alignment between individual Q sorts and each factor. The participants were assigned to the factor on which they had the highest statistically significant loading (>0.40); those who loaded significantly on multiple factors were classified as confounded.

2.4. Factor Interpretation

Factor arrays were calculated for each factor and used as the basis for interpreting the factors (Appendix X). Distinguishing statements were identified as those that ranked significantly differently between one factor and at least three factors, whereas consensus statements were those for which the differences in scores between factors were not

statistically significant on the basis of the standard error of differences (Appendix XI). Interpretation focused on the overall ranking pattern of statements, incorporating as many statements from the factor array as possible. To enhance the meaning and context, post-ranking interview responses from participants loading on each factor were also included [44].

3. Results

3.1. Qualitative Results

The qualitative sample consisted of 26 undergraduate students, comprising 19 IDIs and one FGD with 7 participants. The mean age of the participants was 21.11 years (SD = 1.59), and the majority were female (61.54%). Students were relatively evenly distributed across different fields of study and academic years, ranging from the first to fifth years. Although final-year students were contacted, they declined to participate because of academic demands (Appendix II). Qualitative analysis revealed five themes related to students' perspectives on UPID: privacy, expected effectiveness, expert support, engagement factors, and the unguided nature of the platform (Table 1).

Table 1. Themes and subthemes of student perspectives on UPID

Themes	Subthemes	Quotation samples
Privacy	Privacy concerns	"I am afraid that the program cannot secure my information. This makes me hesitant to participate." 20-year-old male IDI 4
	Privacy trade-off	"If the expert can help, I am willing to share my information." 21-year-old female IDI 14
	Secured privacy	"I do not want people I know to access my information. I feel reassured when my personal information is kept confidential" 22-year-old male, FGD
Expected effectiveness	Depressive symptoms management	"I think it could be effective with mild depression. If we can identify issues early, we can reduce the symptoms with provided contents." 23-year-old female IDI 3
	Effectiveness-related factors	"The disadvantage is that there's no detailed guidance to fully explain what you need to know. So UPID might not be effective."
	Knowledge and skills acquisition	"The program can provide sufficient knowledge and skills for preventing depression." 21-year-old male IDI 13
Expert support	Professionalism	"I prefer personalized counseling. It is more effective because it is tailored to individual needs. In that case, it will be more reliable. UPID is less reliable." 23-year-old female IDI 2
	Therapeutic relationship	"Counselors can help relieve some pressure by listening and providing solutions. UPID might lack listening." 20-year-old female IDI 16
Engagement enablers & barriers	Cost	"Students would consider it more carefully. The higher the fee, the more they will hesitate." 21-year-old male IDI 11
	Motivation	"When people see that others like them have succeeded, they will be more confident and motivated. Seeing strangers sharing their success can build trust." 23-year-old male IDI 1 "So seeing results quickly will be motivating to engage more." 20-year-old female IDI 16
	Temporal factors	"If it is too long, like for someone without serious issues, they might get bored and quit." 22-year-old female IDI 7
Unguided nature	Accessibility	"Well, with a phone call or direct counseling, you only remember what was said at that moment. Later, if you need to review the information, you will not have a record. However, with UPID, you can refer back to it if needed. With direct conversations, it is harder to recall details. You might forget and need to ask again. However, with UPID you can always go back and review. It might help the effectiveness." 21-year-old male IDI 13
	Content properties	"The images should be cute, in a nice style, which would be more appealing to students" 23-year-old female IDI 2
	Self-care	"It seems appropriate for students, especially those who feel a bit down and want to handle things on their own first before seeking counseling." 20-year-old female IDI 16
	Stigma	"Many people feel uncomfortable about visiting a mental health hospital, thinking it is somewhat stigmatizing. They are reluctant to say, 'I'm going to a mental health check-up." 23-year-old female IDI 3

3.1.1. Privacy

The theme reflects the importance of confidentiality when using UPID. It comprises three subthemes: secured privacy, privacy concerns, and privacy trade-offs. Many students highlighted that having secured privacy creates a sense of safety and encourages them to share information more openly. In other words, they felt assured that sensitive details would not be exposed beyond the intervention. This sense of protection strengthened their willingness to disclose sensitive information that is essential in any mental health service: "I do not want people I know to access my information. I feel reassured when my personal information is kept confidential." (Male, 22 years old, FGD). Several students were concerned about the potential leakage of information. This violation could lead to decreased participation. Such concerns suggest that even a perceived risk of data exposure can undermine trust and discourage students from engaging with UPID: "I am afraid that the program cannot secure my information. This makes me hesitant to participate." (Male, 20 years old, IDI 4). Some participants were willing to share personal information with counselors if it led to improved professional guidance, illustrating a trade-off between privacy and benefit: "If the expert can help, I am willing to share my information." (Female, 21 years old, IDI 14). In brief, privacy strongly shapes students' decisions to use UPID. Securing confidentiality increases their willingness to share information, whereas concerns about data leakage reduce participation. Some students may still disclose personal information when professional guidance offers clear benefits.

3.1.2. Expected Effectiveness

This theme reflects students' perceptions of the potential health-related benefits of UPID and possible barriers. Three subthemes were identified: knowledge and skills acquisition, control of depressive symptoms, and effectiveness-related factors.

Knowledge and skills acquisition refers to students' perception that UPID can provide the necessary knowledge and coping skills for preventing depression, including recognizing symptoms, managing stress, and effective communication. Most participants trusted that the program could provide them with essential knowledge and skills: "The program can provide sufficient knowledge and skills for preventing depression." (Male, 21 years old, IDI 13). With respect to depressive symptom control, several students perceived UPID as effective for mild depression: "I think it could be effective with mild depression. If we can identify issues early, we can reduce the symptoms with the provided content." (Female, 23 years old, IDI 3). However, UPID was perceived as less effective for severe cases: "It would not be effective for severe cases where the depression has already significantly impacted the person's life. This situation requires a specialist's intervention" (Female, 21 years old, IDI 6). These views suggest that students generally expect UPID to provide mental health education and support mild cases of depression. However, they perceive its utility as limited for severe cases, which require clinical care. These views imply that students draw a clear boundary between what UPID can handle—mild or emerging symptoms—and situations where professional care becomes essential.

Effectiveness-related factors include barriers such as a lack of guidance and time constraints. Some students worried that unguided content could be misunderstood due to insufficient guidance: "The disadvantage is that there is no detailed guidance to fully explain what you need to know. Therefore, UPID might not be effective." (Female, 22 years old, IDI 19). A few participants noted time-related challenges, reporting that a program that is too long might cause loss of interest, whereas one that is too short may be ineffective: "I think it might be difficult for it to be effective in such a short time, and if it is too long, participants may lose interest." (Female, 23 years old, IDI 8). These perspectives show that although students expect UPID to be effective, they remain concerned that limited guidance and inappropriate time allocation could reduce both its perceived impact and their willingness to engage.

3.1.3. Expert Support

Expert support refers to professionals, including psychological counselors and psychiatrists, when necessary. This theme comprises two subthemes: professionalism and therapeutic effects. With respect to professionalism, many students perceived that the availability of expert support enhances the reliability and personalization of UPID. Most students indicated that experts could provide personalized guidance. One participant stated, "Without guidance, UPID won't provide specific treatment plans professionally" (Female, 21 years old, FGD). Another participant noted, "I prefer personalized counseling. It is more effective because it is tailored to individual needs. In that case, it will be more reliable" (Female, 23 years old, IDI 2). The therapeutic effects subtheme emphasized that interaction with experts provides emotional support and empathy. The lack of such interaction in UPID may reduce students' sense of being understood. The presence of experts was also perceived to help students feel more comfortable when participating. One participant stated, "Counselors can help relieve some pressure by listening and providing solutions. UPID might lack listening." (Female, 20 years old, IDI 16). These results suggest that expert support plays a crucial role. Experts not only provide more personalized assistance but also strengthen participants' trust in UPIDs.

3.1.4. Engagement Factors

Motivation reflects factors that enhance engagement with UPID. Most students are motivated by mental health benefits, such as gaining knowledge and skills and observing the success of others. One participant stated, "When people see that others like them have succeeded, they'll be more confident and motivated. Seeing strangers sharing their success can build trust" (Male, 23 years old, IDI 1). Additionally, perceiving early effectiveness from participation was seen as important for maintaining engagement: "So seeing results quickly will be motivating to engage more." (Female, 20 years old, IDI 16). Moreover, some students noted that external incentives could encourage initial participation and retention, particularly among healthy students with less urgent needs. One participant commented, "For most healthy students, incentives such as additional grades or certificates can help with retention and initial participation." (Female, 22 years old, IDI 7). The results imply that health-related motivations may not fully drive engagement, especially when effectiveness is perceived as low. Additional benefits, such as academic credits or certificates, can therefore play a crucial role in attracting and sustaining participation.

Temporal factors highlighted the influence of program timing and duration on participation. Many students stated that an extended duration could lead to a loss of patience, and the registration period also affected their engagement. One participant explained, "If it starts at the beginning of the semester, students are more likely to have free time and participate. However, if it's in the middle of the semester, they might be too busy with exams and studies, and participation will likely drop." (Male, 23 years old, IDI 15). Others noted that if the program is too long, particularly

for students without serious mental health issues, they might become bored and discontinue participation: "If it's too long, like for someone without serious issues, they might get bored and quit." (Female, 22 years old, IDI 7). These accounts suggest that students' engagement is effected by both study workload and program length, and they expect UPID to fit into academic schedules without creating additional burdens.

The cost subtheme indicated that even small fees might reduce participation, as students would consider joining more carefully. "Students would consider it more carefully. The higher the fee, the more they hesitate." (Male, 21 years old, IDI 11). However, some participants stated that if the program provided significant mental health benefits, they would be willing to pay a small amount: "I don't think a small amount of fee affects much because there are benefits." (Male, 20 years old, IDI 4). This pattern shows that cost is a conditional barrier: students are cautious about payment but remain open to low fees when they perceive clear benefits.

These findings suggest that UPID may be more acceptable when it demonstrates early progress, offers manageable time commitments, and maintains reasonable costs, as these factors influence students' willingness to participate and continue.

3.1.5. Unguided Nature

The theme emphasizes the unique benefits and barriers of self-directed participation in UPID. The four subthemes are accessibility, stigma, self-care, and content properties. Accessibility captures the characteristics of accessing unguided interventions. First, many students agreed that UPID allows participation at any time and from anywhere, providing flexibility and autonomy. One participant explained, "It allows participation anytime, anywhere. If a student faces an issue over the weekend or during holidays, they can still access help" (Female, 22 years old, IDI 7). Second, by providing expert information, UPID can facilitate early access to professional care for those with severe symptoms: "It should inform students about when it's necessary to seek medical help or use medication. Therefore, I think students with serious problems can see the doctor earlier" (Female, 23 years old, IDI 2). These views suggest that students value the convenience of UPID not only for its flexible use but also for its potential to inform timely decisions about seeking formal care.

With respect to the delivery platform, students preferred online modalities, including social media, websites, and mobile applications, over printed materials. Social media was valued for outreach, whereas mobile applications aligned with students' smartphone use and offered high accessibility. Possible barriers included the requirement for digital literacy and potential distractions, particularly on social media platforms. One student mentioned, "UPID could work, but it might be too distracting if delivered through a social media platform." (Female, 22 years old, IDI 19). These reflections suggest that while online formats enhance accessibility, their effectiveness depends on minimizing distractions and ensuring users have adequate digital skills.

The content properties were also emphasized. Students expressed greater trust when the UPID content was designed by experts. However, they stressed that content should be easy to understand, include appropriate illustrations, and be actionable for the target audience. This indicates that credibility alone is insufficient; students expect expert-developed content to be presented in a clear, engaging, and practical manner to support self-directed use.

3.1.6. Stigma

Most students agreed that unguided access could reduce the stigma associated with seeking mental health support, as it allows them to engage privately without fear of judgment or being seen using mental health services. One participant stated, "Many people feel uncomfortable about visiting a mental health hospital, thinking it's somewhat stigmatizing. They are reluctant to say, 'I'm going to a mental health check-up.'" (Female, 23 years old, IDI 3). These finding suggest that privacy in the initial stages of help-seeking is highly valued, and unguided formats provide a discreet entry point that lowers the psychological barrier to accessing support.

3.1.7. Self-Care

With UPID, students can manage their mental health before seeking professional support, giving them a sense of autonomy and allowing early self-intervention before symptoms escalate. One participant noted, "It seems appropriate for students, especially those who feel a bit down and want to handle things on their own first before seeking counseling" (Female, 20 years old, IDI 16). This indicates that students view UPID as a tool that empowers them to address mental health concerns independently, aligning with their preference for managing early or mild symptoms on their own.

3.2. Q-Sorting Results

3.2.1. Q-Factor Analysis

Quotations from the qualitative data and literature review were categorized by theme, resulting in a final Q set of 56 statements used for piloting and Q sorting (Appendix III). Minor wording adjustments were made for clarity. Some

statements remained relatively long, even after adjustments were made to capture both the attributes and the utility of UPID. The students confirmed that the statements broadly covered the key aspects of the intervention. The time required to complete the Q sorting task ranged from 45-60 minutes.

In the Q sorting phase, 50 undergraduate students with a mean age of 21.4 years (SD = 1.46) participated. The majority were female (62%) and came from seven disciplines, with the most common majors being pharmacy (20%), dentistry (18%), and preventive medicine (18%). The participants came from all years of study, with the highest percentages in the second year (28%) and fifth year (22%). Approximately 32% knew someone with depressive symptoms, whereas 20% knew about someone who was formally diagnosed. Additionally, 18% reported past depressive symptoms, but none had a formal diagnosis. Only 38% had ever taken a course in psychiatry. The majority (82%) had never used mental health services, with counseling being the most commonly used service (10%), and 4% had visited a private psychiatric clinic. With respect to technology use, 26% frequently 18% sometimes used healthcare applications (Appendix V).

3.2.2. Principal Component Analysis (PCA)

PCA identified the underlying dimensions of participants' preferences for UPID. Each dimension represents a shared pattern of viewpoints, with participants loading on the same dimension reflecting similar ways of evaluating UPID. Five dimensions, which collectively explained 54.67% of the total variance, were retained for further analysis (Appendix VI).

3.2.3. Q-Analysis

The Q method analysis yielded factor loadings for each Q sort on the identified factors. Q sorts were assigned to a factor if their loadings exceeded the statistical threshold ($p < 0.05$) and their squared loading on that factor was greater than the sum of squared loadings on all other factors (R Core Team, 2024) (Appendix VII). Factor 1 included the largest number of Q sorts (11), indicating that it was the most commonly observed pattern of viewpoints among the participants. Factors 4 and 5 included only 4 Q-sorts each, reflecting less common patterns (Figure 2). All the factors showed high reliability coefficients (0.94–0.98) and low standard errors of factor scores (0.15–0.24), indicating a stable and consistent factor solution (Appendix VIII). The interfactor correlations ranged from 0.28 to 0.63, suggesting moderate associations among factors (Appendix IX). In brief, the results suggest that the viewpoint patterns are unevenly distributed within the sample. They also indicate that some patterns overlap, sharing certain elements rather than being entirely distinct from one another.

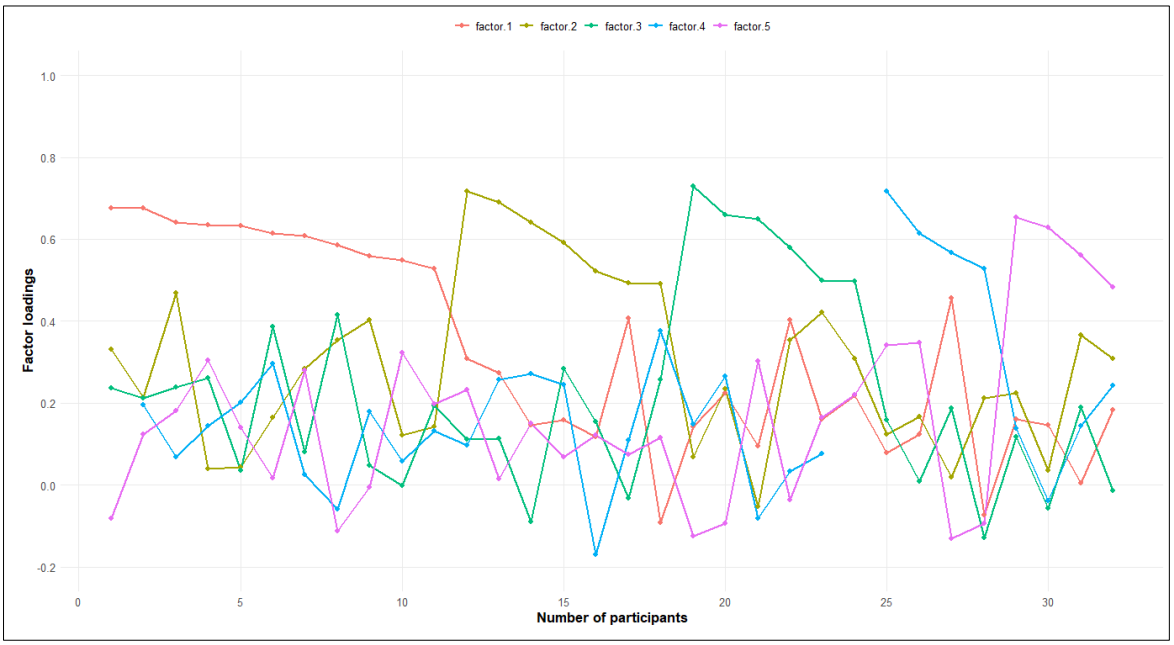


Figure 2. Factor loadings of each participant across five factors in the Q‐method analysis

3.3. Factor Interpretation

3.3.1. Factor 1: Effectiveness-Oriented and Optimistic Attitudes (Figure 3)

Group 1 considered the effectiveness of UPID as the primary motivator for participation (S10:-5) while de-emphasizing the need for external incentives (S9:-3). Participant 21 explained, "My main motivation to participate

comes from health-related benefits, while other incentives are secondary. Such external rewards can be obtained elsewhere; joining UPID should focus on its content and effectiveness." They were optimistic that UPID is professional (S14:-4) and capable of meeting individual needs (S53:-5), particularly when the content is diverse (S31:3). They also trust UPID even without direct expert interaction (S27:-3). The lack of direct support is not seen as reducing effectiveness (S22:-4), and limited feedback does not create a sense of being unheard (S12:-3). In summary, this group values UPID professionalism and flexibility, with minimal interaction having little impact on engagement.

Although this group has a positive attitude toward UPID, they remain cautious about overall effectiveness and therefore seek evidence to reinforce their trust. Their confidence increases when positive feedback is available (S8:4, S26:4), when early results are observed (S28:4), and when content is developed by experts (S55:4). In addition, while privacy is considered important (S1:5, S5:5, S6:5), they recognize that expert awareness of personal information can further enhance effectiveness (S16:2) without reducing participation (S3:-4). Participant 13 noted, "I can share my information to help experts better understand my situation and problems".

Collectively, these perspectives form a distinct user group. They are comfortable with the lack of human interaction as long as the program demonstrates competence and observable benefits. This indicates a user profile that relies more on measurable results than on direct interpersonal support.

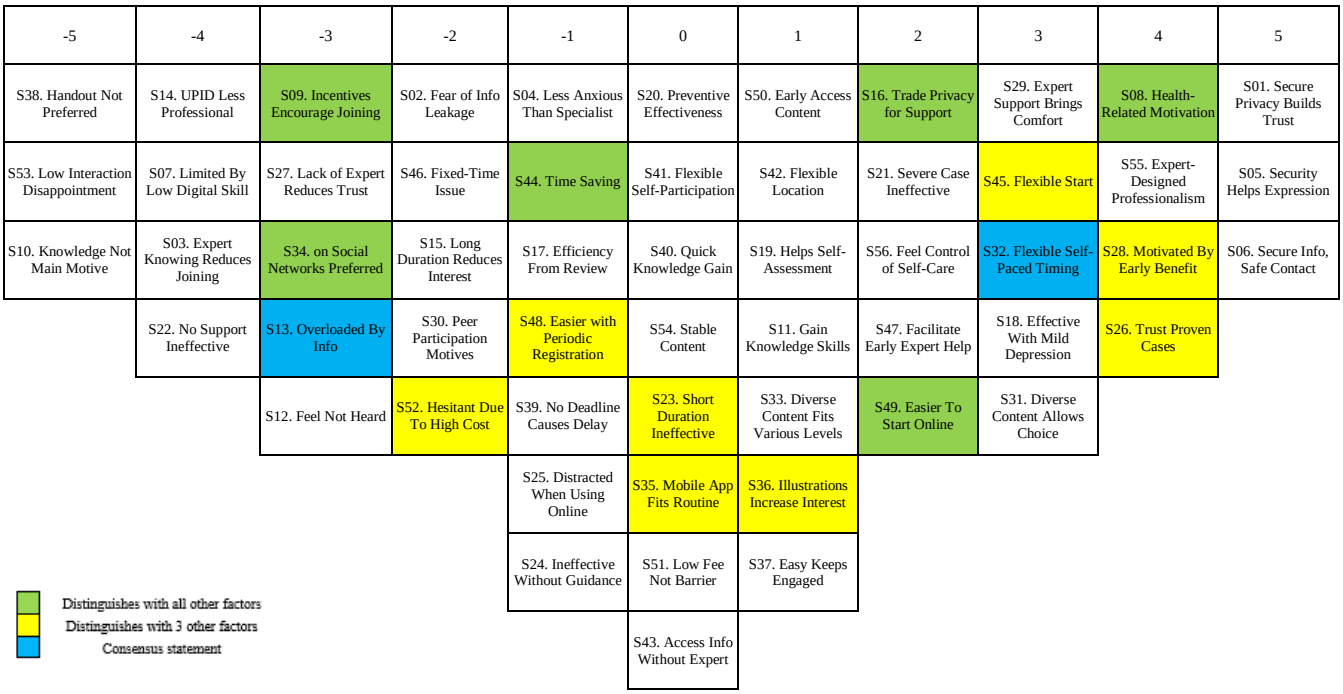


Figure 3. Effectiveness-oriented and optimistic attitudes

3.3.2. Factor 2: Practical Effectiveness and Engagement Group (Figure 4)

Group 2 was confident in achieving essential knowledge and skills (S11:4), which are their primary motivations (S10:-5). The participants perceived that UPID would be effective for enhancing knowledge and skills across different levels of depression (S21:-3), particularly when it was developed by experts (S55:4). This confidence was supported by program features such as reviewable content (S17:4), diverse content (S31:3), and perceived effectiveness even without direct expert interaction (S22:-5). However, they remained neutral regarding the effectiveness of UPID in reducing depressive symptoms.

The group was confident in their commitment when UPID allows self-paced learning (S32:4) and flexible timing (S45:4). UPID is also suitable for their habits, including using mobile applications (S35:3) and reading printed materials (S38:-4). Additional benefits further encourage full participation (S9:3). Notably, obstacles such as high costs (S52:-3) or fixed schedules (S46:-4) do not reduce participation. Moreover, the group continues to engage even when experts are aware of personal information (S3:-4), despite prioritizing privacy (S1:5, S5:5, S6:5).

Group 2 represented users who place their trust primarily in the practical effectiveness of UPID, meaning its ability to deliver reliable knowledge and skills rather than reduce clinical symptoms. This confidence is supported by expert-developed and reviewable content. Their engagement is strengthened when UPID is self-paced and accompanied by additional benefits, and it remains stable even when costs or fixed schedules are present.

-5	-4	-3	-2	-1	0	1	2	3	4	5
S39. No Deadline Causes Delay	S23. Short Duration Ineffective	S21. Severe Case Ineffective	S43. Access Info Without Expert	S26. Trust Proven Cases	S18. Effective with Mild Depression	S08. Health-Related Motivation	S29. Expert Support Brings Comfort	S55. Expert-Designed Professionalism	S45. Flexible Start	S01. Secure Privacy Builds Trust
S22. No Support Ineffective	S46. Fixed-Time Issue	S49. Easier to Start Online	S04. Less Anxious Than Specialist	S16. Trade Privacy for Support	S42. Flexible Location	S28. Motivated By Early Benefit	S50. Early Access Content	S31. Diverse Content Allows Choice	S32. Flexible Self-Paced Timing	S05. Security Helps Expression
S10. Knowledge Not Main Motive	S03. Expert Knowing Reduces Joining	S02. Fear of Info Leakage	S25. Distracted When Using Online	S41. Flexible Self-Participation	S19. Helps Self-Assessment	S56. Feel Control of Self-Care	S37. Easy Keeps Engaged	S36. Illustrations Increase Interest	S11. Gain Knowledge Skills	S06. Secure Info, Safe Contact
	S38. Handout Not Preferred	S52. Hesitant Due to High Cost	S15. Long Duration Reduces Interest	S24. Ineffective Without Guidance	S33. Diverse Content Fits Various Levels	S47. Facilitate Early Expert Help	S20. Preventive Effectiveness	S35. Mobile App Fits Routine	S17. Efficiency From Review	
		S13. Overloaded By Info	S12. Feel Not Heard	S27. Lack of Expert Reduces Trust	S54. Stable Content	S40. Quick Knowledge Gain	S34. On Social Networks Preferred	S09. Incentives Encourage Joining		
				S14. UPID Less Professional	S51. Low Fee Not Barrier	S44. Time Saving				
				S53. Low Interaction Disappointment	S30. Peer Participation Motives	S48. Easier With Periodic Registration				
					S07. Limited By Low Digital Skill					

Distinguishes with all other factors
Distinguishes with 3 other factors
Consensus statement

Figure 4. Practical effectiveness and engagement group

3.3.3. Factor 3: Maximum Benefit: Effectiveness – Incentives – Convenience (Figure 5)

This group expects to gain the maximum health-related and practical benefits, including additional incentives, convenience of participation, and cost savings. They are motivated by the acquisition of knowledge and skills from UPIDs (S10:-5). They are confident that the program can help manage mild depression (S18:4) and support early prevention (S50:3), even within a short timeframe (S23:-4), and with limited direct expert support (S22:-5, S27:-4, S53:-3, S12:-3). Their participation is enhanced by additional incentives, such as points or certificates (S9:4). Participant 32 noted that "Suitable additional incentives are important and help maintain participation." The group also values convenience, finding UPIDs suitable for mobile applications (S35:3), those with sufficient digital literacy (S7:-3), and those with printed materials (S38:-4). The program is considered easy to start (S49:5), allows easy access to information (S43:5), accommodates self-paced progress (S32:3), and saves time compared with meeting a professional (S44:5). Finally, they would be reluctant to participate when costs are high (S52:4). Participant 5 explained, "For healthy students, high fees strongly influence the decision to participate. Since health-related needs are less important than external benefits are, the cost becomes a key consideration". Group 3 represents users who seek maximum benefits from UPID, combining health-related gains with external incentives and convenience. Their expectations extend beyond symptom management to include rewards, flexibility, and low costs as essential features sustaining their participation.

-5	-4	-3	-2	-1	0	1	2	3	4	5
S03. Expert Knowing Reduces Joining	S27. Lack of Expert Reduces Trust	S07. Limited By Low Digital Skill	S05. Security Helps Expression	S17. Efficiency From Review	S01. Secure Privacy Builds Trust	S31. Diverse Content Allows Choice	S11. Gain Knowledge Skills	S32. Flexible Self-Paced Timing	S55. Expert-Designed Professionalism	S44. Time Saving
S22. No Support Ineffective	S02. Fear of Info Leakage	S14. UPID Less Professional	S06. Secure Info, Safe Contact	S34. On Social Networks Preferred	S45. Flexible Start	S37. Easy Keeps Engaged	S36. Illustrations Increase Interest	S35. Mobile App Fits Routine	S09. Incentives Encourage Joining	S43. Access Info Without Expert
S10. Knowledge Not Main Motive	S23. Short Duration Ineffective	S53. Low Interaction Disappointment	S54. Stable Content	S24. Ineffective Without Guidance	S29. Expert Support Brings Comfort	S56. Feel Control of Self-Care	S08. Health-Related Motivation	S50. Early Access Content	S18. Effective With Mild Depression	S49. Easier To Start Online
	S38. Handout Not Preferred	S12. Feel Not Heard	S16. Trade Privacy for Support	S25. Distracted When Using Online	S20. Preventive Effectiveness	S47. Facilitate Early Expert Help	S40. Quick Knowledge Gain	S28. Motivated By Early Benefit	S52. Hesitant Due To High Cost	
		S13. Overloaded By Info	S46. Fixed-Time Issue	S15. Long Duration Reduces Interest	S48. Easier With Periodic Registration	S42. Flexible Location	S51. Low Fee Not Barrier	S26. Trust Proven Cases		
				S21. Severe Case Ineffective	S33. Diverse Content Fits Various Levels	S19. Helps Self-Assessment				
				S39. No Deadline Causes Delay	S41. Flexible Self-Participation	S30. Peer Participation Motives				
					S04. Less Anxious Than Specialist					

Distinguishes with all other factors
Distinguishes with 3 other factors
Consensus statement

Figure 5. Maximum benefit: effectiveness – incentives – convenience

3.3.4. Factor 4: Privacy‐ Prioritized (Figure 6)

A strong prioritization of privacy characterized group 4. A high level of privacy plays a crucial role in expressing problems (S5:5) and fosters confidence in use, enabling secure contact with experts (S1:4, S6:4). At the same time, they are concerned about potential leakage of personal information (S2:5), and participation decreases if experts are aware of such information (S3:4). They believed that disclosing information to experts does not increase support (S16:-5). Participant 30 stated, "I disagree with the idea that sharing personal information with professionals improves support. I am afraid of exposing sensitive information or being scammed." However, they agree that the presence of expert support still provides reassurance (S29:4).

Despite these privacy concerns, they trust that UPID offers health-related benefits with the primary motivation of acquiring knowledge and skills from UPID (S10:-3). They perceive UPID as professional (S14:-5) and find that it meets their expectations even with minimal expert interaction (S27:-3). The program is considered potentially effective for mild depression (S23:-3), but they do not view it as effective across all severity levels, even with diverse content (S33:-4). Notably, they are not motivated by the performance or involvement of others (S8:-4, S30:-3). In terms of accessibility, they are highly familiar with mobile applications (S35:5) and printed materials (S38:-1). They are not limited by digital literacy (S7:-3). They also feel confident that using UPID will not lead to distraction (S25:-5). Participant 32 noted, "I strongly support using a phone-based platform since most of my daily activities are already connected to my mobile phone."

In brief, group 4 consists of users who place the highest priority on protecting their personal information. When privacy is fully ensured, they are willing to engage with UPID and view it as applicable, primarily through web- or mobile-based platforms. This reflects a privacy-first user profile in which confidence in data protection is the key condition for participation.

Figure 6. Privacy‐ Prioritized

3.3.5. Factor 5: Expert‐ Trusting (Figure 7)

Group 5 was motivated primarily by acquiring knowledge and skills (S10:-5) and places high value on the role of experts in achieving effectiveness. They feel reassured and are more willing to participate when expert support is available (S29:5); consequently, a lack of interaction with experts reduces their sense of being heard and trust in UPIDs (S27:4; S12:3). While they acknowledge that UPID may save time (S44:3), they remain skeptical about its effectiveness: they consider UPID ineffective for severe depression (S21:4) and neutral regarding its effectiveness for mild depression or its capacity to deliver knowledge and skills independently (S18:2, S11:1). This skepticism may have derived from concerns that they may misinterpret UPID content without expert guidance (S24:5), even when the content is structured (S54:-5), and that UPID cannot efficiently provide knowledge without expert support (S40:-4; S43:-4). As a result, they expect UPID to present content in a clear and easy-to-follow manner to maintain engagement and motivation (S36:3; S37:4), and they report that they do not find UPID easy to start using (S49:-3). Participant 41 emphasized that "Without expert guidance, I might misunderstand complex content such as psychological issues, medication, or self-harm topics." Although Group 5 values privacy—seeing it as important for comfortable sharing,

secure use of UPID, and contacting experts (S1:4, S5:5, S6:3)—they believe that expert awareness of personal information does not reduce participation (S3:-4) and did not express concern about potential information leakage (S2:-3). Group 5 represents users who strongly rely on expert involvement to ensure an accurate understanding and appropriate personalization. They viewed minimal-guidance UPIDs as insufficient for delivering meaningful benefits, as expert input is seen as essential for interpreting content safely and effectively.

Figure 7. Expert - Trusting

4. Discussion

This study examined the preferences of HP students for UPID. Using a mixed-method study with a Q-sorting approach, this study explored how students prioritize key features of UPID. The qualitative results revealed five main themes: privacy, expected effectiveness, expert support, engagement factors, and the unguided nature of the intervention. These qualitative results were used to form a concourse of statements for the Q-sorting process, which revealed five distinct viewpoint groups. Overall, the findings highlight the diversity of student preferences for UPID.

Most groups agreed on the importance of privacy and confidentiality, noting that secure privacy protection increased their comfort and engagement with UPID. These results are similar to previous studies, which showed that discomfort in disclosing personal data can reduce participation [45, 46], whereas restricting third-party access enhances engagement [47–49]. Privacy also facilitates the disclosure of personal concerns, supporting evidence that anonymous or confidential interventions encourage help-seeking behaviors [50]. Unlike previous reports, the disadvantages of anonymity, such as reduced trust or feelings of isolation, were not observed [32, 51]. This study revealed differences in privacy preferences among groups. Group 4 prioritized data security and expressed strong concerns about information leakage. In contrast, Group 3 valued health benefits and incentives more highly than privacy protection. The differences may be explained by previous studies, which have shown that perceived benefits can outweigh confidentiality risks [52] and that users in the digital age increasingly accept certain privacy risks. Future interventions should ensure both actual and perceived security while clearly communicating the benefits of participation that can help offset privacy concerns. Such insights can guide the design of UPID programs that enhance engagement without compromising user trust [53].

The expected effectiveness of UPID varied across groups. All groups agreed that UPID was unlikely to be effective for severe depression, which is consistent with prior studies showing that high symptom severity reduces engagement [54] and with clinical guidelines recommending professional involvement for severe cases [55]. Groups 1, 3, and 4 believed that the UPID was effective for mild depression; however, the other groups were uncertain. Prior studies suggest that differences in mental health status and preexisting beliefs may shape these views. Individuals experiencing depressive symptoms may feel more motivated and hopeful about interventions, whereas those who find preventive programs less credible are more likely to doubt their effectiveness. When expectations are low, students may engage less; however, positive attitudes can promote early participation. Future studies should explore the psychological and contextual factors that influence these beliefs to inform the development of more engaging and effective UPID programs [56].

The findings of this study highlight the significant role of expert involvement in unguided preventive interventions for depression (UPIDs). First, programs with content developed by professionals and access to expert support when needed enhance students' confidence and sense of security during participation. Moreover, allowing experts to access personal information did not decrease participation; rather, it was often perceived as an additional source of reassurance. Our findings are consistent with those of previous studies, which indicate that professional guidance improves engagement with digital mental health programs, whereas fully unguided approaches often lead to lower adherence [57]. Emotional connection, login activity, and self-monitoring were also strengthened when expert support was available [58]. Furthermore, users generally view unguided interventions as a complementary option rather than a substitute for face-to-face therapy [59]. Previous studies also demonstrate a strong preference for expert involvement [40, 60]; however, the underlying reasons may differ. In this study, students in group 5 expressed concerns about misinterpreting unguided content without professional support. In contrast, this preference in the two previous studies was more pronounced, as their participants were individuals with existing symptoms [40, 60]. In this context, contact with professionals could provide a therapeutic effect. These comparisons emphasize the need for professional support in both clinical treatment and unguided preventive interventions. In the context of UPID, professional involvement helps students avoid misinterpreting content and increases their confidence in completing program activities. This suggests that UPID models with appropriate support from professionals may increase student acceptability. Implementation research on unguided interventions should explore how to integrate professional resources in a feasible and sustainable manner. This approach would help increase the uptake of UPID while avoiding additional strain on existing resources.

Our findings reveal distinct facilitators of engagement across participant groups. Group 1 was motivated by noticing early improvements after participation. This aligns with previous research, which shows that recognizing early benefits in symptoms, behaviors, or skills enhances engagement [61–64]. Moreover, positive feedback from others is also a facilitator. This result is consistent with a previous study [60]. Students also value services that are recommended by peers with experience of mental health problems. Therefore, future unguided interventions should facilitate early evaluation, such as measuring observable improvements in symptoms or behaviors within the first 1–2 weeks [65]. Current campus mental health programs also promote their effectiveness through anonymous student testimonials. This may help strengthen students' trust in the services already available. However, triggering negative emotions, such as painful memories, can lower engagement [66, 67]. Therefore, it is essential to gather user feedback and incorporate clear emotional support or referral options into program design.

External incentives, such as points and certificates, were strong motivators among groups 2 and 3. Previous studies have shown that incentives can improve the participation of individuals with high life satisfaction and low perceived health needs [68]. Therefore, universal interventions targeting asymptomatic populations should consider context-specific incentives to foster initial participation and maintain long-term engagement [69].

Regarding time-related factors, prolonged waiting periods reduce preferences for face-to-face services and increase preferences for e-mental health options [60]. Similarly, this study shows that students value the temporal convenience of UPID, particularly when delays are minimized and access is more flexible. When UPID demonstrates effectiveness and is promoted appropriately, it also has the potential to reduce pressure related to wait times by enabling earlier referral to professionals. Moreover, its effectiveness for mild cases may help alleviate, to some extent, the shortage of mental health professionals.

Previous studies have shown a positive association between digital literacy and the uptake of unguided or internet-based interventions. In low-resource settings, limited access to digital devices and Internet can further restrict UPID use [70]. However, our findings suggest that students in this study were not constrained by low digital literacy (S7: –4 to 0). This may reflect their confidence in using digital tools, as digital competencies are increasingly required in academic activities. Nevertheless, in low-resource environments, limited digital access may still pose a substantial barrier to UPID engagement. Printed materials may therefore serve as an appropriate alternative format. Notably, none of the factors in this study opposed the use of printed documents (S38: –5 to 0). In summary, research on UPID preferences should consider both digital and printed delivery formats, and implementation strategies should be tailored to the resource conditions of each setting.

Customizing interventions solely based on findings from choice-based studies is not entirely sufficient. This is due to several limitations inherent in these methods [71]. First, choice-based approaches rely on the assumption that users behave in a consistently rational manner, which often does not reflect the realities of mental health service use. Second, the results are derived from hypothetical choice sets rather than actual behaviors, indicating the need to strengthen findings with qualitative insights. Finally, attribute selection is often constrained to reduce respondent burden, which may lead to the omission of attributes that are important for specific user groups. Q-sorting offers strengths that can address these limitations. The Q-set is developed from a comprehensive review of the literature and qualitative sources, ensuring broad coverage of relevant topics. Moreover, factors identified through Q-analysis are enriched with information from post-sorting interviews. In summary, designing effective unguided interventions should incorporate evidence from choice-based studies, Q-sorting studies, and research on actual preferences for existing programs.

In summary, numerous studies on preferences for unguided or Internet-based mental health interventions in the student population have been conducted. However, the heterogeneity in methods indicates the need for a systematic review to identify common preference patterns. Findings from this study reveal various patterns of preferences for UPID. Future research should validate these results by identifying the distribution of preference segments, which would provide a foundation for piloting UPID among university students.

5. Conclusion

This study assessed the preferences of HP students toward UPIDs via a mixed-methods design incorporating Q-sorting. This method revealed distinct preference patterns and the possible reasons behind them, which cannot be explored via survey-based approaches. Five themes emerged from the qualitative phase, namely privacy, expected effectiveness, expert support, engagement factors, and the unguided nature of UPID. These themes were later used to describe each factor in the Q-sorting phase. In the Q-sorting phase, five viewpoint groups were identified, each differing in how they prioritized key features of UPID identified in the qualitative phase. These findings suggest that students do not share a single preference structure but rather form clusters with specific needs and expectations for UPID. Therefore, designing UPIDs requires a comprehensive understanding of the needs of HP students.

Future research should identify the relative importance of each characteristic using a choice-based study, such as a discrete choice experiment. In addition, a latent class analysis design is essential to validate the Q-sorting results and to quantify the proportion of each user type. The results of these studies are valuable for designing suitable UPIDs in university settings in the future. Such evidence can help accommodate the diverse needs reflected in these preference patterns. Moreover, studies examining actual preferences and user behaviors in existing interventions are necessary to evaluate the correspondence between stated and actual preferences. Evidence from research on actual-preference may support the modification and management of existing UPIDs that achieve stronger engagement among HP students.

5.1. Limitations

Although this study was limited to a single health science university, students from diverse disciplines and academic years provided a range of perspectives on UPID preferences. Moreover, Q-methodology is designed to explore subjective viewpoints rather than measure their population distribution; thus, limited generalizability is an inherent feature of the method. Future research should utilize quantitative methods, such as discrete choice experiments or segmentation studies, to assess preference patterns in larger, more representative populations.

Second, Q-methodology involves inherent subjectivity in the selection, sorting, and interpretation of statements. While this limitation is characteristic of the method, to our knowledge, the present study is the first to apply it in exploring distinct preference patterns for UPID. The findings, therefore, provide a foundation for future studies using more representative or quantitative designs to validate and expand these insights.

Another limitation of Q-sorting is that it does not estimate the proportion of each group. Future research could use cluster or latent class analysis to validate the Q-method findings and quantify the proportions of viewpoint groups. Such information would support the design of UPIDs that align more closely with the distribution of student preferences.

Finally, the study relied on stated rather than actual preferences. Nonetheless, this limitation is unavoidable owing to the absence of such interventions for this population. Future studies should investigate actual preferences and user behaviors once UPID programs are implemented.

6. Declarations

6.1. Author Contributions

Conceptualization, T.T.P.; methodology, T.T.P., L.N.C., C.S., S.A., and L.T.T.; software, T.T.P.; validation, L.N.C. and C.S.; formal analysis, T.P.P.; investigation, T.T.P., T.V.D., T.T.N., and N.T.H.; resources, L.N.C.; data curation, T.T.P. and T.V.D.; writing—original draft preparation, T.T.P. and L.N.C.; writing—review and editing, T.T.P. and L.N.C.; visualization, T.V.D. All authors have read and agreed to the published version of the manuscript.

6.2. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

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6.5. Institutional Review Board Statement

The study was approved by the Human Research Ethics Committee of Walailak University on July 24, 2024 (Project No. WU-EC-PU-1-241-67; Certificate No. WUEC-24-266-01).

6.6. Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

6.7. Declaration of Competing Interest

The authors declare that there are no conflicts of interest concerning the publication of this manuscript. Furthermore, all ethical considerations, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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Appendix I: In-Depth Interview and Focused Group Discussion Guide

Qualitative Research Tool: IDI & Focused Group Discussion Guide for Students

1. Rapport

- Introduce the study purpose, confidentiality, and ask participant to self-introduce (age, major, year).
- Explore brierley their understanding and experience of depression, the current situation and needs for depression prevention programs among students.

2. Main topics

Introduce the concept of Unguided Preventive Intervention for Depression (UPID)

- Explain UPID to participants:
  - Prevents onset, progression, or severity of depressive symptoms.
  - Students receive knowledge, skills and practice the practices themselves.
  - Support of expert is minimal
- Ask general impressions: feasibility, usefulness, strengths, weaknesses.

UPID characteristics

- What properties should the program have?
- For each property:
  - How does it affect participation of students?
  - Why is it important?
  - How would changes in this property of the UPID affect your participation?

Suggested properties:

- Contents
  - Knowledge (symptoms, impact, services)
  - Skills (recognition, stress reduction, communication, problem-solving)
- Delivery channels (online: web, app; offline: handouts)
- Time properties
  - Duration (4, 8, 12 weeks)
  - Session frequency & length (1–2 sessions/week, 30–60 min/session)
  - Start time (semester start, mid-semester, ongoing, before/after exams
- Incentives (points, certificates, none)
- Privacy/confidentiality (fully private, experts aware, not secure)
- Personalization (high, low)
- Cost (free, paid)

Instructions for Interviewer

- Ask participants to elaborate in their own words.
- Use probes to clarify or explore depth of responses.
- Record detailed examples, experiences, and quotes wherever possible.

Appendix II: Characteristics of Participants in the Qualitative Phase

n =26 (19 from IDIs, 7 from FGD)		**Frequency (%) / mean (SD)**
Age (Years)		21.11 (SD: 1.59)
Gender	Male	10 (38.46%)
	Female	16 (61.54%)
Discipline	Pharmacy	4 (15.38%)
	General medicine	6 (23.09%)
	Preventive medicine	4 (15.38%)
	Public health	3 (11.54%)
	Nursing	4 (15.38%)
	Traditional medicine	5 (19.23%)
Year of study	1st year	3 (11.54%)
	2nd year	8 (30.77%)
	3rd year	7 (26.92%)
	4th year	4 (15.38%)
	5th year	4 (15.38%)

SD: Standard deviation

IDI: In-depth interview

FGD: Focused group discussion

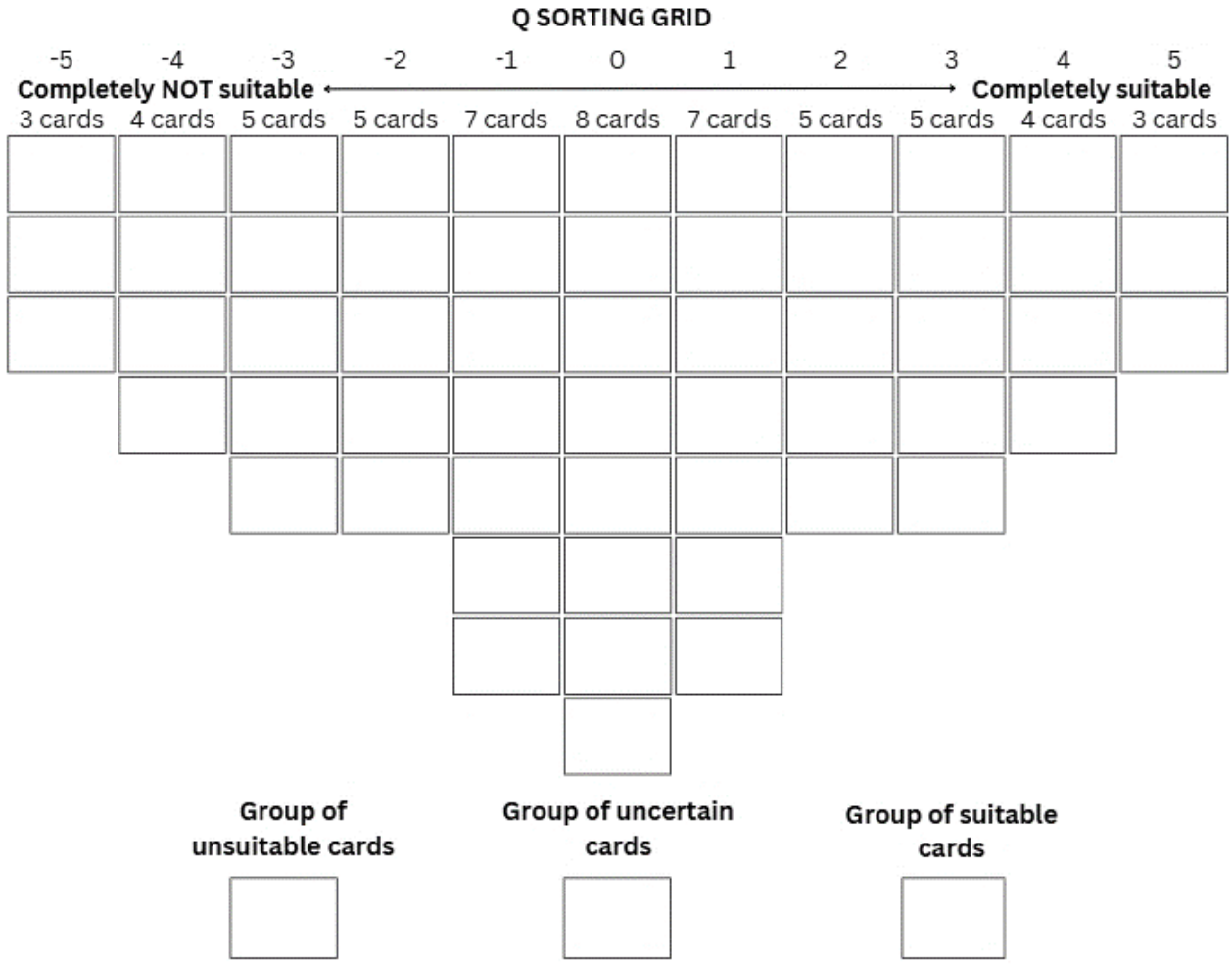
Appendix III: Statements from the Concourse Pool Derived from Qualitative Data and the Literature Review

Quotation	Source	Themes	Statements
We could add success stories and benefits shared by participants. Yes, sharing benefits and success stories. Including testimonials from people who have completed the program. To enhance motivation	Male, 5th General Medicine, 23 years old, IDI 1	Engagement enablers & barriers	S08 Success stories from UPID motivate me to participate more
Incentives can help with retention and initial participation. However, most healthy students, if they know they have a problem, they will seek solutions before it gets worse. For example, I would look for solutions before things get out of hand.	Female, Preventive Medicine, 4th year, 22 years old, IDI 7	Engagement enablers & barriers	S09 Benefits such as points/certificates help me participate fully
First, if I'm participating for the training credits.	Female, 5th year of General medicine, 23 years old, IDI 3	Engagement enablers & barriers	S10 Gaining knowledge and skills to prevent depression are not my main motivation for participating.
If it is too long, like for someone without serious issues, they might get bored and quit.	Female, 4th year, General Medicine, 22 years old	Engagement enablers & barriers	S15 UPID time is too long will make me not want to participate, maintain
Yes, exactly. UPID could work, but it might be too distracting if online on social media platform	Female, 4th year of Traditional Medicine, 22 years old, IDI 19	Engagement enablers & barriers	S25 I can be distracted using UPID online vs going to see a specialist
I think creating a forum where people can share their success stories would be beneficial. When people see that others like them have succeeded, they will be more confident and motivated. Seeing strangers sharing their success can build trust. In addition, of course, other features could be added.	Male, 5th General Medicine, 23 years old, IDI 1	Engagement enablers & barriers	S26 I trust UPID more when there are real cases of effectiveness after using UPID
To maintain participation, if a student joins once and sees an improvement in their condition, they will likely come back.	Female, 3rd year of RHM, 21 years old, IDI 6	Engagement enablers & barriers	S28 When I realize the early effectiveness of UPID, I will continue to participate
Yes, I think, for example, if we want to relieve stress. There should be people doing it together According to me, most students in our school Spend almost 12 hours together every day. If they're in the same rotation. It could be 18-19 hours a day. So having friends around could provide more energy.	Male, 5th General Medicine, 23 years old, IDI 1	Engagement enablers & barriers	S30 When I know that more students are participating, I will be more willing to join UPID
Yes. I prefer self-pace so I can do it according to my schedule	Female, 1st Public Health, 19 years old, IDI 5	Engagement enablers & barriers	S32 UPID with flexible timings allows me to work at my own pace
If in the material, It does not recommend a specific time, I think the adherence rate would be low due to the procrastination	Male, 5th General Medicine, 23 years old, IDI 1	Engagement enablers & barriers	S39 UPID does not give a deadline for implementation which makes me prone to delay implementation
If we follow a fixed schedule, it can be a bit restrictive. However, if you leave it to the last day, Some people might end up cramming. I think it is better to leave it flexible, allowing people to do it whenever they want.	Female, 2nd year of Nursing, 20 years old. IDI 12	Engagement enablers & barriers	S46 Fixed time UPID registration does not meet my need in time
If it starts at the beginning of the semester, students are more likely to have free time and participate. However, if it is in the middle of the semester, they might be too busy with exams and studies, and participation will likely drop.	Male, 5th year General Medicine, 23 years old, idi 15	Engagement enablers & barriers	S48 UPID is organized with periodic registration which makes it easier for me to participate.
Overall, if there's a fee, students would not mind paying if it is reasonable.	Male, 5th year General Medicine, 23 years old, idi 15	Engagement enablers & barriers	S51 Low entry fee does not hinder me from joining UPID.
Students would consider it more carefully. The higher the fee, the more they will hesitate.	Male, 3rd public health, 21 years old, IDI 11	Engagement enablers & barriers	S52 UPID has high fees which would make me hesitant to join.
If the program provides enough knowledge and practical solutions, it could be effective in preventing depression	Male, Preventive Medicine, 3rd year, 21 years old, IDI 13	Expected effectiveness	S11 UPID online helps me gain the necessary knowledge and skills
Previous studies suggested that unguided self-help interventions may be effective for individuals with subthreshold depressive symptoms	Digital mental health interventions: an opportunity to enhance care while preserving human connection (Article)	Expected effectiveness	S18 With the knowledge and skills from UPID, I will effectively deal with mild depression/S50 UPID helps me access depression prevention content earlier.
Then, I can identify several issues through the survey by my self.	female, 4th year. Preventative medicine. 22 years old	Expected effectiveness	S19 UPID helps me self-assess my level of depression
The group, which has no symptoms, will use the program to help them self-regulate, so their condition would be stable.	Female, 3rd year general medicine, 21 years old (IDI 14)	Expected effectiveness	S20 Practicing UPID fully will help me achieve effectiveness in preventing depression
Internet-based programs are an attractive, low-threshold and cost-effective option for students at universities, particularly for preventive measures, for which the willingness to try and invest a lot of time and money is usually low	Evaluation of the effectiveness of a 7-week minimal guided and unguided cognitive behavioral therapy-based stress-management APP for students (Article)	Expected effectiveness	S20 Practicing UPID fully will help me achieve effectiveness in preventing depression
Because if someone is already depressed, providing such materials might not help much. If the depression is severe, the student must go to see the doctor	Female, Preventive Medicine, 4th year, 22 years old, IDI 7	Expected effectiveness	S21 If I have severe depression, UPID will not be effective due to lack of professional support.
The disadvantage is that there's no detailed guidance to fully explain what you need to know. So UPID might not be effective	Female, 4th year of Traditional Medicine, 22 years old, IDI 19	Expected effectiveness	S22 UPID will not work as I have to complete it on my own without much direct support
I think it might be difficult for it to be effective in such a short time.	Female, 5th year Pharmacy, 23 years old, IDI 8	Expected effectiveness	S23 With the UPID time too short, It will not be effective with me
The lack of guidance means there's no evaluation of the treatment's effectiveness. guidance means there's no evaluation of the treatment's effectiveness. guidance Without specific guidance, individuals are left to decide their own course of action, like self-learning. This could be problematic because, in a depressed state, it is hard to follow exact instructions or misunderstand the training. They might need someone to guide them more closely or stronger support tools.	Female, 3rd year of RHM, 21 years old, IDI 6	Expected effectiveness	S24 With little guidance, UPID can be ineffective as I may misunderstand the content

I prefer UPID because I can learn quickly and remember the skills.	Male, 3rd year Pharmacy, 21 years old, IDI 9	Expected effectiveness	S40 UPID online will help me gain knowledge and skills quickly
The main pro is that it provides a space for students who need advice or someone to talk to. They have somewhere to go, register, and express their concerns. The counselors can help relieve some pressure by listening and providing solutions. UPID might lack of listening	Female, Nursing 2nd year, 20 years old (IDI 16)	Expert support	S12 UPID lack of immediate response makes me feel unheard.
I think prevention involves psychological counseling where people share their stories with a professional. This professional will assess the risk level of depression. However, without guidance means that they will not provide specific treatment plans professionally. They will just identify the risk but will not guide the individual through the treatment process.	Female, 3rd year of General Medicine, 21 years old (FGD)	Expert support	S14 I feel UPID is less professional than seeing a specialist.
I prefer personalized counseling. It is more effective because it is tailored to individual needs. In that case, It will be more reliable. UPID is less reliable	Female, 5th year of General Medicine, 23 years old, IDI 2	Expert support	S27 The lack of direct interaction with the expert reduces my trust in UPID
I prefer personalized counseling. It is more effective because it is tailored to individual needs. In that case, It will be more reliable	Female, 5th year of General Medicine, IDI 2	Expert support	S29 UPID providing expert support when needed gives me peace of mind to participate.
Messaging can be slow too. People might not reply immediately and scheduling can take time. With phone calls, you often need to schedule ahead, too. It is not like you can just call whenever. Therefore, overall, I prefer face-to-face interaction	Female, 4th of Traditional Medicine, 22 years old, idi 19	Expert support	S53 With little interaction with the expert, UPID failed to meet my own expectations
I prefer them (acquaintances) do not know. I feel secured to keep my personal information	Male, 4th General Medicine, 22 years old, FGD	Privacy	S01 When information is secure, I feel more secure using UPID.
Persons who would have not sought to participate in a preventive intervention due to other individual reasons, such as fear of stigma, would also have access to IMIs.	Prevention of Mental Health Disorders Using internet- and Mobile-Based Interventions: A Narrative Review and Recommendations for Future Research (Article)	Privacy	S01 When information is secure, I feel more secure using UPID.
It can also be of use in higher-income countries, where it can provide increased convenience and accessibility for populations wishing to remain anonymous due to mental health stigma, reduce costs, broaden the reach of treatment, and increase the flexibility of treatment	The Effects of Nonclinician Guidance on Effectiveness and Process Outcomes in Digital Mental Health Interventions: Systematic Review and Meta-analysis (Article)	Privacy	S01 When information is secure, I feel more secure using UPID.
Their preferences for knowledge and confidentiality. Some are worried about their information being exposed.	Male, 3rd year Pharmacy, 21 years old, IDI 9	Privacy	S02 I am afraid to join UPID because I am afraid of personal information leakage
A study assess university students' intentions and use of internet-based self-help resources… indicates that students have low interest in using these resources and face barriers like stigma, privacy, and confidentiality concerns.	Understanding university students' attitudes and preferences for internet-based mental health interventions (Article)	Privacy	S02 I am afraid to join UPID because I am afraid of personal information leakage
I prefer fully anonymous. If privacy is guaranteed this way, students will participate more.	Female, 1st Public Health, 19 years old, IDI 5	Privacy	S03 Having a professional know my personal information could reduce my participation.
If privacy is guaranteed and the counselor does not know you, it is much better. The more privacy, the better. If you do not have to share with others, it is best. Privacy is the most priority for me	Female, 4th Preventive Medicine, 22 years old, IDI 10	Privacy	S03 Having a professional know my personal information could reduce my participation.
Yes, if they know each other, they will not share as freely. Some things are hard to say.	Male, 5th General Medicine, 23 years old, IDI 1	Privacy	S05 UPID with good security makes it easier for me to express my problem
It can provide increased convenience and accessibility for populations wishing to remain anonymous due to mental health stigma, reduce costs, broaden the reach of treatment, and increase the flexibility of treatment	The Effects of Nonclinician Guidance on Effectiveness and Process Outcomes in Digital Mental Health Interventions: Systematic Review and Meta-analysis (Article)	Unguided nature	S04 Using UPID reduces my apprehension compared to seeing a specialist
I think it (privacy) helps them feel more comfortable to contact for help	Male, Preventive Medicine, 3rd year, 21 years old, IDI 13	Privacy	S06 Completely secure personal information helps me feel secure when contacting experts
So I mostly concerned with privacy among my friends or acquaintances. However, if professionals are trying to help, then I would not mind sharing certain details.	Female, 3rd year general medicine, 21 years old (IDI 14)	Privacy	S16 Having my personal information known by a professional helps me get better support.
Yes, I understand. However, I think the benefit of not having experts involved is that students might feel less shy about participating.	Female, Nursing 2nd year, 20 years old (IDI 16)	Unguided nature	S04 Using UPID reduces my apprehension compared to seeing a specialist
Self-help reduces both the time burden associated with visiting a clinic and the impact of stigma, as it is possible to access therapy without others knowing	Practitioner Review: Unguided and guided self-help interventions for common mental health disorders in children and adolescents: a systematic review and meta-analysis (Article)	Unguided nature	S04 Using UPID reduces my apprehension compared to seeing a specialist
Many people feel uncomfortable about visiting a mental health hospital, thinking it is somewhat stigmatizing. They are reluctant to say, "I'm going to a mental health check-up."	Female, 5th year of General Medicine, 23 years old, IDI 3	Unguided nature	S04 Using UPID reduces my embrassment compared to seeing a specialist
Digital literacy is characterized by having the necessary digital skills to use and guide internet-focused technology and feeling comfortable or eager to use digital tools. … These competencies are also essential predictors for using eHealth applications	Understanding university students' attitudes and preferences for internet-based mental health interventions (Article)	Unguided nature	S07 UPID online will limit my participation as I have little skills in using phones and websites
Students' high level of digital literacy makes it easier for them to access and use online interventions, which is also reflected in previous studies in the high level of acceptance and user satisfaction with corresponding programs	Evaluation of the effectiveness of a 7-week minimal guided and unguided cognitive behavioral therapy-based stress-management APP for students (Article)	Unguided nature	S07 UPID online will limit my participation as I have little skills in using phones and websites
Lower digital literacy is seen as a barrier to internet-based interventions	Understanding university students' attitudes and preferences for internet-based mental health interventions (Article)	Unguided nature	S07 UPID online will limit my participation as I have little skills in using phones and websites

Yes, exactly. It makes an impression, but UPID can be overwhelming with too much content.	Male, 4th year General Medicine, 22 years old (IDI 17)	Unguided nature	S13 UPID can be overwhelming for me by providing too much information.
Well, with a phone call or direct counseling, you only remember what was said at that moment. Later, if you need to review the information, you will not have a record. However, with UPID, you can refer back to it if needed. With direct conversations, it is harder to recall details. You might forget and need to ask again. However, with UPID you can always go back and review. It might help the effectiveness	Male, Preventive Medicine, 3rd year, 21 years old, IDI 13	Unguided nature	S17 UPID ensures efficiency as I can review the content.
Should have many options depending on their condition. Different situations for different levels.	Female, 5th year of General medicine, 23 years old, IDI 3	Unguided nature	S31 UPID with diverse content helps me make choices that suit my problems and abilities.
Unguided self-help digital interventions have been argued to provide flexibility and anonymity at a low-cost, offering predesigned content such as videos, exercises or information, that users access at their own pace	Digital mental health interventions: an opportunity to enhance care while preserving human connection (Article)	Unguided nature	S32 UPID with flexible timings allows me to work at my own pace
So I believe the content should be tailored to each group, depending on their level of depression	Female, 3rd year general medicine, 21 years old (IDI 14)	Unguided nature	S33 UPID has a variety of content, will suit any level of depression I have
I think it is alright. If the information is shared on public platforms like social media, Facebook, and so on, it can reach more people. It would be easier to access, and students would not be as hesitant to participate.	Male, 4th year General Medicine, 22 years old (IDI 17)	Unguided nature	S34 I would be more inclined to participate when UPID is organized on social networks
Online and mobile options are suitable. Because students usually use a lot of app	Female, 5th year General Medicine, IDI 2	Unguided nature	S35 UPID on phone app fits my routine
The images should be cute, like nice style, which would be more appealing to students.	Female, 5th year General Medicine, IDI 2	Unguided nature	S36 UPID has many pictures, illustrative videos that will help me be interested in participating
A process starting with simple tasks, to relieve emotions first. Then, moving gradually toward health improvement. This simple process helps me to maintain practice	Male, 5th General Medicine, 23 years old, IDI 1	Unguided nature	S37 UPID is easy to implement, easy to understand will keep me engaged.
Instead of reading printed materials and scrolling on their smartphones, where they can easily access all the information, if they are handed a booklet, I think it is not suitable to my habit"	Male, Preventive Medicine, 3rd year, 21 years old, IDI 13	Unguided nature	S38 UPID in handout form does not suit my reading habits
Yes, it allows participation anytime, anywhere. If a student faces an issue over the weekend or during holidays, they can still access help.	Female, Preventive Medicine, 4th year, 22 years old, IDI 7	Unguided nature	S41 I will proactively participate when UPID content is available 24/7
Yes, it allows participation anytime, anywhere. If a student faces an issue over the weekend or during holidays, they can still access help.	Female, Preventive Medicine, 4th year, 22 years old, IDI 7	Unguided nature	S42 I can choose location, suitable when using UPID online
Therefore, convenience and accessibility. It can help the student to access the information quickly without visiting the professionals	Female, 5th year Pharmacy, 23 years old, IDI 8	Unguided nature	S43 UPID helps me access information without seeing an expert
It saves time, and students can learn about themselves and try to manage it on their own.	Female, 1st Public Health, 19 years old, IDI 5	Unguided nature	S44 UPID online saves me time as I do not have to arrange a meeting with a specialist.
If it is organized as a specific enrollment period during the semester, some might not be ready. They might be free at the beginning of the semester, but when the program opens mid-semester, they might be too busy. if it is flexible, people can join whenever they're available.	Male, 5th year General Medicine, 23 years old, idi 15	Unguided nature	S45 I can decide when to start with UPID with flexible registration time
It should inform students about when it is necessary to seek medical help or use medication. So I think student with serious problem can see the doctor earlier	Female, 5th year of General Medicine, 23 years old, IDI 2	Unguided nature	S47 UPID provides information to experts to help students with moderate/severe depression to access earlier intervention
Yes, I think it is doable, especially at our school. I'm not sure how effective it will be, but I think it can be implemented. It seems appropriate for students, especially those who feel a bit down and want to handle things on their own first before seeking counseling.	Female, Nursing 2nd year, 20 years old (IDI 16)	Unguided nature	S49 I find it easier to start using UPID online than to find an expert to help
This relatively new medium for promoting mental health and preventing MHD introduces a fresh array of possibilities, including the provision of evidence-based psychological interventions that are free from the restraints of travel and time and allows reaching participants for whom traditional opportunities are not an option	Prevention of Mental Health Disorders Using internet- and Mobile-Based Interventions: A Narrative Review and Recommendations for Future Research (Article)	Unguided nature	S49 I find it easier to start using UPID online than to find an expert to help
As a stand-alone measure, IMIs increase the reach of effective psychological interventions.	Prevention of Mental Health Disorders Using internet- and Mobile-Based Interventions: A Narrative Review and Recommendations for Future Research (Article)	Unguided nature	S49 I find it easier to start using UPID online than to find an expert to help/S50 UPID helps me access depression prevention content earlier.
The advantage is that it is easy to access the health education content early	Female, 4th year of Traditional Medicine, 22 years old (FGD)	Unguided nature	S50 UPID helps me access depression prevention content earlier.
A number of studies have recognized the nested structure in the analysis and have shown that therapists do play a significant role in patient outcomes – a phenomenon termed as a therapist effect	A systematic review of therapist effects: A critical narrative update and refinement to Baldwin and Imel's (2013) review (Article)	Unguided nature	S54 I am assured that UPID content is always stable, not affected by human factors
If this program is developed (56:18) by professionals like mental health experts and psychiatrists (56:20), the content will be reliable.	Female, 3rd year general medicine, 21 years old (IDI 14)	Unguided nature	S55 UPID content designed by experts helps me feel the professionalism of UPID
It seems appropriate for students, especially those who feel a bit down and want to handle things on their own first before seeking counseling.	Female, Nursing 2nd year, 20 years old (IDI 16)	Unguided nature	S56 UPID helps me feel in control of my mental health care.
The combination of self-help material with minimal human support via the internet thus increases empowerment of the participants and the degree of self-directed coping	Prevention of Mental Health Disorders Using internet- and Mobile-Based Interventions: A Narrative Review and Recommendations for Future Research (Article)	Unguided nature	S56 UPID helps me feel in control of my mental health care.

Appendix IV: Q-Grid for the Sorting Task



Appendix V: Sociodemographic Characteristics of the Q-Sorted Participants

n = 50		**Frequency (%)**	**Mean (SD)**
Gender	Male	19	38
	Female	31	62
Age (Years)		21.42	1.46
Major	General Medicine	8	16
	Dentistry	9	18
	Pharmacy	10	20
	Nursing	3	6
	Traditional medicine	6	12
	Preventive Medicine	9	18
	Public Health	5	10
Year of study	First year	6	12
	Second year	14	28
	Third year	10	20
	Fourth year	9	18
	Fifth year	11	22
Experience others' depression	Knows someone having depressive symptoms	16	32
	Know someone diagnosed with depression	10	20
	Do not know	9	18
	Not sure	15	30
Self-depression	Used to have depressive symptoms	9	18
	Used to have diagnosis of depression	0	0
	Have not experience	12	24
	Not sure	29	58
Learning psychiatry course	Yes	19	38
	No	31	62
Used mental health services	Psychological counseling	5	10
	Private psychiatric clinic	2	4
	Psychiatric hospital	0	0
	Other	2	4
	Never	41	82
Health care application/website/unguided	Frequently	13	26
	Sometimes	9	18
	Rarely	17	34
	Never	11	22

SD: Standard deviation

Appendix VI: Principal Component Analysis

Dimension	Variance	% of variance	Cumulative % of variance
Dimension.1	17.569	35.139	35.139
Dimension.2	2.831	5.662	40.801
Dimension.3	2.644	5.289	46.09
Dimension.4	2.188	4.377	50.466
Dimension.5	2.1	4.2	54.667
Dimension.6	1.815	3.63	58.297
Dimension.7	1.678	3.356	61.653
Dimension.8	1.415	2.831	64.484
Dimension.9	1.374	2.748	67.232
Dimension.10	1.274	2.549	69.781
Dimension.11	1.17	2.339	72.12
Dimension.12	1.113	2.226	74.346
Dimension.13	1.042	2.085	76.431
Dimension.14	0.933	1.865	78.297
Dimension.15	0.911	1.823	80.119
Dimension.16	0.857	1.714	81.833
Dimension.17	0.8	1.6	83.434
Dimension.18	0.748	1.497	84.93
Dimension.19	0.681	1.362	86.292
Dimension.20	0.651	1.301	87.593
Dimension.21	0.587	1.173	88.767
Dimension.22	0.544	1.087	89.854
Dimension.23	0.513	1.025	90.879
Dimension.24	0.51	1.021	91.9
Dimension.25	0.409	0.818	92.718
Dimension.26	0.39	0.78	93.499
Dimension.27	0.366	0.733	94.232
Dimension.28	0.34	0.681	94.913
Dimension.29	0.321	0.643	95.556
Dimension.30	0.285	0.57	96.125
Dimension.31	0.262	0.524	96.65
Dimension.32	0.215	0.429	97.079
Dimension.33	0.212	0.424	97.503
Dimension.34	0.192	0.385	97.888
Dimension.35	0.177	0.355	98.243
Dimension.36	0.15	0.301	98.544
Dimension.37	0.135	0.27	98.814
Dimension.38	0.117	0.233	99.047
Dimension.39	0.101	0.202	99.249
Dimension.40	0.084	0.169	99.417
Dimension.41	0.072	0.143	99.561
Dimension.42	0.054	0.109	99.67
Dimension.43	0.045	0.09	99.76
Dimension.44	0.036	0.073	99.833
Dimension.45	0.027	0.055	99.888
Dimension.46	0.022	0.045	99.932
Dimension.47	0.015	0.03	99.962
Dimension.48	0.011	0.023	99.984
Dimension.49	0.005	0.01	99.994
Dimension.50	0.003	0.006	100

Appendix VII: Q-Method Analysis Results

Q-sort	f1	flag_f1	f2	flag_f2	f3	flag_f3	f4	flag_f5	f5
Q1	0.5446	FALSE	0.382	FALSE	0.23144	FALSE	0.414	FALSE	0.1714
Q2	0.2728	FALSE	0.691	**TRUE**	0.11326	FALSE	0.2569	FALSE	0.0146
Q3	0.6341	**TRUE**	0.039	FALSE	0.26091	FALSE	0.1431	FALSE	0.3039
Q4	0.2186	FALSE	0.309	FALSE	0.49697	**TRUE**	-0.2125	FALSE	0.2206
Q5	0.1417	FALSE	0.068	FALSE	0.72988	**TRUE**	0.1472	FALSE	-0.1253
Q6	0.1173	FALSE	0.522	**TRUE**	0.15395	FALSE	-0.1708	FALSE	0.1219
Q7	0.5135	FALSE	0.076	FALSE	0.28613	FALSE	0.1138	FALSE	0.567
Q8	0.4766	FALSE	0.053	FALSE	0.32836	FALSE	0.0018	FALSE	0.3649
Q9	0.4598	FALSE	0.263	FALSE	0.1808	FALSE	0.3988	FALSE	0.0803
Q10	0.5853	**TRUE**	0.354	FALSE	0.41518	FALSE	-0.06	FALSE	-0.1117
Q11	0.0949	FALSE	-0.053	FALSE	0.64889	**TRUE**	-0.0808	FALSE	0.3025
Q12	0.3142	FALSE	0.501	FALSE	0.39989	FALSE	0.3308	FALSE	0.1315
Q13	0.5488	**TRUE**	0.121	FALSE	-0.00097	FALSE	0.0573	FALSE	0.3234
Q14	0.6146	**TRUE**	0.165	FALSE	0.38706	FALSE	0.2969	FALSE	0.0164
Q15	0.6751	**TRUE**	0.214	FALSE	0.21171	FALSE	0.1962	FALSE	0.123
Q16	0.6766	**TRUE**	0.331	FALSE	0.2355	FALSE	-0.2149	FALSE	-0.0815
Q17	-0.0916	FALSE	0.492	**TRUE**	0.25699	FALSE	0.3766	FALSE	0.1145
Q18	0.5584	**TRUE**	0.402	FALSE	0.04728	FALSE	0.179	FALSE	-0.0057
Q19	0.6088	**TRUE**	0.283	FALSE	0.08138	FALSE	0.0258	FALSE	0.2799
Q20	0.1267	FALSE	0.078	FALSE	0.53846	FALSE	0.5003	FALSE	0.3144
Q21	0.6327	**TRUE**	0.044	FALSE	0.03428	FALSE	0.2011	FALSE	0.1392
Q22	0.1611	FALSE	0.421	FALSE	0.50015	**TRUE**	0.0758	FALSE	0.1641
Q23	0.4026	FALSE	0.354	FALSE	0.57942	**TRUE**	0.0338	FALSE	-0.0376
Q24	0.5274	**TRUE**	0.143	FALSE	0.1936	FALSE	0.1324	FALSE	0.197
Q25	-0.073	FALSE	0.212	FALSE	-0.12817	FALSE	0.5286	FALSE	-0.0947
Q26	0.4075	FALSE	0.493	**TRUE**	-0.03245	FALSE	0.1084	FALSE	0.074
Q27	0.2586	FALSE	0.495	FALSE	0.28805	FALSE	0.0449	FALSE	0.3269
Q28	0.0049	FALSE	0.365	FALSE	0.18999	FALSE	0.1445	**TRUE**	0.5604
Q29	0.1833	FALSE	0.309	FALSE	-0.01416	FALSE	0.2416	**TRUE**	0.4833
Q30	0.4569	FALSE	0.019	FALSE	0.18802	FALSE	0.5665	FALSE	-0.1309
Q31	0.1609	FALSE	0.224	FALSE	0.11794	FALSE	0.1378	**TRUE**	0.6525
Q32	0.1239	FALSE	0.166	FALSE	0.00868	FALSE	0.6148	FALSE	0.3471
Q33	0.5026	FALSE	-0.003	FALSE	0.47575	FALSE	-0.0716	FALSE	0.354
Q34	0.1656	FALSE	0.336	FALSE	0.49965	FALSE	0.2352	FALSE	0.3089
Q35	0.4529	FALSE	0.354	FALSE	0.01483	FALSE	0.5208	FALSE	0.1561
Q36	0.39	FALSE	0.376	FALSE	0.38368	FALSE	-0.0361	FALSE	0.3185
Q37	0.6411	**TRUE**	0.469	FALSE	0.23781	FALSE	0.0678	FALSE	0.1805
Q38	0.3254	FALSE	0.231	FALSE	0.24273	FALSE	0.4737	FALSE	-0.2249
Q39	0.449	FALSE	0.369	FALSE	0.35226	FALSE	0.2389	FALSE	0.1496
Q40	0.3818	FALSE	0.628	FALSE	0.47572	FALSE	0.1765	FALSE	-0.1423
Q41	0.1469	FALSE	0.036	FALSE	-0.05688	FALSE	-0.0381	**TRUE**	0.628
Q42	0.3087	FALSE	0.717	**TRUE**	0.11198	FALSE	0.0977	FALSE	0.2332
Q43	0.2771	FALSE	0.021	FALSE	0.35157	FALSE	0.4427	FALSE	0.1619
Q44	0.2236	FALSE	0.234	FALSE	0.66004	**TRUE**	0.2655	FALSE	-0.0946
Q45	0.1798	FALSE	0.449	FALSE	0.48417	FALSE	0.1396	FALSE	-0.0281
Q46	0.1468	FALSE	0.64	**TRUE**	-0.09049	FALSE	0.2718	FALSE	0.1504
Q47	0.1399	FALSE	-0.129	FALSE	0.02957	FALSE	0.3226	FALSE	0.3571
Q48	0.5407	FALSE	0.452	FALSE	0.29379	FALSE	0.1812	FALSE	0.1342
Q49	0.0788	FALSE	0.123	FALSE	0.15782	FALSE	0.7178	FALSE	0.3417
Q50	0.1587	FALSE	0.591	**TRUE**	0.2834	FALSE	0.2437	FALSE	0.068

TRUE: Representative of the factor; FALSE Not representative of the factor

Appendix VIII: General Characteristics of Each Factor

Factor	av_rel_coef	nload	eigenvalues	explained variance %	reliability	se_fscores
f1	0.8	11	7.8	15.7	0.98	0.15
f2	0.8	7	6.3	12.5	0.97	0.19
f3	0.8	6	5.4	10.9	0.96	0.2
f4	0.8	4	4.1	8.3	0.94	0.24
f5	0.8	4	3.7	7.3	0.94	0.24

av_rel_coef: Average inter-factor correlation; nload: Number of Q-sorts loading on the factor; se_fscores: Standard error of factor scores

Appendix IX: Correlations Between Factor Z Scores

	zsc_f1	zsc_f2	zsc_f3	zsc_f4	zsc_f5
zsc_f1	1	0.63	0.59	0.39	0.44
zsc_f2	0.63	1	0.46	0.44	0.45
zsc_f3	0.59	0.46	1	0.3	0.28
zsc_f4	0.39	0.44	0.3	1	0.42
zsc_f5	0.44	0.45	0.28	0.42	1

Appendix X: Distribution of Q‑Sort Statement Scores Across Five Factors in the Q‑Method Analysis

Statement	zsc_f1	fsc_f1	zsc_f2	fsc_f2	zsc_f3	fsc_f3	fsc_f4	zsc_f4	fsc_f5	zsc_f5
1	1.77	5	2.22	5	0.14	0	4	1.5	4	1.31
2	-0.71	-2	-1.09	-3	-1.7	-4	5	1.51	-3	-1.05
3	-1.44	-4	-1.15	-4	-1.95	-5	4	1.17	-4	-1.69
4	-0.22	-1	-0.78	-2	0.36	0	0	0.02	1	0.2
5	1.74	5	1.72	5	-0.6	-2	5	2.42	5	1.84
6	1.56	5	2.22	5	-0.5	-2	4	1.42	3	1.13
7	-1.35	-4	0.02	0	-1.01	-3	-3	-1.02	-2	-0.52
8	1.47	4	0.49	1	0.9	2	-4	-1.44	-1	-0.27
9	-0.97	-3	0.95	3	1.19	4	0	-0.15	1	0.39
10	-1.98	-5	-1.91	-5	-2.08	-5	-3	-1.08	-5	-2.22
11	0.36	1	0.99	4	0.85	2	1	0.43	1	0.34
12	-1.34	-3	-0.71	-2	-1.19	-3	-2	-0.55	3	1.08
13	-1.18	-3	-1.09	-3	-1.17	-3	-2	-0.87	-4	-1.42
14	-1.34	-4	-0.19	-1	-1.36	-3	-5	-1.51	0	0.09
15	-0.78	-2	-0.64	-2	-0.32	-1	1	0.18	-1	-0.11
16	0.84	2	-0.58	-1	-0.61	-2	-5	-1.77	1	0.24
17	-0.27	-1	1.32	4	-0.35	-1	1	0.24	-1	-0.12
18	1.01	3	0.19	0	1.09	4	3	1.05	2	0.85
19	0.42	1	0.03	0	0.37	1	1	0.57	-2	-0.6
20	0.27	0	0.7	2	0.21	0	0	-0.04	-2	-0.6
21	0.82	2	-0.95	-3	-0.25	-1	2	0.9	4	1.25
22	-1.44	-4	-1.75	-5	-1.85	-5	-2	-0.85	-3	-0.78
23	-0.06	0	-1.54	-4	-1.46	-4	-3	-1.11	0	-0.07
24	-0.67	-1	-0.61	-1	-0.42	-1	-1	-0.36	5	1.57
25	-0.59	-1	-0.77	-2	-0.43	-1	-5	-1.51	-3	-0.98
26	1.36	4	-0.23	-1	1.04	3	0	-0.22	0	0.18
27	-1.08	-3	-0.46	-1	-1.72	-4	-3	-1.19	4	1.28
28	1.39	4	0.68	1	1.04	3	1	0.39	2	0.58
29	1.28	3	0.75	2	0.2	0	4	1.43	5	1.75
30	-0.85	-2	0.07	0	0.44	1	-3	-1.04	0	0
31	0.93	3	0.91	3	0.49	1	0	-0.08	2	0.63
32	1.08	3	1.06	4	1.01	3	2	0.82	2	0.56
33	0.33	1	0.22	0	0.25	0	-4	-1.25	-1	-0.24
34	-1.08	-3	0.76	2	-0.07	-1	2	0.88	-1	-0.27
35	-0.09	0	0.9	3	1.07	3	5	1.61	1	0.37
36	0.3	1	0.91	3	0.83	2	2	0.71	3	1.19
37	0.29	1	0.71	2	0.57	1	3	0.98	4	1.57
38	-1.59	-5	-1.55	-4	-1.77	-4	-1	-0.31	-5	-1.88
39	-0.36	-1	-1.79	-5	-0.07	-1	-1	-0.47	1	0.28
40	0.08	0	0.49	1	0.79	2	-1	-0.54	-4	-1.42
41	0.21	0	-0.52	-1	0.1	0	-2	-0.88	0	-0.09
42	0.5	1	0.28	0	0.66	1	3	1.15	-2	-0.45
43	-0.13	0	-0.86	-2	1.42	5	-1	-0.53	-4	-1.79
44	-0.24	-1	0.33	1	1.4	5	3	1.12	3	0.98
45	1.26	3	1.18	4	0.25	0	1	0.4	1	0.24
46	-0.77	-2	-1.41	-4	-0.63	-2	0	-0.15	0	-0.09
47	0.68	2	0.3	1	0.52	1	-1	-0.3	-1	-0.17
48	-0.29	-1	0.28	1	0	0	-4	-1.38	-3	-1.41
49	0.6	2	-1.14	-3	1.66	5	0	-0.11	-3	-0.94
50	0.55	1	0.82	2	0.97	3	1	0.56	0	0.15
51	-0.1	0	-0.18	0	0.78	2	3	1.07	-2	-0.36
52	-0.89	-2	-1.13	-3	1.14	4	2	0.95	3	1
53	-1.66	-5	-0.27	-1	-1.24	-3	-4	-1.48	0	0.02
54	0.08	0	0.28	0	-0.57	-2	-2	-0.82	-5	-2.04
55	1.46	4	0.96	3	1.1	4	0	-0.11	2	0.69
56	0.82	2	0.54	1	0.49	1	-1	-0.34	-1	-0.18

Appendix XI: Distinguishing and Consensus Statements

Statement	dist.and.cons	f1_f2	f1_f3	f1_f4	f1_f5	f2_f3	f2_f4	f2_f5	f3_f4	f3_f5	f4_f5
1	df3	-0.446	1.635^	0.273	0.462	2.08^	0.718*	0.908**	-1.362***	-1.1729***	0.189
2	df3, df4	0.378	0.99***	-2.218^	0.345	0.612*	-2.597^	-0.033	-3.208^	-0.6447*	2.563^
3	df4	-0.296	0.51*	-2.612^	0.249	0.806**	-2.316^	0.544	-3.123^	-0.2619	2.861^
4	df2	0.555*	-0.577*	-0.243	-0.423	-1.132***	-0.798**	-0.978**	0.334	0.1535	-0.18
5	df3	0.023	2.343^	-0.681*	-0.101	2.319^	-0.704*	-0.124	-3.024^	-2.4436^	0.58
6	df2 df3	-0.656**	2.065^	0.141	0.431	2.721^	0.797**	1.088***	-1.924^	-1.6334^	0.291
7	df2-f1,f3,f4	-1.366^	-0.338	-0.323	-0.822**	1.028***	1.044***	0.545	0.015	-0.4837	-0.499
8	df1 df4 df5	0.979***	0.565*	2.911^	1.733^	-0.414	1.932^	0.755*	2.346^	1.1683***	-1.177***
9	df1	-1.92^	-2.157^	-0.815**	-1.355***	-0.237	1.105***	0.565	1.343***	0.8021*	-0.54
10	df4 only	-0.071	0.105	-0.899**	0.248	0.176	-0.828**	0.319	-1.005**	0.1425	1.147***
11		-0.635**	-0.497*	-0.075	0.021	0.138	0.561	0.656*	0.422	0.5182	0.096
12	df5	-0.627**	-0.145	-0.788**	-2.414^	0.482	-0.161	-1.787^	-0.644*	-2.2696^	-1.626***
13	Consensus	-0.093	-0.009	-0.307	0.239	0.084	-0.213	0.332	-0.298	0.2482	0.546
14	df25-f1,f3,f4 df5-f1,f3,f4	-1.148***	0.018	0.165	-1.429^	1.166***	1.313***	-0.281	0.148	-1.4469***	-1.595***
15		-0.144	-0.462	-0.961***	-0.678*	-0.318	-0.817**	-0.534	-0.499	-0.2157	0.283
16	df1 df4 df5	1.423^	1.454^	2.611^	0.596*	0.031	1.189***	-0.827**	1.157***	-0.8584**	-2.016^
17	df2 only	-1.592^	0.079	-0.512	-0.148	1.67^	1.08***	1.444***	-0.591	-0.2268	0.364
18	df2 only	0.816***	-0.084	-0.037	0.163	-0.9***	-0.853**	-0.653*	0.047	0.2474	0.2
19	df5 only	0.389	0.05	-0.144	1.018***	-0.339	-0.533	0.63*	-0.194	0.9687**	1.163***
20	df5-f1,2,3	-0.433	0.057	0.31	0.87**	0.49	0.743*	1.303***	0.252	0.813**	0.561
21	df2 df3	1.769^	1.067***	-0.083	-0.432	-0.702*	-1.852^	-2.201^	-1.15***	-1.4991***	-0.349
22	df4-f1,f2,f3 df5-f1,f2,f3	0.313	0.404	-0.597*	-0.664*	0.092	-0.91**	-0.977**	-1.002**	-1.0685***	-0.067
23	df1-f2,f3,f4 f5-f2,f3,f4	1.474^	1.398^	1.048***	0.003	-0.076	-0.426	-1.471***	-0.35	-1.3951***	-1.045**
24	df5 only	-0.069	-0.252	-0.314	-2.245^	-0.183	-0.245	-2.176^	-0.062	-1.9934^	-1.931^
25	df4-f1,f2,f3	0.178	-0.164	0.917**	0.388	-0.342	0.739*	0.21	1.081***	0.5516	-0.529
26	df1, f2,f4,f5	1.596^	0.324	1.584^	1.18***	-1.272***	-0.012	-0.416	1.26***	0.8561**	-0.404
27	df2 df5	-0.623**	0.636*	0.106	-2.364^	1.259***	0.729*	-1.741^	-0.53	-3.0002^	-2.47^
28	df1-f2,4,5	0.703**	0.345	0.999***	0.807**	-0.358	0.296	0.104	0.654*	0.4619	-0.192
29	df2 df3	0.535*	1.079***	-0.142	-0.47	0.544*	-0.677*	-1.006***	-1.221***	-1.5496^	-0.329
30	df4-f2,f3,f5	-0.917***	-1.288^	0.193	-0.843**	-0.371	1.11***	0.074	1.481***	0.445	-1.036**
31	df4-f1,f2,f5	0.02	0.44	1.015***	0.297	0.42	0.995**	0.277	0.575	-0.1428	-0.718*
32	Consensus	0.017	0.065	0.265	0.524	0.048	0.248	0.507	0.199	0.4584	0.259
33	df4	0.109	0.08	1.579^	0.566*	-0.029	1.47***	0.456	1.499***	0.4859	-1.013**
34	df1	-1.835^	-1.003***	-1.959^	-0.811**	0.832**	-0.124	1.024***	-0.956**	0.1923	1.148***
35	df1-f2,f3,f4	-0.988***	-1.159***	-1.696^	-0.456	-0.171	-0.708*	0.533	-0.537	0.7033*	1.24***
36	df1-f2,f3,f5	-0.604*	-0.525*	-0.407	-0.884**	0.08	0.197	-0.28	0.117	-0.3593	-0.476
37	df5-f1,f2,f3	-0.419	-0.274	-0.691*	-1.273***	0.145	-0.272	-0.854**	-0.417	-0.9989**	-0.582
38	df4 only	-0.043	0.172	-1.28***	0.288	0.215	-1.237***	0.331	-1.452***	0.1161	1.568***
39	df2	1.432^	-0.29	0.117	-0.64*	-1.722^	-1.315***	-2.072^	0.407	-0.3506	-0.757*
40	df4 df5	-0.407	-0.707**	0.628*	1.5^	-0.3	1.035***	1.907^	1.335***	2.2069^	0.872*
41	df4-f1,f3,f5	0.736**	0.109	1.092***	0.301	-0.627*	0.356	-0.435	0.983**	0.1929	-0.79*
42	df5	0.221	-0.154	-0.644*	0.947***	-0.375	-0.866**	0.726*	-0.491	1.1009***	1.592***
43	df3 df5	0.732**	-1.55^	0.397	1.661^	-2.283^	-0.336	0.929**	1.947^	3.2113^	1.264***
44	df1 df2	-0.573*	-1.644^	-1.362***	-1.227***	-1.071***	-0.789**	-0.654*	0.282	0.4172	0.135

45	df1-f3,f4,f5 df2-f3,f4,f5	0.072	1.01***	0.859**	1.017***	0.938***	0.788**	0.945**	-0.15	0.0071	0.157
46	df2	0.645**	-0.144	-0.62*	-0.679*	-0.789**	-1.265***	-1.324***	-0.476	-0.5352	-0.059
47		0.378	0.165	0.977***	0.854**	-0.214	0.598	0.476	0.812**	0.6895*	-0.123
48	df1-f2,f4,f5 df4-f1,f2,f3	-0.567*	-0.281	1.094***	1.124***	0.286	1.661^	1.691^	1.375***	1.4052***	0.03
49	df1 df3 df4	1.747^	-1.053***	0.709*	1.548^	-2.801^	-1.038***	-0.199	1.762^	2.6017^	0.839*
50		-0.269	-0.421	-0.012	0.405	-0.151	0.258	0.674*	0.409	0.8253**	0.416
51	df3-f1,f2,f5 df4-f1,f2,f5	0.073	-0.878***	-1.171***	0.252	-0.951***	-1.244***	0.179	-0.293	1.1303***	1.423***
52	df1-f3,f4,f5 df2-f3,f4,f5	0.237	-2.036^	-1.845^	-1.897^	-2.274^	-2.083^	-2.134^	0.191	0.1397	-0.051
53	df2-f1,f3,f4 df5-f1,f3,f4	-1.389^	-0.421	-0.183	-1.681^	0.968***	1.206***	-0.292	0.238	-1.26***	-1.498***
54	df5	-0.197	0.651**	0.899**	2.124^	0.848**	1.096***	2.321^	0.248	1.4729***	1.225***
55	df4	0.497*	0.358	1.574^	0.765**	-0.14	1.077***	0.268	1.216***	0.4079	-0.809*
56	df4-f1,f2,f3 df5-f1,f2,f3	0.28	0.338	1.159***	1.007***	0.059	0.88**	0.728*	0.821**	0.6688*	-0.152

Note: *p<0.05; **p<0.01; ***p<0.001; ^p<0.000001

dfi only: The statement distinguishes factor *i* from all other factors, while all other pairs of factors show no significant differences (e.g. “df2 only” at statement 17 means statement 17 is distinguishes factor 2 with all other factors, while all other pairs of factors show no significant differences)

dfi: The statement distinguishes factor *i* from all other factors, but some other factor pairs also differ significantly (e.g. “df5” at statement 54 means statement 54 is distinguishes factor 5 with all other factor, this statement also distinguish factor 1 and factor 3)

dfi–fk, fj, fm: The statement distinguishes factor *i* from the listed factors (k, j, m); no implication for other comparisons (e.g. “df3-f1,f2,f5” at statement 51 means statement 51 is distinguishes factor 3 with factor 1, factor 2, factor 5, respectively but not distinguish with factor 4)

Consensus: No significant differences; all factors scored the statement similarly.