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Rapid e-Delphi Design of a Survey on Student Lifestyles, Psychological, and Contextual Factors Integrating the World Mental Health International College Student Assessment in the Italian Higher Education Setting

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ABSTRACT

Background: This study presents the development of a supplementary questionnaire assessing lifestyle behaviors, psychological well-being, and contextual factors, designed to complement the World Mental Health International College Student (WMH-ICS) survey, within the Italian Health Mode On project.

Methods: A preliminary questionnaire, based on a literature review and composed of brief standardized measures across 15 sections, was drafted. Its validation was conducted through a two-round electronic Delphi process involving 17 experts from Italian universities and research institutes. In the first round, the experts rated the relevance of each section and domain and suggested item revisions or additions. Feedback was synthesized and presented in the second round, during which the experts re-rated their agreement with all proposed modifications.

For a complete list of the *Health Mode On* Investigators, see the Acknowledgments section.

Giansanto Mosconi and Giacomo Pietro Vigezzi contributed equally to this study.

Results: All sections proposed in the preliminary version were retained. Experts provided 115 item-modification proposals and 10 suggestions for new sections or domains; 35 modifications (30.4%) and 3 additions (30%) were accepted. The final instrument comprises 18 sections and 64 items covering anthropometry, socio-economic status, housing, commuting, physical activity, diet, sleep, nicotine product use, social media, gaming, gambling, loneliness, hopelessness, life satisfaction, academic stress, student services, discrimination, and general well-being.

Conclusions: A rapid e-Delphi process produced a concise, expert-validated supplement expanding the WMH-ICS survey's capacity to inform health promotion and prevention interventions.

1 | Introduction

The transition to higher education entails profound changes in multiple domains of daily life. Adjustments in lifestyles, exposure to academic and social demands, and the strain of adapting to unfamiliar contexts may all contribute to an accumulation of stressors, which in turn can increase psychological vulnerability. Importantly, this transition also typically coincides with the passage from adolescence to early adulthood, a developmental phase marked by ongoing neurobiological maturation and identity formation, during which many psychiatric disorders most commonly emerge (Arnett 2000; Kessler et al. 2005, 2007).

In response to the growing demand for mental health support among university populations worldwide, the World Health Organization (WHO) and Harvard University launched the World Mental Health International College Student (WMH-ICS) initiative in 2016, in partnership with a global consortium of universities. WMH-ICS was designed to generate robust epidemiological data on student mental health, evaluate the effectiveness of scalable web-based prevention and treatment, and disseminate evidence-informed strategies adaptable to diverse settings. Its core component is a comprehensive survey administered to first-year university students, covering demographics, self-perceived health status, attention and concentration, mood and anxiety symptoms, use of alcohol and other psychoactive substances, self-harming behaviors, help-seeking attitudes, adverse family and childhood experiences, recent stressors, social functioning, sexuality, and self-concept (Auerbach et al. 2018; Harvard Medical School 2025). Cross-national findings consistently show substantial prevalence of DSM-based disorders, clinically relevant symptoms, and role impairment, alongside significant treatment gaps among students (Auerbach et al. 2018). Attitudinal and structural barriers, including stigma, perceived norms, low mental-health literacy, limited capacity, and waiting times, constrain help-seeking and timely access to care, underscoring the need for integrated, system-level responses (Hunt and Eisenberg 2010).

Participation in the WMH-ICS constitutes a central component of the Health Mode On (HMO) project, a multicentre initiative aimed at promoting well-being and preventing mental health issues among students enrolled in universities and conservatories of music in Italy. Funded by the PRO-BEN competitive call of the Italian Ministry of University and Research, HMO adopts the WMH-ICS self-report validated instruments to ensure international comparability while extending administration beyond first-year cohorts to include all academic years and programmes (Auerbach et al. 2018). Moreover, to enrich the explanatory value of surveillance and to guide health promotion and prevention in real-world campus systems, HMO set out to introduce a complementary questionnaire designed to collect information on contextual factors, lifestyles, as well as on students' knowledge, use, and expectations of their institution's services.

Given the importance of developing a psychometrically sound assessment tool that adequately captures all relevant domains while remaining concise and contextually appropriate for university students, we adopted an electronic Delphi (e-Delphi) approach to establish content validity through expert consensus (Donohoe et al. 2012). The Delphi technique is a structured, iterative process designed to achieve expert consensus on complex issues. It proceeds through successive rounds of independent and anonymous evaluation, during which experts provide feedback on the proposed content. After each round, aggregated and anonymized feedback is shared with all participants, allowing them to reconsider their views in light of the group's input. This controlled feedback mechanism fosters the refinement of opinions and a progressive convergence toward consensus, while mitigating dominance effects and groupthink bias (Hsu and Sandford 2007; Keeney et al. 2011; Diamond et al. 2014; Jünger et al. 2017). Beyond its procedural advantages, the Delphi method aligns with the "wisdom of crowds" framework, whereby the aggregation of independent judgements can produce more accurate and robust decisions than face-to-face group deliberation, which may be influenced by dominant individuals or group dynamics (Jorm 2025). The electronic Delphi (e-Delphi) is a web-based adaptation that enables remote and asynchronous participation, retaining the advantages of anonymity, iteration, and controlled feedback while accelerating timelines and expanding geographical reach. This paper provides an overview of the governance structure and methodological procedures of the e-Delphi process used to design the complementary questionnaire for the HMO project, summarizes the outcomes of each round, and presents the expert-validated tool resulting from the consensus process.

2 | Methods

Based on this foundation, a preliminary version of a complementary questionnaire was developed by a core team composed of GM and GPV at the University of Pavia. Drawing on their expertise and a focused review of relevant literature (Vigezzi, Blandi, et al. 2023; Bosetti et al. 2022; Vigezzi, Bertuccio, et al. 2022; Della Valle et al. 2021; Vigezzi, Bertuccio, et al. 2023; Bertuccio et al. 2023; Mosconi, DelFerro, et al. 2024; Mosconi, Bertuccio, et al. 2024, 2023; Vigezzi, Bertuccio, et al. 2022;

Amerio et al. 2023; Zeduri et al. 2022; Bonaccio et al. 2022; Vigezzi et al. 2024, 2025), the team identified a set of domains not addressed by the WMH-ICS instrument but considered epidemiologically relevant and offering potential programmatic leverage, including lifestyle, psychological, and contextual factors. Whenever possible, the team prioritized brief, validated instruments with prior use in peer-reviewed research to maximize comparability and methodological robustness, while keeping the overall length of the survey manageable (de Vet et al. 2011; Boateng et al. 2018; Mokkink et al. 2018). The preliminary version of the questionnaire consisted of 15 sections: anthropometric measures, socioeconomic factors, housing conditions, commuting habits (i.e., home-to-university travel), physical activity, diet, sleep, social media use, video game use, gambling, use of nicotine-based products, loneliness, hopelessness, academic stress, as well as knowledge, use, and expectations regarding student support services. Each section contained one or more domains, each representing a distinct variable operationalized via a proposed measurement instrument, either a validated scale or a single item formulated in accordance with established methodological standards for single-item measures in health and behavioral research (Boateng et al. 2018; Bowling 2005). The complete list of domains explored within each section, along with the proposed measurement instrument for each domain, is presented in Table 1.

2.1 | Expert Panel and Governance

The e-Delphi panel included a total of 17 members: the scientific leads from each of the eight institutions (besides the University of Pavia) involved in the project, plus seven additional experts selected among Italian university faculty members and researchers with recognized expertise in one or more of the areas covered by the supplementary questionnaire. The process was overseen by a facilitation team (University of Pavia) responsible for protocol adherence, synthesis, and controlled feedback in line with Delphi guidance.

2.2 | Study Design

We implemented a two-round e-Delphi using the online survey-management system EUsurvey to enable anonymous, asynchronous participation and a complete audit trail. Following contemporary consensus-method reporting guidance, including CREDES and DELPHISTAR, we declared panel composition, rating scales, retention/acceptance thresholds, and handling of disagreements (Jünger et al. 2017; Niederberger et al. 2024) (Diamond et al. 2014; Jünger et al. 2017; European Commission 2025). The full process was conducted in four phases: (i) anonymous evaluation by the experts' panel of the preliminary proposal developed by the University of Pavia team; (ii) processing of the inputs received from the experts and synthesis of the proposed revisions by two facilitators from the University of Pavia; (iii) anonymous evaluation by the experts of all suggested revisions collected during the first round; and (iv) development of the final version of the integrative questionnaire by the University of Pavia team, based on the most widely shared positions.

2.3 | Round 1: Evaluation of the Preliminary Proposal

In the first phase of the e-Delphi procedure, experts were invited to complete an anonymous questionnaire administered via EUSurvey within 10 days. The questionnaire was preceded by detailed instructions, which are available in the Supporting Information S1.

Experts were first asked to evaluate each of the 15 thematic sections in terms of overall relevance, using a 10-point Likert scale (from "not at all relevant" to "extremely relevant"), to enhance discrimination and ensure a sufficiently granular assessment, given that these ratings informed the definition of the questionnaire's macro-structure, thereby capturing meaningful differences in perceived relevance and reducing the risk of uniformly similar ratings across sections. For each domain included within these sections, the survey presented the corresponding proposed measurement instrument along with detailed background information. This included the rationale for the inclusion of the domain, the justification for the instrument choice, relevant bibliographic references (where applicable), the full wording of the scale or question, and notes on scoring procedures or on any skip logic.

Experts were then asked to assess the relevance of each domain, followed by an evaluation of the wording and structure of the associated measurement instrument, using 5-point Likert scales to balance sensitivity with cognitive burden. Respondents were also asked to provide a recommendation regarding the proposed measurement instrument for each domain, selecting one of the following options: retain without modifications; retain with modifications, to be specified in a designated comment field; replace with an equivalent measurement instrument, also to be specified; eliminate without suggesting an alternative; or choose not to provide a recommendation.

For each section, it was possible to propose additional domains, optionally accompanied by a corresponding suggested measurement instrument. At the end of the questionnaire, suggestions could also be made for the inclusion of domains not conceptually related to any of the predefined sections, again with the option of indicating a suitable measurement instrument. The use of Likert-type response formats and explicit anchors followed standard survey design practice (Likert 1932; Dillman et al. 2014).

2.4 | Round 1: Processing of the Input Received and Synthesis of the Proposed Revisions

According to the protocol, in the second phase, sections with a median relevance score below 6 were to be eliminated, regardless of the scores assigned to the individual domains and their associated measurement instruments. Similarly, domains that received a median relevance score below 3 were to be removed, regardless of the evaluation of the proposed measurement instrument or the recommendation provided for it. The proposed measurement instrument was retained if fewer

TABLE 1 | Sections, domains and proposed measures with Round 1 appraisals. For each section: median section relevance (10-point scale, IQR). For each domain: domain-relevance median (5-point), instrument wording median (5-point) and instrument architecture median (5-point), each with IQR. The rightmost columns summarize expert comments and any additional domains suggested. Instruments flagged as overlapping with WMH-ICS were not considered further.

Section	Median of the relevance scores provided by the experts for each section (IQR)	Domain	Domain's relevance: Median of the scores given by the experts (IQR)	Item	Item wording: Median of the scores given by the experts (IQR)	Item architecture: Median of the scores given by the experts (IQR)	Synthesis of experts' comments	Additional domain for the section
Gambling	6 (2)	Gambling frequency in the past 12 months	4 (2)	*How often have you engaged in gambling in the past 12 months?** • I have not engaged in gambling • Once a month or less • 2–4 times a month • 2–3 times a week • 4–5 times a week • 6 or more times a week	5 (1)	5 (2)	– Revise wording – Revise response options – Revise instructions	Gambling frequency during the last 30 days
		Problem gambling	5 (2)	NORC Diagnostic screen for gambling disorders - loss of control, lying, and preoccupation (NODS-CLiP)	5 (1)	4 (1)	– Revise wording – Revise scale structure – Replace with another validated scale	
Gaming	7 (3)	Gaming frequency in the past 12 months	4 (2)	*In the past 12 months, have you played video games?* • Yes • No	5 (1)	5 (1)	– Replace with another question – Revise instructions	
		Problematic gaming	4 (2)	Gaming disorder test	4 (2)	4 (1)	– Revise wording – Revise response options – Revise instructions	
Social media use	7 (3)	Type of social media used in the past 12 months	5 (2)	*Which of the following social media platforms have you used in the past 12 months?* • deviantArt • Facebook • Flickr • Google current • Instagram	5 (1)	4 (1)	– Revise wording – Revise response options – Replace with another question	Reasons for social media use

(Continues)

TABLE 1 | (Continued)

Section	Median of the relevance scores provided by the experts for each section (IQR)	Domain	Domain's relevance: Median of the scores given by the experts (IQR)	Item	Item wording: Median of the scores given by the experts (IQR)	Item architecture: Median of the scores given by the experts (IQR)	Synthesis of experts' comments	Additional domain for the section
				• Last.fm • LinkedIn • Pinterest • Pheed • Reddit • Second life • Snapchat • SoundCloud • Twitch • X • YouTube • TikTok • Treads • Wechat • Whatsapp • Other social media • I don't used any social media				
		Problematic use of social media	5 (1)	Bergen social media addiction scale (BSMAS)	4 (1)	4 (1)	– Revise wording – Revise response options – Revise instructions	
Loneliness	8 (4)	Frequency of loneliness, exclusion, or isolation	5 (1)	UCLA-3 loneliness scale	4 (1)	4 (1)	– Revise wording – Revise scale structure – Revise instructions	
Hopelessness	7 (3)	Negative expectations for the future	5 (1)	Beck hopelessness scale (BHS) short	5 (1)	5 (1)	– Revise wording – Revise instructions	
Anthropometric measures	6 (4)	Weight	4 (2)	Weight measurement (kg)	5 (1)	5 (1)	– Revise wording – Revise instructions – Revise response options	– Lean body mass – Body image perception
		Height	4 (2)	Height measurement (cm)	5 (0)	5 (1)	– Revise response options – Revise instructions	

(Continues)

TABLE 1 | (Continued)

Section	Median of the relevance scores provided by the experts for each section (IQR)	Domain	Domain's relevance: Median of the scores given by the experts (IQR)	Item	Item wording: Median of the scores given by the experts (IQR)	Item architecture: Median of the scores given by the experts (IQR)	Synthesis of experts' comments	Additional domain for the section
Socioeconomic status	8 (3)	Nationality	5 (2)	*Please indicate your nationality:* • Italian • Foreign (*European Union member country*) • Foreign (*non-European Union member country*) • I prefer not to answer	5 (1)	5 (2)	– Replace with another question – Revise response options	
		Perceived socio-economic status	4 (2)	*From an economic point of view, how would you classify your family?* • Well above the national average • Slightly above the national average • About the national average • Slightly below the national average • Well below the national average • I don't know/I prefer not to answer	4 (1)	4 (2)	– Revise wording – Revise response options – Replace with another question	
		Financial support during studies	5 (1)	*Which sources of financial support do you rely on during your period of study?* • Financial assistance from family • Employment income (part-time or full-time) • Public assistance (e.g., study allowances, guaranteed minimum income, other government aid) • Student loans or educational financing	5 (1)	4 (1)	– Revise response options – Revise question structure	

(Continues)

TABLE 1 | (Continued)

Section	Median of the relevance scores provided by the experts for each section (IQR)	Domain	Domain's relevance: Median of the scores given by the experts (IQR)	Item	Item wording: Median of the scores given by the experts (IQR)	Item architecture: Median of the scores given by the experts (IQR)	Synthesis of experts' comments	Additional domain for the section
				• Other • I prefer not to answer				
		Financial security - perceived financial adequacy	5 (2)	*Do you consider the financial resources available to you sufficient to cover your current needs?* • Yes, absolutely • Yes, but with some difficulty • No, I often have difficulties • I prefer not to answer	5 (1)	5 (1)	– Revise response options	
Housing conditions	7 (3)	Place of living	5 (1)	*What is your living arrangement in relation to your place of study? You are...* • Resident on-campus student – You live and study in your province of residence. • Non-resident on-campus student – You are officially registered in a different province from where you study, but you live permanently near your course location. • Commuter student – You study in a different province from your residence and regularly travel to your place of study. • I prefer not to answer.	5 (1)	5 (1)	– Revise response options – Revise wording	– Availability of a dedicated space for music practice – Greenery and natural surroundings – Number of individuals sharing the respondent's bathroom

(Continues)

TABLE 1 | (Continued)

Section	Median of the relevance scores provided by the experts for each section (IQR)	Domain	Domain's relevance: Median of the scores given by the experts (IQR)	Item	Item wording: Median of the scores given by the experts (IQR)	Item architecture: Median of the scores given by the experts (IQR)	Synthesis of experts' comments	Additional domain for the section
		Housing situations	5 (1)	*Where do you primarily reside during your course attendance period?* • In my family home (with the relatives I lived with before starting my studies) • In a shared apartment with roommates • In a single-occupancy residence • In a merit-based college residence • In a dormitory managed by a student welfare agency • In another kind of student residence • In a residence with my partner or current family (partner and/or children) • Other	5 (1)	4 (1)	– Revise response options	
		Cohabitants - sleeping arrangements	5 (1)	*How many people sleep in the same room as you?* • None • 1 • 2 • 3 • 4 or more	5 (1)	5 (1)	– Replace with another question	
Trasportation habits	6 (3)	Commuting - transportation habits	4 (2)	*What means of transportation do you use most often to reach your place of study?* • Private car (as a driver)	5 (2)	4 (1)	– Revise wording – Revise response options – Revise question structure	

(Continues)

TABLE 1 | (Continued)

Section	Median of the relevance scores provided by the experts for each section (IQR)	Domain	Domain's relevance: Median of the scores given by the experts (IQR)	Item	Item wording: Median of the scores given by the experts (IQR)	Item architecture: Median of the scores given by the experts (IQR)	Synthesis of experts' comments	Additional domain for the section
				• Private car (as a passenger) • Company car • Scooter or motorcycle • Public transportation (e.g., bus, train, or a combination) • Bicycle • E-scooter • On foot • Combination of car and public transportation • Combination of bicycle (or e-scooter) and public transportation • Other				
		Satisfaction with transportation mode	4 (2)	*Please rate your satisfaction with the way you travel to your place of study:* • Very low • Low • High • Very high	5 (1)	4 (1)	– Replace with another question	
Physical activity	8 (2)	Daily activity intensity and sitting time	5 (1)	IPAQ scale	4 (2)	4 (2)	– Revise wording – Revise scale structure – Revise response options – Replace with another question	– Use of university sport facilities – Engagement in different types of sport during the past 12 months
Diet	7 (2)	Adherence to the Mediterranean diet	4 (2)	Medi-Lite scale	4 (1)	4 (1)	– Revise instructions – Revise response options	– Sweets consumption – Food frequency questionnaire

(Continues)

TABLE 1 | (Continued)

Section	Median of the relevance scores provided by the experts for each section (IQR)	Domain	Domain's relevance: Median of the scores given by the experts (IQR)	Item	Item wording: Median of the scores given by the experts (IQR)	Item architecture: Median of the scores given by the experts (IQR)	Synthesis of experts' comments	Additional domain for the section
Smoking	8 (3)	Nicotine products use	5 (1)	*a. In the past 12 months, have you ever smoked manufactured cigarettes, hand-rolled cigarettes, heated tobacco products (e.g., IQOS, Glo), pipe, cigars, cigarillos, or hookah?* • Yes • No *b. In the past 30 days, have you smoked manufactured cigarettes, hand-rolled cigarettes, heated tobacco products (e.g., IQOS, Glo), pipe, cigars, cigarillos, or hookah?* • Yes • No *c. In the past 30 days, have you used these tobacco products every day or almost every day?* • Yes • No *d. In the past 12 months, have you used an e-cigarette with nicotine-containing liquid?* • Yes • No *e. In the past 30 days, have you used an e-cigarette with nicotine-containing liquid?* • Yes • No *f. In the past 30 days,*	5 (1)	4 (2)	– Revise question structure – Replace with another question	– Number of cigarettes smoked – Attempt to quit

(Continues)

TABLE 1 | (Continued)

Section	Median of the relevance scores provided by the experts for each section (IQR)	Domain	Domain's relevance: Median of the scores given by the experts (IQR)	Item	Item wording: Median of the scores given by the experts (IQR)	Item architecture: Median of the scores given by the experts (IQR)	Synthesis of experts' comments	Additional domain for the section
				have you used an e-cigarette every day or almost every day? • Yes • No				
Sleep	8 (4)	Sleep quantity and quality	5 (1)	*a. In the past month, how many hours of actual sleep did you get on average per night?* Hours: ___ *b. How would you rate the quality of your sleep in the past month?* • Very good • Fairly good • Fairly poor • Very poor	5 (1)	5 (1)	No suggestions	
Academic stress	9 (3)	Study-life balance	5 (1)	*We ask you to carefully reflect on each of the following statements and indicate your level of agreement or point of view using the response options provided.* *a.I find it difficult to balance my personal life with my studies.* • Strongly disagree • Somewhat disagree • Neither agree nor disagree • Somewhat agree • Strongly agree *b. The demands of my studies interfere with my personal and family life.* • Strongly disagree • Somewhat disagree	5 (1)	5 (1)	– Revise wording – Revise response options	

(Continues)

TABLE 1 | (Continued)

Section	Median of the relevance scores provided by the experts for each section (IQR)	Domain	Domain's relevance: Median of the scores given by the experts (IQR)	Item	Item wording: Median of the scores given by the experts (IQR)	Item architecture: Median of the scores given by the experts (IQR)	Synthesis of experts' comments	Additional domain for the section
				• Neither agree nor disagree • Somewhat agree • Strongly agree *c. Some situations in my personal life make it difficult for me to concentrate on my studies.* • Strongly disagree • Somewhat disagree • Neither agree nor disagree • Somewhat agree • Strongly agree *d. My studies have had a positive impact on my personal life: for example, by helping me gain new skills, build new relationships, or engage in new activities.* • Strongly disagree • Somewhat disagree • Neither agree nor disagree • Somewhat agree • Strongly agree *e. I perceive the impact of my studies on my overall well-being as...* • Negative • Somewhat negative • Neutral • Somewhat positive • Positive • Not applicable				

(Continues)

TABLE 1 | (Continued)

Section	Median of the relevance scores provided by the experts for each section (IQR)	Domain	Domain's relevance: Median of the scores given by the experts (IQR)	Item	Item wording: Median of the scores given by the experts (IQR)	Item architecture: Median of the scores given by the experts (IQR)	Synthesis of experts' comments	Additional domain for the section
Students' services	8 (4)	Student services - assessment of university services and strategic investment priorities	5 (2)	*Indicate the priority order of services in which the University of Pavia should consider investing. Assign first place to the most important service and last place to the least important. (Drag and drop the items into your preferred order)* • Study rooms • Psychological support • Career guidance (assistance in finding internships, traineeships, and career opportunities) • Financial support (scholarships, tuition reductions, discounts on services and activities) • Promotion of cultural activities • Promotion of sports activities • Support services for students with disabilities or learning disorders • Subsidies for public transportation	4 (2)	4 (2)	- Revise wording	
		Counseling service	5 (1)	*a. Have you ever heard of the psychological counseling service offered by the University of Pavia?*	5 (1)	5 (1)	- Revise question structure	

(Continues)

TABLE 1 | (Continued)

Section	Median of the relevance scores provided by the experts for each section (IQR)	Domain	Domain's relevance: Median of the scores given by the experts (IQR)	Item	Item wording: Median of the scores given by the experts (IQR)	Item architecture: Median of the scores given by the experts (IQR)	Synthesis of experts' comments	Additional domain for the section
				• Yes • No *b. Have you ever used the psychological counseling service offered by the University of Pavia?* • Yes • No				
Additional proposals (general)				Life purpose satisfaction				
				Smart drugs use (use of drugs and smartdrugs)				
				Use of coffee, energy drinks, supplements				
				Climate change worry				
				Academic performance				
				Multidimensional scale of perceived social support (MSPSS)				
				Discrimination				
				Altarum consumer engagement (ACE)				
				Antisocial behaviors				
				Access to local prevention services				
				WHO-5 well-being index				

Note: medians and IQRs are computed over all 17 experts. "Architecture" refers to response format, option structure and skip logic.
Abbreviations: BSMAS = Bergen Social Media Addiction Scale; NODS-CLiP = NORC Diagnostic Screen for Gambling Disorders-Control, Lying, Preoccupation; IPAQ = International Physical Activity Questionnaire; WMH-ICS = World Mental Health–International College Student.

than 8 participants recommended its elimination without suggesting an alternative.

In cases where a domain's median relevance score was at least 3, but eight or more experts recommended eliminating the proposed instrument for that domain without suggesting an alternative, the procedure required that the facilitation team identify a suitable alternative instrument to be submitted in the second round. This identification process was to be guided by the experts' evaluations of the wording and structure of the excluded instrument, ensuring conceptual alignment with the domain and methodological consistency. The procedure also required that, for any measurement instrument belonging to a domain and section that had been retained, if it had received fewer than eight recommendations for elimination, any proposed revisions or replacements were to be collected and synthesized by two facilitators (GM and EF), and grouped when substantively similar.

For proposed additions of new domains in which no measurement instrument had been specified, a facilitator (GM) was responsible for identifying a validated scale or a suitable single-item question, prioritizing brevity and clarity whenever possible. Domains proposed outside the existing sections were assigned to new standalone sections, and when conceptually related, they were grouped within the same section. Proposals that overlapped too closely with items already included in the WMH-ICS questionnaire were discarded.

The operational algorithm is depicted in Figure 1. This algorithm operationalized controlled feedback and explicit consensus rules consistent with Delphi quality guidance and consensus-measurement scholarship (Hsu and Sandford 2007; Diamond et al. 2014; von der Gracht 2012).

The second round of the e-Delphi process involved, as the third phase, the administration of a new anonymous survey to the expert panel via EUSurvey, with a completion deadline of 10 days. The survey included all previously retained measurement instruments, together with the full set of revision proposals processed and synthesized by the facilitators, as well as all newly proposed domains with their corresponding measurement instruments. Experts were asked to indicate their level of agreement with each proposed revision or addition using a 7-point Likert scale ranging from "strongly disagree" to "strongly agree", to capture gradations of agreement with proposed revisions in line with common Delphi practice.

2.5 | Round 2: Development of the Final Version of the Supplementary Instrument

Proposals meeting acceptance criteria were incorporated into the final version of the integrative questionnaire. Proposals with a median score higher than 4 were accepted. In cases where two or more partially incompatible or mutually exclusive proposals for the same element exceeded the acceptance threshold, the procedure foresaw reconciliation by the core team, favoring higher medians and brevity while documenting decisions, consistent with RAND/UCLA and Delphi reconciliation principles (Keeney et al. 2011; Fitch et al. 2001). The final instrument and processing notes were archived to support subsequent content validity appraisal (Mokkink et al. 2018).

3 | Results

Invitations to complete the first round of evaluation of the questionnaire were sent on the February 18th, 2025 and all 17 experts submitted their feedback by February 28th, 2025, yielding a 100% response rate within 10 days.

A detailed summary of the feedback collected during the first round of evaluation is provided in Table 1. All 15 sections of the questionnaire reached at least the a priori minimum median retention threshold of 6 (median relevance ≥ 6 on a 10-point scale) and were therefore retained. The section on "Academic stress" obtained the highest score (median = 9, IQR = 3), while the lowest scores were attributed to the sections on "Gambling" (median = 6, IQR = 2), "Anthropometric measurements" (median = 6, IQR = 4), and "Mode of Commuting" (median = 6, IQR = 3). For all the domains, the median relevance score met the prespecified minimum retention threshold of 3 (median ≥ 3 on a five-point scale). The highest number of elimination proposals for any item or scale was 5, observed in the case of Medi-Lite (diet quality index). In total, 115 proposals for modifications of the preliminary domains were submitted. The most frequent suggestions concerned response-option changes (15 domains) and item rewording (14 domains). Additionally, the inclusion of 10 new domains was proposed. Figure 2 displays bar plots with the median scores for all proposed sections.

The second-round survey presented all retained baseline instruments together with the consolidated revision sets and the newly proposed domains with candidate measures. Using a 7-point agreement scale, 35 of the 115 modification proposals of the preliminary domains (30.4%) achieved the acceptance criterion (median > 4) and were adopted. Among the newly proposed domains, 3 of 10 (30.0%) met the acceptance threshold and were incorporated, as the median of the assigned scores was greater than 4. The resulting supplementary questionnaire comprises 18 sections and 64 questions (presented in the Supporting Information S1).

4 | Discussion

Using a rapid e-Delphi, we systematically gathered, synthesized, and prioritized multidisciplinary expertise to refine preliminary domains and introduce targeted new content, converging on a pragmatic supplement of 18 sections and 64 items for use alongside WMH-ICS in Italian higher-education settings. The process balanced timeliness with methodological transparency (pre-specified thresholds, controlled feedback, auditable decisions), consistent with contemporary guidance on Delphi design and reporting (Hsu and Sandford 2007; Keeney et al. 2011; Diamond et al. 2014; Jünger et al. 2017). Near-perfect engagement (100% completion across both rounds within the set deadlines) supports the feasibility and acceptability of an

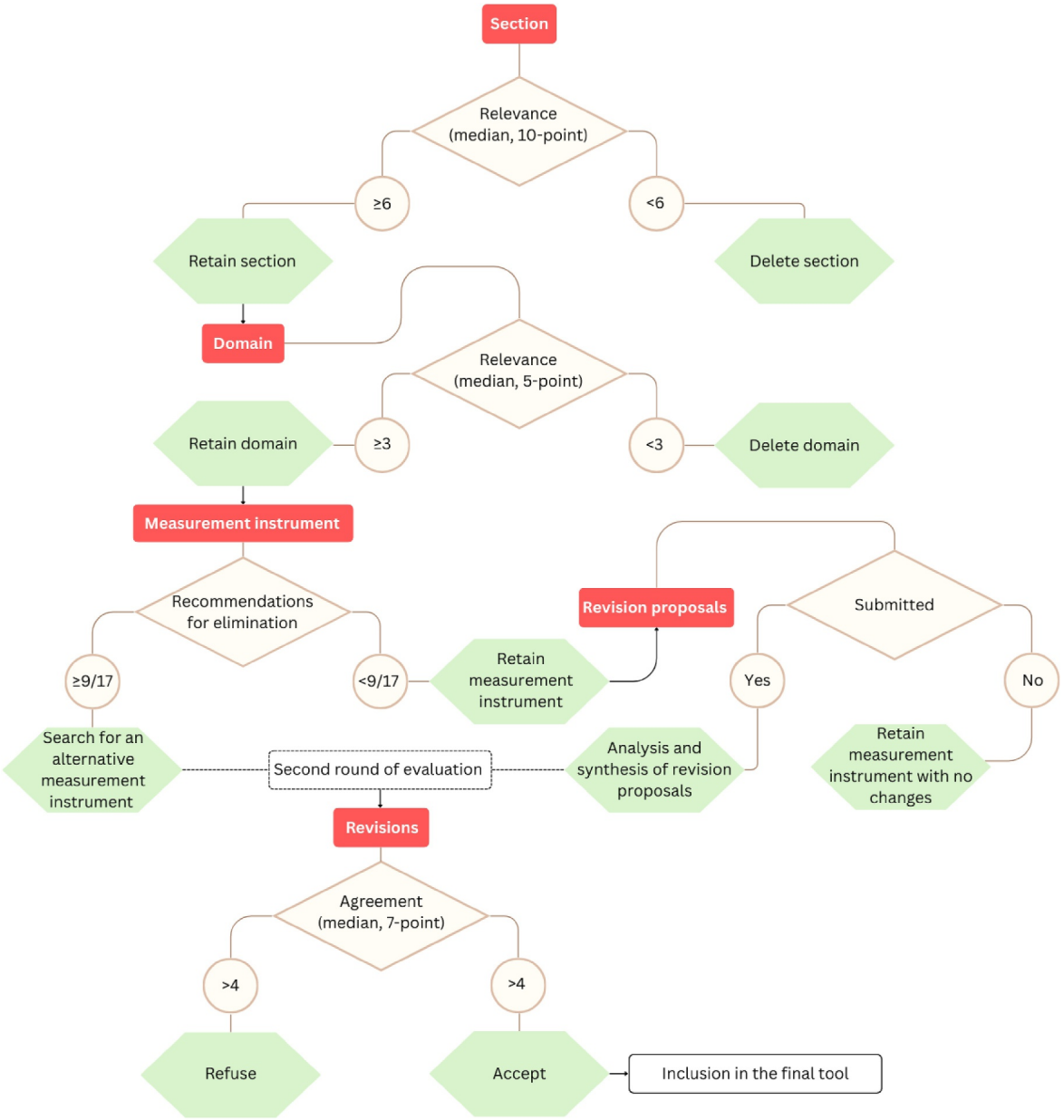

FIGURE 1 | Operational algorithm for processing expert input in the rapid e-Delphi. In Round 1, each section was rated for relevance on a 10-point scale; sections with a median ≥ 6 were retained. Within retained sections, each domain was rated on a five-point scale; domains with a median ≥ 3 were retained. For each domain's measurement instrument, if < 8 experts recommended elimination without suggesting an alternative, the instrument was retained; if ≥ 8 experts recommended elimination without an alternative, an alternative instrument was sought. Where revision proposals (e.g., wording, response options) were submitted, these were synthesized for Round 2. In Round 2 (dotted box), experts rated agreement (7-point scale) on revisions/additions; proposals with median agreement > 4 were accepted and incorporated into the final module. Shapes: diamonds = decision nodes; rounded rectangles = process steps/outputs; dotted outline = Round 2 processes. Thresholds and scales were pre-specified in the protocol.

e-Delphi in multicentre academic programmes, as well as the perceived relevance of the survey.

The content of the final questionnaire reflects important contributions from the experts. Most accepted proposals focused on clarifying item wording and optimizing response options, which likely improves measurement precision without adding burden, an important trade-off for online surveillance (Dillman et al. 2014). At the same time, the inclusion of new domains is sensitive to the specific needs and priorities of the Italian higher education context and reflects convergent evidence on modifiable determinants of student mental health, such as sleep quantity and quality, physical activity, diet, social media use, and social connections (Almarzouki et al. 2022; Teuber et al. 2024; Adams et al. 2021; Teng et al. 2020; Rubin et al. 2016; Wu et al. 2024; Chen et al. 2025; Zhang et al. 2021). These domains were selected to capture modifiable behavioral and contextual exposures with plausible links to mental health outcomes and service use, thereby enhancing the instrument's relevance for both epidemiological monitoring and programmatic action. By deliberately

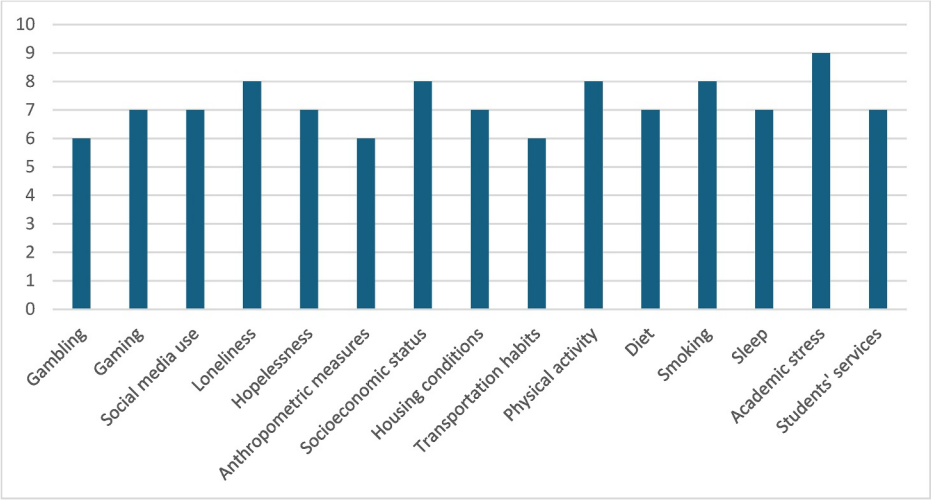

FIGURE 2 | Section-level relevance in Round 1. Bars show medians (10-point scale). The prespecified retention threshold (median ≥ 6) was set at median ≥ 6.

avoiding overlap with WMH-ICS core constructs (e.g., DSM-5 disorder status, symptom severity, role impairment), the instrument preserves internal coherence and international comparability, while the retained domains complement the core instrument by addressing upstream determinants and service-related dimensions not covered in WMH-ICS, providing levers for local quality improvement (Proctor et al. 2011).

Our findings confirm the feasibility and added value of adopting an e-Delphi approach to questionnaire development. The process ensured transparency, inclusiveness, and methodological rigor while maintaining efficiency, which was essential given the multi-institutional context and the need to align perspectives across diverse areas of expertise. This study contributes a transparent, auditable template for time-sensitive consensus on content that must remain brief yet actionable. Beyond classical Delphi elements (i.e., anonymity, iteration, controlled feedback), we declared a priori retention and acceptance thresholds and documented reconciliation rules, features repeatedly emphasized in reviews of Delphi quality and consensus measurement (von der Gracht 2012). By keeping a complete record of how decisions were made, we can now test the module with students in a structured way. We will follow COSMIN guidance, checking if items are understandable and really cover what we want to measure (content validity), group together as expected and form coherent sections (structural validity), and that scores are stable and reproducible (reliability) (de Vet et al. 2011; Mokkink et al. 2018; Terwee et al. 2018). Further work should extend these initial applications by formally testing measurement invariance across institutions and key student subgroups. In a multicentre context, establishing invariance (e.g., configural, metric, and scalar) is essential to ensure valid and comparable estimates and to support robust, defensible cross-group comparisons (Meredith 1993; Cheung and Rensvold 2002; Putnick and Bornstein 2016).

Some limitations should be acknowledged. First, the compressed timeline may have limited opportunities for deeper deliberation, a known issue in "rapid" adaptations despite the benefits of anonymity and structured feedback (Keeney et al. 2011). Second, although the questionnaire was designed to be also administered to international students and is available in both Italian and English, it was developed within the Italian context, and some sections may therefore reflect context-specific priorities. Several domains may nonetheless be applicable, at least in part, to other higher education settings, subject to appropriate contextual adaptation. Third, end-user input (i.e., students) was intentionally sequenced for the subsequent phase. Although the instrument incorporates previously validated scales and has undergone pilot administration supporting its feasibility and acceptability, its psychometric properties have not yet been formally evaluated in this specific context; therefore, further analyses are needed to assess reliability, construct validity, and measurement invariance. Fourth, even a concise supplement increases survey length, with implications for response rates, missingness, and nonresponse bias; mitigation strategies may include tailored design, incentives, and responsive follow-up (Dillman et al. 2014; Groves 2006). Finally, recent simulation studies suggest that larger panel sizes are required to ensure adequate replicability; accordingly, the relatively small panel size ($n = 17$) may have reduced the stability of the estimates compared with some Delphi applications (Manyara et al. 2024). Despite these limitations, the study has several strengths. They include: (i) a prespecified protocol with explicit thresholds and reconciliation consistent with Delphi best practice (Keeney et al. 2011; Diamond et al. 2014; Jünger et al. 2017); (ii) complete panel retention and a comprehensive audit trail; (iii) a multidisciplinary panel spanning public health, clinical psychology, sports and nutrition sciences, addictions and student services; (iv) parsimony through validated short forms and justified single-item screens (Boateng et al. 2018); and (v) non-overlap with WMH-ICS to preserve international benchmarking (Auerbach et al. 2018). In addition, following preliminary piloting to ensure clarity and usability, as of this paper's acceptance date, the questionnaire has been administered at scale, yielding nearly 10,000 responses and supporting its feasibility and acceptability in real-world settings. After excluding respondents who failed one or more of the three

attention-check items embedded throughout the questionnaire, 96% of responses have been retained as valid, indicating high levels of engagement and response reliability.

5 | Conclusions

In conclusion, the rapid e-Delphi process enabled the development of a context-sensitive and methodologically robust survey on university student lifestyle and well-being, designed to complement the WMH-ICS questionnaire. By coupling these instruments, the approach enables the triangulation of behavioral and contextual exposures with mental disorders, impairment, and help-seeking patterns, contributing to ongoing efforts to adapt international mental health monitoring tools to local contexts.

This integrated framework has the potential to generate robust epidemiological evidence, inform targeted interventions, and support policies aimed at improving student mental health and quality of life. Moreover, its repeated implementation can foster a learning-system feedback loop, whereby successive data collections identify high-burden exposures, assess service acceptability and uptake, and guide iterative, evidence-informed adjustments. Over time, linking these measures with implementation outcomes may support scalable, equity-oriented improvements across institutions and provide a model transferable to other academic systems and countries.

Author Contributions

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Ethics Statement

This study was conducted according to the guidelines of the Declaration of Helsinki and did not require approval from an ethics committee. All participants were informed about the aims and procedures of the research and provided their informed consent prior to participation. Participation was completely voluntary. Panellists remained anonymous

to each other during the study. Participants have also consented to the dissemination of the anonymized study results.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.

Supporting Information S1: mpr70075-sup-0001-suppl-data.docx.