Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Does Teaching Psychosocial Skills Benefit the Healthcare Student Teachers? An Exploratory Mixed Methods Study With French Healthcare Students

Julia Langer

julia.langer@univ-grenoble-alpes.fr

Université Grenoble Alpes

Emmanuel Bernet

Université Lumière Lyon 2

Nassim Elimari

Université Lumière Lyon 2

Léa Duchesne

Nantes University Hospital

Bastien Boussat

Centre Hospitalier Universitaire de Grenoble

Rebecca Shankland

Université Lumière Lyon 2

Research Article

Keywords: psychosocial skills, health professions education, well-being, mental health, learning-through-teaching, medical education, mixed methods

Posted Date: November 23rd, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11390041/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Does Teaching Psychosocial Skills Benefit the Healthcare Student Teachers? An Exploratory Mixed Methods Study With French Healthcare Students

Julia Langer[1,2], Emmanuel Bernet[3], Nassim Elimari[3,5], Léa Duchesne[4], Bastien Boussat[1,2], & Rebecca Shankland[3,6]

1. Laboratory of Medical Engineering Techniques and Complexity – Computer Science, Mathematics and Applications (TIMC), Université Grenoble Alpes, Grenoble, France
2. Clinical Epidemiology Unit, Grenoble Alpes University Hospital (CHU Grenoble Alpes), Grenoble, France
3. Development, Individual, Process, Disability, Education Research Unit (DIPHE), Université Lumière Lyon 2, Lyon, France
4. Department of Medical Evaluation and Epidemiology, Nantes University Hospital, Nantes, France
5. Université de Reims Champagne-Ardenne, C2S, Reims, France
6. Institut universitaire de France, Paris, France

Corresponding Author Contact: Julia Langer, CReSI. Laboratoire TIMC CS 40700 38058 Grenoble Cedex 9, France; julia.langer@univ-grenoble-alpes.fr

ORCID:

Julia Langer: 0000-0002-4225-1081

Nassim Elimari: 0000-0003-2787-2725

Emmanuel Bernet: 0000-0003-1204-6826

Léa Duchesne:0000-0001-8139-319X

Bastien Boussat: 0000-0003-0725-9122

Rebecca Shankland: 0000-0002-9182-5483

Abstract

Background: Healthcare students are at high risk of poor psychological outcomes. Psychosocial skills may improve mental health and well-being. While psychosocial skills interventions have shown promise in reducing student stress, little is known about whether teaching the skills may benefit the student teachers themselves. This study explores an intervention that utilizes a learning-through-teaching model to improve mental health and well-being in French healthcare students.

Methods: A mixed-methods multi-study investigation was conducted. Qualitative data were collected from 28 participants in five focus groups of healthcare students in a psychosocial skills-enhanced mandatory program in France. The following year, a non-randomized quasi-experimental pre-post study quantitatively compared healthcare students participating in a psychosocial skills-enhanced program (36 participants) to those in a standard program (10 participants).

Results: Qualitative results found that participants reported greater awareness of existing psychosocial skills, increased confidence, and the importance of the context in the experience. Quantitatively, the intervention group followed more favorable trajectories for well-being and vigor compared to the control group. These results were, however, partly driven by control group well-being and engagement decline. No significant improvements were observed for psychosocial skills or mental health.

Conclusions: Teaching psychosocial skills is a promising approach to enhancing healthcare student engagement and aspects of well-being through a learning-through-teaching process. Although measurable improvements in psychosocial skills were not detected in the

quantitative findings, qualitative findings suggest the intervention promotes greater awareness and intentional use of existing skills. Larger randomized controlled studies are needed to confirm these findings and clarify the mechanisms underlying the effects.

Keywords: psychosocial skills, health professions education, well-being, mental health, learning-through-teaching, medical education, mixed methods

Introduction

Healthcare students have a high risk of poor psychological outcomes, such as depression, anxiety, and stress (1). These students face numerous challenges, including an intense academic workload, financial debt, lack of sleep, frequent exposure to illness and other hardships, and compounding problematic relationships in the educational environment. All of these factors may contribute to the high prevalence of mental health risks in this population (2). Given the risks it is important to research educational approaches to improve student mental health and well-being.

Mental health is increasingly conceptualized as encompassing not only the absence of psychological distress but also the presence of positive well-being (3), which is necessary for individuals to function well in society. The World Health Organization defines mental health as one's capacity to deal with stress, learn, work, and contribute to the community (4) High levels of well-being are conceptualized as flourishing, social well-being, engagement, positive relationships, meaning, and accomplishment (3,5). While mental health and well-being are two distinct concepts, they are often congruent with the quality of students' lives.

Psychosocial skills (PSS) have recently been investigated as a protective factor to buffer against poor mental health and promote well-being in students (6,7). These skills are defined as

one's ability to manage the demands and challenges of daily life and include cognitive (self-awareness, decision-making, critical thinking, self-efficacy), emotional (emotion/stress awareness, expression, control of self and others), and social (communication, conflict resolution, assertiveness) skills.

PSS are associated specifically with a number of positive health outcomes. They include reduced stress, depression, anxiety (8–10), a decreased risk of burnout (7), and loneliness (11). Further, PSS are associated with improved interpersonal functioning (12–14), flourishing (15), engagement (16), and purpose in life (12). Evidence is mounting for the efficacy of PSS interventions in student populations. However, this research is in its infancy, and the pathway for improvement remains unclear.

The learning-through-teaching theory suggests that one develops a deeper understanding of a subject when they teach it to others (17,18). This process includes several primary steps: the preparation to teach process, explaining, simplifying, reformulating, and adapting and reacting to student questions/reactions (18). PSS are behavioral skills that require practice and teaching PSS may facilitate students' personal integration of these skills. This process may lead to improvements in the student's mental health and well-being.

An opportunity to directly examine the effects of learning-through-teaching PSS may be found with the French Service Sanitaire (SESS). This is a mandatory French national service-learning program implemented in 2018 in health facilities across the country (17). Healthcare students receive and deliver health promotion interventions in real-world community settings. This program offers a real world environment to examine whether teaching PSS to younger pupils will promote PSS development among student educators.

Research gap

PSS are a useful tool to improve mental health and well-being in students. Conventional interventions mainly involve group-based interventions or peer-learning . Learning-through-teaching may be an avenue to improve PSS. More specifically, this study investigates if teaching PSS through an authentic learning-through-teaching intervention, the SESS, to promote PSS in pupils will help in their development among student educators themselves. This may function by requiring the healthcare students to understand, explain, and adapt PSS to their pupils' needs, and then reflect on them for a later presentation. Further, teaching actively requires students to apply these skills while teaching. It is possible that the act of teaching may help students develop and apply PSS to personal and professional lives. To our knowledge there are no investigations into improving PSS through a learning-through-teaching modality.

The aim of this body of work was to investigate the impact of a learning-through-teaching methodology employed in a PSS-enhanced SESS program on PSS, mental health, and well-being. Due to the preestablished associations between these skills and positive outcomes, teaching these skills may help students transfer them to other aspects of their lives leading to improved mental health and well-being. In study 1, the objective was to qualitatively understand whether and how students perceive the impact of teaching PSS on their own skill development, mental health, and well-being. The second study aimed to test whether a PSS-enhanced SESS program improves PSS, mental health, and well-being compared to a control group following the standard SESS program.

SESS Learning-Through-Teaching Framework

The two studies were conducted within the SESS learning-through-teaching framework. The standard program involved four phases: pedagogical training, program development, teaching activities, and a summary presentation. All participants in this program were adults over 18 in the SESS program within the disciplines: medicine, nursing, dentistry, pharmacy, physiotherapy, and other health professions programs.

Phase 1: Pedagogical Training

Participants received pedagogical training (approximately 16 hours) regarding how to work with at-risk populations and teach public health interventions. The program was designed for students to experience the types of activities they would later facilitate to younger pupils, such as role-play, creative arts, and active listening. Generally, training topics include public health knowledge, prevention methodologies, project development, and health promotion activities.

PSS-enhanced training includes development of PSS through workshops integrating various techniques. Targeted skills included stress and emotion management, empathic communication, teamwork, problem-solving, and critical thinking. Students were encouraged to integrate PSS and creative pedagogical approaches in their community prevention projects.

Phase 2: Program Development

Students developed and designed health promotion programs for younger pupil populations (aged 3-17). The healthcare students were assigned to groups and each group was paired with a school. Together the student groups and schools developed prevention programs

tailored to the partnered schools' needs. Topics included mental health, nutrition, sleep, addiction, physical activity, bullying, in addition to others. All activities were developed under university and school faculty supervision.

PSS-enhanced programs needed to include activities specifically targeting PSS.

Phase 3: Teaching Activities

Students delivered their interventions to the younger pupils in a series of sessions that lasted between 45 minutes and 1.5 hours. These sessions occurred during the academic year between November and March.

In PSS-enhanced programs students were requested to model and explain PSS to the pupils.

Phase 4: Summary Presentation

Students presented a summary of their experiences to their faculty advisor. These presentations included reflections on the administrative aspect of the project, context of the intervention, teaching and implementation plan and objectives, teaching and implementation experience as a group and personally, methods used, and pupil reactions.

Study 1

Study 1 Objective

The objective of this study was to explore how healthcare students perceive the experience of teaching PSS and how they believed it influences their personal PSS, mental health, and well-being.

Study 1 Methods

Study Design

Five focus groups were conducted at [BLINDED FOR PEER REVIEW], which uses a PSS-enhanced SESS program. The groups were conducted in February 2025 directly after the summary presentation. Participants had completed and delivered the Flourishing in schools program (*Tous Épanouis à l'École, TEAL)*, a PSS based anti-bullying intervention for elementary school students. Students followed a manual for program development, which focused on PSS development to reduce bullying. Otherwise, they followed a standard PSS-enhanced SESS program. The study was conducted under the approval of [BLINDED FOR PEER REVIEW].

All 36 students who participated in TEAL were given the opportunity to join the focus groups through convenience sampling, 28 chose to enroll. Participation was completely voluntary and held at the university behind closed doors. Groups were audio-recorded and then transcribed, keeping the original French language. Field notes were taken by the facilitator during the groups, all notes and recordings were anonymous with no identifying factors noted. Focus groups had between three and eight participants and lasted an average of 36 minutes and 9 seconds (range: 24 minutes 11 seconds to 42 minutes 29 seconds). To retain anonymity no demographic data was collected. See Table 1 for a description of the Groups.

These semi-structured focus groups explored participants' perceptions of their overall experience of the program, the impact teaching had on their ability to integrate PSS, the ability to transfer PSS skills to their personal and professional lives, and the impact the program had on their mental health and well-being. Example questions include "*How has this program impacted*

your perception of yourself?" and "*What impact did teaching this content have on your own learning?*". Follow-up questions were used to further explore topics. There was particular attention to participants' perceptions of if teaching PSS contributed to the development, reinforcement, and internalization of these competencies. The interview guide can be seen in Appendix 1.

Table 1: *Focus Group Participant Numbers and Duration (n = 28)*

Focus group	Number of Participants	Duration of Focus Group
FG01	6	42 min 29 sec
FG02	8	37 min 22 sec
FG03	3	24 min 11 sec
FG04	6	41 min 14 sec
FG05	5	35 min 27 sec

Note. The first author facilitated all focus groups and is not included in the number of participants. The duration of the focus group was based on the length of the recording.

Qualitative Data Analysis

Qualitative data was analyzed using an exploratory qualitative descriptive-interpretive approach that combines directed content and codebook thematic analysis. The initial codebook was created based on the study objectives, focus group guide, the first author's field notes, PSS framework, and learning-through-teaching literature. After human familiarization ChatGPT-5.5 Pro (19) was used to assist with theme scouting which was reviewed and verified by the second author. Researchers made all final decisions regarding the codebook, coding, interpretation, quotations, and publication claims.

Five anonymized transcripts were prepared with speaker, timestamp, and segment identifiers. This was created by human transcribers and underwent a technical review by the AI software. ATLAS.ti Mac, version 26.1.1 (20), managed coding, memos, queries, exports, and calibration. The final codebook comprised 17 codes across five categories: PSS and its dimensions, learning-through-teaching, transfer, mental health and well-being, and contextual conditions. We additionally coded using six valence markers. We descriptively examined code recurrence, valence, and co-occurrences.

FG03 was independently coded in full by two researchers (the first and second authors, both fluent in French) using a provisional codebook and served as the calibration subset. During this phase ChatGPT (19) acted as bounded analytic support and helped identify potentially missing codes in the codebook. The second author reviewed ChatGPT's recommendations for cohesion with the codebook. Discrepancies were reviewed collaboratively and informed refinements to code definitions, code boundaries, coding-unit decisions, and valence rules (21). This process was used to create the final version of the codebook. FG03 coding was

subsequently recoded by both first and second authors with the revised codebook. This coding project was compared in ATLAS.ti. The inter-coder agreement was calculated for group FG03 using Krippendorff's c-alpha-binary coefficients yielding (c-α_{binary} = .686) and the valence coding layer (c-α_{binary} = .624). Given the variability in the recommended thresholds for qualitative intercoder agreement, these coefficients were interpreted cautiously and used diagnostically, together with code-specific results, to identify ambiguities and guide further review (21).

For the remaining focus groups, one author coded the whole transcript, and the other counter-coded approximately one quarter of the material, prioritizing passages judged more difficult or uncertain by the primary coder. This was done to provide an additional check on coding consistency. Full materials including the final codebook, a reconstructed representative AI prompt, and summaries of other AI tasks are provided in Supplementary Appendix 2.

Study 1 Results

Qualitative results are structured around the five focus groups (FG01–FG05). The analysis identified patterns in how participants experienced the intervention in their specific school. Table 2 summarizes the findings and provides an overview of contextual valence stated in each group, PSS use, and associated outcomes across groups.

We see a pattern emerge across the focus groups. FG01 is the most ambivalent across all domains, with variable PSS use, and mixed outcomes. FG02 presents generally negative context valence, with variable PSS use and generally negative outcomes. FG03 is characterized by a highly positive context, high PSS use, and generally positive outcomes. FG04 shows moderately positive outcomes across domains. FG05 shows a generally negative context, low PSS use, and

generally negative mental health appraisals. Context valence labels were determined by both the valence counts and the reading of the transcripts.

Table 2. *Qualitative Context Valence, PSS Use, and Outcomes by Focus Group (n = 28)*

Focus Group	Context Valence Interpretation	PSS Use	Outcomes
FG01	Ambivalent	Variable	Mixed Outcomes (confidence present, other outcomes limited)
FG02	Negative	Fragmented	Predominantly negative mental health reported, mixed confidence
FG03	Positive	High	Strong confidence and well-being reported
FG04	Positive	Moderate	Moderately positive outcomes
FG05	Negative	Low	Predominantly negative mental health reported

The qualitative findings were organized around four interpretive themes. Theme 1 is Context, or the contextual conditions that shaped whether teaching PSS felt manageable and meaningful or a stressful burden. Theme 2 is learning-through-teaching PSS, or how teaching PSS skills helped participants use their skills through adapting, reformulating, and interacting with pupils. Theme 3 is the perceived PSS integration and its relationship with self-confidence. This theme combined PSS, self-perception, and students' ability to transfer PSS to their personal and professional lives. Theme 4 is the perceived program impact on mental health and well-being. The descriptive coverage and recurrence of qualitative themes can be seen in Table 3. All themes appeared in all five focus groups.

Table 3. *Descriptive Coverage and Recurrence of Qualitative Themes Across Five Focus Groups (n = 28)*

Theme title	Coded segments	Unique speakers represented	Associated valence count				
			+	-	±	=	?
Theme 1: Context.	179	22	78	59	15	6	10
Theme 2: PSS is used differently within the learning- through-teaching processes	77	18	43	6	6	4	3
Theme 3: PSS integration and Self-Confidence	109	18	57	18	5	4	12
Theme 4: Impact of Mental health and well-being	72	17	40	20	1	2	4

Note. Counts refer to the number of coded segments counted once in each theme, one quotation could contribute to more than one theme. Valence markers were not mutually exclusive and some quotations had no valence markers. VALΔ or Valence change, is not included in the displayed columns, only the valence after the change, as it was exclusively co-coded.

Theme 1. Context

The healthcare student participants described implementation conditions shaping their experiences ranging from manageable and meaningful to burdensome and stressful. Researchers identified 179 individually coded segments, with 22 different participants discussing context. Students across all five focus groups reported how positive or negative their experience was, the difficulties of program implementation, feelings of teaching preparedness, and general program satisfaction.

Seventy-eight of the contextual codes had positive valence attached, including statements such as “They [the pupils] actually had good participation. So that helped us feel a bit more comfortable” (FG01-P02) and “The teacher who had been trained was very committed to the project, so she was even more able to motivate her students and get them to work between

sessions" (FG03-P04). Finally, one participant said, "I found it very easy. We were kind of expected like messiahs in the school" (FG04-P03).

Fifty-nine coded segments had negative valence when discussing context, making statements such as: "[The teachers] told us, 'We'll let you do it,' and it was horrible because we couldn't get anything done; it was too chaotic. … we couldn't manage to redirect the students, and if we tried to talk, it would just drift onto something else; it was difficult" (FG02-P05).

The valence counts also included 15 mixed or ambivalent segments, six neutral or limited-change segments, and 10 uncertain segments. Eleven coded segments had no valence marker.

Theme 2. PSS is used differently within the learning-through-teaching processes

The student participants reported learning-through-teaching appeared when they had to explain, reformulate, adapt, and respond to pupils. 18 students referred to the concept 77 times, 43 of which had positive valence and only six having a negative valence. This subject was discussed 15 times with no clear valence. Learning-through-teaching appeared to be linked to different categories of PSS depending on the pedagogical activity. Students described interaction-based and adaptation-based teaching as associated with global PSS and social skills, while preparation-based activities were inconsistently linked to PSS.

We coded teaching PSS co-occurring with learning-through-teaching 24 times. When the healthcare students discussed their sense of preparedness for teaching, PSS was only briefly mentioned in three of the five focus groups, twice mentioning social skills, and once mentioning the global PSS. One participant mentioned feeling underprepared, stating "the PSS themselves-

we talked about them in general in terms of what we had learned for the main ones but … They remain titles. We didn't really implement them" (FG05-P03).

Healthcare students mentioned using social skills to adapt their teaching to pupils' needs 10 times across 3 groups. One participant expressed, "Beyond… teaching skills to students, we ourselves were placed in a situation where we had to use tricks or ways of speaking to students so that they would feel more implicated" (FG01-P05). Another participant said, "The fact that sometimes I think I am being clear, but actually I am not … It's about finding … the right way of communicating… things that seem easy to us are not necessarily easy for them" (FG02-P05).

When participants discussed interacting with the pupils, we saw co-occurrence with PSS, 12 positively coded segments. Respondents primarily reported global PSS with 6 co-occurrences across all groups, making statements such as "actually, it also makes us reflect on this ourselves" (FG04-P05) and "It is interesting to understand that it is better to work on our own skills, and that this is what will lead us to not have these [undesired] behaviours" (FG02-P03) and "because we had to explain [PSS] a lot, also reformulate it, and know how to answer students' questions, I find that it was more…[useful] for us"(FG05-P04).

Five segments describe using social skills to interact with pupils. Participants said things like "It's certain, I learned a lot from my interactions with the children" (FG02-P01). Four coded segments described cognitive PSS and student interactions, for example: "Personally, I find that working with children is quite impactful in itself, because once we've grown up, we forget what we were like at that age. Sometimes, it even makes us reflect on ourselves" (FG03-P03). Only one student described emotional skills and pupil interactions.

Theme 3. PSS integration and self-confidence

Theme 3 investigated PSS and self-confidence, which consisted of 109 coded segments representing 18 individual speakers. Associated valence counts included 57 positive and 18 negative segments, while the remaining had ambivalent or unclear valence. PSS integration was characterised by increased awareness and recognition of existing skills. Self-confidence emerged as a stable outcome associated with reported PSS use.

Students described changes in their PSS awareness making statements such as “I think it’s good to put words on things that we actually do in everyday life …I think it’s really cool to be able to make sense of the whole thing afterwards” (FG02-P05) and “I became aware of things we do in everyday life without realising that they are actually skills” (FG02-P03). Some participants explicitly noted limited reflection or transformation: “I don’t know, I haven’t thought about it enough” (FG02-P05)

Self-confidence was mentioned 33 times across focus groups. PSS was co-coded with confidence and positive valence 12 times in four of the groups. Global PSS was co-coded with confidence twice, social skills six times, emotional skills twice, and cognitive skills twice. When discussing PSS and confidence, participants made statements such as: “Managing a conflict, managing a situation can be somewhat difficult… [and] knowing how to help them, … I think that this can really help me going forward. So the psychosocial tools from the camp are useful” (FG04-P03), “I am capable of doing it” (FG02-P03) and “In terms of mastering this area, at least psychosocial competencies, I didn’t think we could end up transmitting so many things or working on so many different aspects through exercises or workshops like the ones we did” (FG03-P04).

Theme 4. Impact of Mental Health and Well-Being

Mental health and/or well-being were discussed across all five focus groups, with 72 distinctly coded sections from 17 students. They discussed mental health and well-being at the same time 31 times. 40 of the coded sections had a positive valence, and 20 had a negative valence, 12 with either other or no applied valence markers. Some students described their experiences through enjoyment, gratification, and a feeling of personal meaning or usefulness (sections with a positive valence), while others described stress, uncertainty, or mental load (coded sections with a negative valence).

Well-being was mentioned 45 times; 23 of those times were in focus group 03. Well-being was coded with positive valence 37 times, and negative valence only eight times. For example, participants explained their experiences as “Ah, that’s cool, I was able to bring something to children.’ So it is rewarding.” (FG03-P04) and “It’s gratifying” (FG03-P03) and “it's enriching” (FG05-P02).

Mental health was mentioned in four of the five focus groups 58 times, often with negative valence (34 negative valence markers were coded with mental health, 17 with positive valence markers, seven had either other or no applied valence markers). Participants made statements such as: “honestly… It had more of a negative impact, unfortunately” (FG05-P03), “It was hard and tiring” (FG02-P05), “Personally, it was a real pain in the butt” (FG03-P02) and “It was complicated. Often, I didn’t want to go; I didn’t want to go see them” (FG05-P01).

When we further analyzed the contextual conditions related to teaching PSS, we identified an association between the general context and whether participants found the program to be enriching or cumbersome. Groups who described positive experiences (FG03 and FG04)

also tended to report generally positive mental health and well-being. Negative experiences were reported with negative mental health and well-being (FG02 and FG05). See Table 2 for a focus group profile interpretation.

Across the four themes, participants' accounts reveal patterns in their experience of the SESS and the relationship with PSS. Valence appeared to shape experience descriptions with positive valence frequently aligned with increased PSS and positive mental health and well-being, and the opposite for negative valence. The learning-through-teaching process was described as requiring different PSS depending on activity type. Overall, PSS integration was characterised by increased awareness and recognition of existing PSS. Confidence emerged as the most stable associated outcome.

Study 1 Discussion

The qualitative findings suggest that learning-through-teaching may act as a framework for change but it is not possible to determine causality. We identified four main themes in our findings. First, context matters and has an overarching impact on general experience. This is supported by the existing literature on student well-being in higher education asserting that class climate was an important factor (22).

Second, PSS are engaged differently through the learning-through-teaching process. Preparing lessons was associated with very few mentions of PSS, but interacting and adapting the lessons for the pupils incited more frequent discussion of PSS. One explanation is that teaching younger pupils may have reinforced learning-through-teaching, prompted self-reflection and confidence, and increased skill internalization through practice (18,23). This may have occurred because participants were asked to model, explain, and adapt their personal PSS to

the classroom (24). Student teachers were forced to think and interact differently with the pupils which may have had an impact on their social and cognitive skills. For example, the student teachers have to take others' perspectives, bridge knowledge gaps, anticipate misconceptions, and reorganize concepts based on the pupils' prior knowledge and misconceptions.

Theme three posited that when healthcare students felt they integrated PSS they reported increased self-confidence. One possible explanation is that students became more aware of their PSS as teaching requires active introspection giving more access to skills. Another explanation is that participants who successfully taught children PSS became more aware of their capacity to use PSS effectively.

The final theme was that context may actively influence the value and impact of the intervention on mental health and well-being. Host teacher involvement, commitment, and excitement, pupil classroom behavior and the required administrative tasks all played important roles in the healthcare student teacher's experience of the program. The context impacted if they saw the program as a burden or a benefit.

Our results provide insights on perceptions of PSS-enhanced SESS program improving PSS awareness and use in healthcare students. It also suggests that the program may influence mental health and well-being in differential ways. These findings give increased confidence in the use of a learning-through-teaching methodology as a way to improve PSS in healthcare students. Because this study examined perceptions of the experience but did not collect quantifiable measures, Study 2 compared the quantitative outcomes of participation in the PSS-enhanced SESS program to a standard program, looking at changes in PSS, mental health and well-being.

Study 2

Study 2 Aims and Hypothesis

Study 2 aimed to examine if students participating in a PSS-enhanced SESS program demonstrated greater pre-post improvements in PSS, mental health, well-being, and student engagement than the control group standard SESS program. We hypothesized that students in the PSS-enhanced SESS program would demonstrate greater improvements from pre to post intervention in PSS, mental health, well-being, and student engagement than the students in the control group.

Study 2 Methods

This study employed a non-randomized multi-site quasi-experimental pre-post design with a control group. The intervention group had a PSS-enhanced SESS program and was recruited from the University [A, BLINDED FOR PEER REVIEW]. The control group was recruited from the [B, BLINDED FOR PEER REVIEW] and had a non-enhanced program. The ethics committee of University [B, BLINDED FOR PEER REVIEW] approved this study [BLINDED FOR PEER REVIEW]. To conserve anonymity participants created personal codes. Data were collected before any substantial program exposure (beginning in October 2025) and after submitting their final presentation (starting March 2026). Participants in both groups followed the SESS program. When the students were divided into groups to develop their program and teach the intervention group were divided into pairs, while the control group were groups of four.

All students in the SESS programs at participating universities were invited to participate (intervention: 650, control: 519). At Time 1(T1) 449 in the intervention group, and 34 in the

control group responded to the questionnaire. The participants in the intervention group were given a paper copy of the questionnaire in addition to having online access at T1. At Time 2 (T2), 78 intervention and 31 control responded. Only participants matched at T1 and T2 were included (intervention n=36, control n=10).

Participants in the intervention group were predominantly women (86.1%) and between 18 and 24 (77.8%). Nursing was the most common field of study (55.5%), followed by medicine and physiotherapy (19.4% respectively). For the control group, 60% were women, 90% were between 18 and 24, and 70% were studying medicine. No a priori power calculation was conducted. To see the full group demographics, see Table 4.

Table 4 *Baseline Sociodemographic Characteristics of Study Participants (n = 46)*

Characteristic		**Experimental n= 36**	**Control n= 10**	**Total n= 46**
Gender	Women	31 (86.1%)	6 (60.0%)	37 (80.4%)
	Men	5 (13.8%)	4 (40.0%)	9 (19.6%)
Age	18-24	28 (77.8%)	9 (90.0%)	37 (80.4%)
	25-34	1 (2.8%)	1 (10.0%)	2 (4.3%)
	≥35	7 (19.4%)	0 (0.0%)	7 (15.2%)
Study Track	Nursing	20 (55.5%)	0 (0.0%)	20 (43.5%)
	Medicine	7 (19.4%)	7 (70.0%)	14 (30.4%)
	Physiotherapy	7 (19.4%)	1 (10.0%)	8 (17.4%)
	Pharmacy	2 (5.5%)	0 (0.0%)	2 (4.3%)
	Dentistry	0 (0.0%)	2 (20.0%)	2 (4.3%)

Note: information is presented as the number of participants (percent of participants).

Data Analysis

Descriptive statistics and reliability indices were computed using Jamovi (version 2.6.2) (25), all inferential analyses were conducted in R (version 4.6.1) (26). Descriptive statistics and t-tests were calculated to summarize participant characteristics and baseline outcome measures. Continuous variables are presented as means and standard deviations, while categorical variables are presented as frequencies and percentages.

To evaluate changes in outcomes over time, separate repeated-measures analyses of variance (ANOVAs) were conducted for each outcome measure, with time as the within-subject factor and group (intervention, control) as the between-subject factor. The primary effect of interest was the Time x Group interaction, representing differential changes over time between the intervention and control groups. Mann–Whitney U tests were performed as sensitivity analyses to examine whether the observed between-group differences in change scores remained consistent using a non-parametric approach. Given the number of outcomes examined and the size of the control group, no correction for multiple comparisons was applied and the inferential analyses are reported as exploratory.

Outcome Measures

PSS. The Psychosocial Competencies scale for adults was used to measure PSS (27). This 15-item scale examines the three categories of PSS on a 5-point Likert scale (1=never, 5= all the time). This scale has four subscales corresponding to the WHO framework for PSS: emotional (5 items), cognitive (5 items), social (3 items), and assertiveness (2 items, an aspect of social skills). For each subscale, the average is calculated. An example item for the emotional subscale is "*when I am angry I can easily calm myself*", for the cognitive subscale is "*when I*

418 *take decisions I think about the pros and cons*", for the social subscale is *"I am always ready to*
419 *help others"* and the social-assertive subscale is "*when I disagree with someone I tell them".* The
420 PSS score showed acceptable internal consistency at both T1 (α = .73, ω = .73) and T2 (α = .76,
421 ω = .77). The subscales had internal consistencies of cognitive (T1 α = .59, ω = .662, T2 α = .74,
422 ω = .758), emotional (T1 α = .59, ω = .595, T2 α = .63, ω = .619), social (T1, α = .54, ω =.544,
423 T2 α = .42, ω = .489), and social-assertiveness (T1 α = .67, ω = .672, T2 α = .74 ω =.744).

424 ***Mental health.*** Mental health was measured by investigating symptoms of depression,
425 anxiety, and stress. We measured depression, anxiety, and stress with the Depression Anxiety
426 Stress Scale (DASS-21), developed by Lovibond and Lovibond, and validated as a short scale by
427 Antony and colleagues (28,29). This measure uses a 4-point Likert scale (1 = *not at all* to 4 =
428 *almost always)* where participants are asked to respond to how often they had the following
429 experiences over the past week. An example of the depression subscale is "*I couldn't seem to*
430 *experience any positive feeling at all*". An example of the anxiety subscale is *"I worried about*
431 *situations where I might panic and make a fool of myself".* An example of the stress subscale is
432 "*I find it difficult to relax".* Responses were summed to create a total score for each subscale.
433 The DASS-21 subscales showed good internal consistency at T1 for depression (α = .83, ω =
434 .83), anxiety (α = .82, ω = .83), and stress (α = .84, ω = .84), and at T2 for depression (α = .90, ω
435 = .90), anxiety (α = .84, ω = .86), and stress (α = .84, ω = .84).

436 ***Well-Being.*** Well-being was assessed using the PERMA Profiler (30). This scale is a
437 multidimensional approach that allows us to examine the different domains of well-being as well
438 as a total well-being score (30). The PERMA Profiler was used to assess well-being as
439 conceptualized by Seligman (30), a 23-item scale with five subscales. The PERMA

conceptualization of well-being measures broad multidimensional well-being. Subscales are the five dimensions of the model, positive emotions, engagement, relationships, meaning, accomplishment, and health. Each item is assessed on an 11-point Likert scale with five different end ranges, where 0 is always low (never or very bad), and 10 is always high (excellent, always, or completely). Each subscale was averaged, then the overall well-being score was calculated as the mean of the means. An example of the positive emotions subscale is *"In general how often do you feel happy?",* of the engagement subscale is "*How frequently are you absorbed in what you are doing?",* the relationships subscale *"To what extent do you receive help and support from other people when you need it?"* meaning, *"In general, to what extent do you lead a useful and meaningful life?"*, accomplishment "*How often do you feel that you are making progress toward achieving your goals?"*and health *"In general, how would you rate your health?"*. The total PERMA score showed good internal consistency at T1 (α = .88, ω = .89) and excellent internal consistency at T2 (α = .93, ω = .94). The subscales of the PERMA had internal consistencies of the individual dimensions positive emotion (T1 α = .85, ω = .85, T2 α = .89, ω = .889), engagement (T1 α = .51, ω = .555, T2 α = .27, ω = .508), relationships (T1 α = .80, ω = .828, T2 α = .87, ω =.875), meaning (T1 α = .86, ω = .866, T2 α = .83, ω =.834) and accomplishment (T1 α = .83, ω = .832, T2 α = .79, ω =.800).

Student Engagement. Finally we assessed student engagement with the Utrecht Work Engagement Scale-Short form for Students (UWES-9S). As this study targets a student population, how students engage with their studies is part of their overall academic well-being. We assessed engagement using the French version of the UWES-9S (7). The UWES-9S is a targeted engagement scale for students, examining vigor, dedication, and absorption.

The UWES-9S is a 9-item, 7-point Likert scale (0 = never to 6 = always) and has three subscales with means calculated for each: Vigor, Dedication, Absorption. An example item for vigor is *"When I get up in the morning, I feel like going to class"*. An example item for dedication is "*I am enthusiastic about my studies*". An example item for absorption is *"I feel happy when I study intensely"*. At T1, internal consistency was acceptable for vigor (α = .78, ω = .79) and good for dedication (α = .84, ω = .84), but slightly below conventional thresholds for absorption (α = .69, ω = .69). At T2, internal consistency was acceptable to good for vigor (α = .83, ω = .84), dedication (α = .84, ω = .85), and absorption (α = .78, ω = .79).

Study 2 Results

Baseline Comparisons

Independent-samples t tests were conducted to examine whether the experimental and control groups differed at baseline across the study outcomes. Detailed results can be seen in Table 5. No significant baseline differences were observed for mental health, well-being, total PSS, emotional skills, and social skills. However, the control group reported significantly higher baseline cognitive PSS, $t(13.19) = 2.45$, $p = .024$, vigor, $t(11.57) = 2.84$, $p = .014$, dedication, $t(11.48) = 3.01$, $p = .011$, and absorption, $t(11.92) = 2.31$, $p = .039$, indicating that participants in the control group entered the study with higher levels of schoolwork engagement and cognitive PSS than those in the intervention group.

Intervention Effects

The matched sample comprised 36 participants in the intervention group and 10 in the control group. One intervention participant had incomplete PERMA engagement and meaning

scores, leaving 35 intervention participants for those two outcomes. To examine intervention effects, repeated-measures analyses of variance (ANOVAs) were conducted with Time (T1 vs. T2) as a within-subject factor and Group (experimental vs. control) as a between-subject factor for mental health, well-being, engagement, and PSS. Results can be seen in Table 5.

For total PERMA well-being, a significant main effect of Time was observed, $F(1, 44) = 5.30$, $p = .026$, $\eta^2p = .107$, and a significant Time × Group interaction emerged, $F(1, 44) = 9.56$, $p = .003$, $\eta^2p = .178$. PERMA scores increased slightly in the intervention group, from 6.94 at T1 to 7.07 at T2, whereas they decreased substantially in the control group, from 7.51 to 6.60. These analyses indicate divergent trajectories between groups.

For the PERMA subscales, there was a main effect of time for positive emotion, $F(1, 44) = 6.18$, $p = .017$, $\eta^2p = .123$. Significant Time × Group interactions were observed for PERMA positive emotion, $F(1, 44) = 7.64$, $p = .008$, $\eta^2p = .148$; and PERMA engagement, $F(1, 43) = 5.72$, $p = .021$, $\eta^2p = .117$. Positive emotion remained nearly stable in the intervention group ($M = 6.63$ to 6.70) but declined in the control group ($M = 7.33$ to 5.93). Engagement increased slightly in the intervention group ($M = 6.83$ to 7.03) and declined in the control group ($M = 7.77$ to 6.77). The engagement finding warrants particular caution because the subscale showed low internal consistency, especially at T2 ($\alpha = .27$). The remaining PERMA subscales showed no significant time x group interaction, relationships (.054), meaning (.285), accomplishment (.094).

There was a main effect of group for cognitive PSS, $F(1, 44) = 4.71$, $p = .035$, $\eta^2p = .097$; scores were higher in the control group at both assessments. No other significant interactions were observed, total PSS (.658), social PSS (.732), cognitive PSS (.731), emotional PSS (.564), assertiveness PSS (.841). Thus, none of the PSS scores showed evidence of differential pre–post change between groups.

A significant Time × Group interaction was also observed for vigor, $F(1, 44) = 11.75$, $p = .001$, $\eta^2p = .211$. Vigor increased in the intervention group, from 3.00 at T1 to 3.46 at T2, while it decreased in the control group, from 3.97 to 3.30. This pattern indicated a clear divergence between groups over time. Dedication showed a marginal Time × Group interaction, $F(1,44)=3.21$, $p=.080$, $\eta^2p=.068$. Scores remained stable in the intervention group but declined in the control group. Dedication remained essentially unchanged in the intervention group, with a mean of 4.80 at both T1 and T2, but declined in the control group, from 5.53 to 4.90. Therefore, this trend appeared to reflect deterioration in the control group rather than improvement in the intervention group. No significant Time × Group interaction was observed for absorption ($p = .183$).

For mental health, depression showed a non-significant trend toward differential change between groups, $F(1, 44) = 2.99$, $p = .091$, $\eta^2p = .064$. Mean depression scores decreased in the intervention group, from 1.87 at T1 to 1.66 at T2, whereas they increased slightly in the control group, from 1.69 to 1.86. We did not find significant results for anxiety (.595) or stress (.245).

As sensitivity analyses, Mann–Whitney tests compared individual change scores (T2 – T1) between groups. They supported differential changes in vigor ($U = 80$, $p = .008$), PERMA positive emotion ($U = 97.5$, $p = .028$), and PERMA engagement ($U = 89$, $p = .019$). They also yielded $p = .050$ for PERMA relationships and $p = .033$ for dedication, although the corresponding ANOVA interactions were $p = .054$ and $p = .080$, respectively. The other Mann–Whitney tests were not significant. These results should be read in light of the small control group and the number of outcomes examined.

Overall, the strongest evidence of differential change concerned well-being measured by PERMA and vigor. In both cases, scores followed more favorable trajectories in the intervention

group than the control group, although the PERMA interaction was largely driven by a decrease in the control group and only a small increase in the intervention group. The results also suggested weaker, mixed patterns for depression, and dedication. No evidence of differential change was observed for anxiety, stress, any PSS score, or absorption. Both the ANOVA and the non-parametric findings supported these findings.

Study 2 Discussion

Quantitatively, the results provided mixed evidence of intervention-related change. The clearest pattern concerned the vigor aspect of engagement, increasing in the intervention and decreasing in the control group. Well-being, as described by the five domains of the PERMA model (positive emotions, engagement, relationships, meaning, and accomplishment) also showed significant between-group differences. Specifically we found positive outcomes in the intervention group in PERMA positive emotions, PERMA engagement, and vigor. This effect was mainly driven by a decline in the control group and a modest increase in the intervention group's well-being. These findings are important given that we often see well-being decline in healthcare students (31), which was observed in the control group, and the intervention group not only did not decline, but showed improvement.

One possible explanation of the difference between well-being measures outcomes is that the PERMA Profiler may be more sensitive to intervention-related changes as it includes engagement as a key domain of well-being.

Table 5 *Baseline and Post-Intervention Outcome Measures in Intervention (n = 36) and Control (n = 10) Groups*

Outcome	Subscales	Int. T1 Mean (SD)	Cont. T1 Mean (SD)	T1 t value	T1 *p*	Int. T2 Mean (SD)	Cont. T2 Mean (SD)	Time Effects F	*P*	η^2p	Time X Group F	*p*	η^2p
PSS	**Total**	3.58 (0.48)	3.87 (0.37)	t(12.34) = 2.12	.055	3.61 (0.49)	3.85 (0.50)	0.04	.842	<.001	0.20	.658	.005
	Social	3.82 (0.66)	3.83 (0.32)	t(12.95) = 0.06	.951	3.93 (0.54)	3.87 (0.45)	0.46	.500	.010	0.12	.732	.003
	Assert	3.61 (0.86)	3.75 (0.83)	t(13.74) = 0.47	.648	3.51 (1.00)	3.60 (0.74)	0.90	.348	.020	0.04	.841	<.001
	Cognitive	3.81 (0.53)	4.18 (0.39)	t(13.19) = 2.45	.024	3.86 (0.60)	4.28 (0.45)	1.47	.232	.032	0.12	.731	.003
	Emotional	3.19 (0.68)	3.62 (0.39)	*t*(17.2) = 2.05	.057	3.22 (0.63)	3.52 (0.76)	0.11	.744	.002	0.34	.564	.008
DASS-21	**Depression**	1.87 (0.61)	1.69 (0.41)	t(12.96) = −1.11	.291	1.66 (0.60)	1.86 (0.69)	0.02	.887	<.001	2.99	.091	.064
	Anxiety	1.79 (0.70)	1.59 (0.33)	t(14.44) = −1.34	.204	1.66 (0.59)	1.59 (0.56)	0.29	.595	.006	0.29	.595	.006
	Stress	2.15 (0.73)	2.01 (0.70)	t(13.03) = −0.56	.587	2.00 (0.64)	2.16 (0.67)	.000	.963	<.001	1.39	.245	.031
UWES	**Vigor**	3.00 (1.35)	3.97 (0.90)	t(11.57) = 2.84	.014	3.46 (1.15)	3.30 (0.87)	0.38	.540	.009	**11.75**	**.001****	.211
	Dedication	4.80 (1.18)	5.53 (0.59)	t(11.48) = 3.01	.011	4.80 (1.02)	4.90 (0.79)	3.21	.080	.068	3.21	.080	.068
	Absorption	3.94 (1.35)	4.77 (0.94)	t(11.92) = 2.31	.039	3.89 (1.42)	4.07 (1.35)	2.51	.120	.054	1.83	.183	.040
PERMA	**Total**	6.94 (1.28)	7.51 (1.45)	t(12.79) = 1.13	.283	7.07 (1.36)	6.60 (1.63)	**5.30**	**.026***	.107	**9.56**	**.003****	.178
	Positive emotions	6.63 (1.83)	7.33 (1.92)	t(13.89) = 1.03	.319	6.70 (1.72)	5.93 (2.18)	**6.18**	**.017***	.123	**7.64**	**.008****	.148
	Engagement	6.83 (1.50)	7.77 (1.24)	t(17.31) = 2.01	.060	7.03 (1.39)	6.77 (.77)	2.54	.118	.056	**5.72**	**.021***	.117
	Relations	7.45 (1.87)	7.13 (2.36)	t(12.29) = -0.40	.699	7.57 (1.83)	6.07 (2.92)	2.49	.122	.054	3.92	.054	.082

Meaning	7.21 (1.83)	8.13 (1.53)	t(17.11) = 1.61	.12	7.35 (1.75)	7.73 (1.87)	0.26	.611	.006	1.17	.285	.027
Accomplishment	6.64 (1.81)	7.17 (1.48)	t(17.30) = 0.95	.355	6.71 (1.54)	6.50 (1.79)	1.87	.179	.041	2.92	.094	.062

548 ****p< .001, **p<.01, *p<.05. , Int= intervention group, Cont= control group*

General Discussion

This mixed methods study investigated an intervention aimed at improving PSS and ultimately mental health and well-being. The program utilized a learning-through-teaching methodology implemented within the French SESS. The results provide promising support for the intervention. Qualitatively, study 1 results suggest that learning-through-teaching, when implemented in supportive contexts, improves self-confidence and PSS awareness and use.

In study 2 we quantitatively found participants in the intervention group showed more favourable trajectories for well-being and vigor. Students in the control group started with higher engagement and cognitive PSS than the intervention group and declined in both well-being and vigor at T2. The intervention group slightly improved their vigor and well-being from T1 to T2. This suggests that learning-through-teaching may attenuate the expected well-being decline we often see in medical student populations (31).

The qualitative findings suggest that participants developed greater self-confidence in their ability to teach and interact with pupils. This increased confidence may help explain the more favorable trajectory observed for vigor, as feeling capable and effective is associated with greater engagement in academic activities. Research has found positive correlations between self-confidence and UWES vigor (32).

The intervention aimed to improve PSS, while the quantitative results did not show a significant improvement although this is not unexpected. Developing PSS takes time, and after PSS training, students may change how they evaluate their skills. Students may become more aware, during and after the intervention, that they need to continue to improve their skills (33). In

570 the focus groups, we found that participants regularly reported not acquiring new PSS, but had a
571 feeling that they were better able to define and strategically use their PSS. Rather than increasing
572 the number of skills present, our intervention may have promoted awareness of existing PSS and
573 insights on when and how to use them. This awareness can help the continued development of
574 PSS, as self-evaluation may change as understanding of the concept develops (33). This change in
575 awareness and use of skills may explain why we saw a perceived impact without a significant
576 quantitative change in PSS.

577 In study 2 there was a limited reported impact on mental health. This may be due to
578 intensive external factors in healthcare student programs, particularly because both T1 and T2
579 measurements were during exam periods. It is possible that this intervention cannot overcome the
580 broader contextual stressors impacting mental health in healthcare students. This study may have
581 worked on the well-being pathways, without impacting mental health (3).

582 ***Strengths and Limitations***

583 Strengths of this study include its mixed-methods design, allowing for the two strands to
584 be read as complementary. This provides a more complete picture of the results as the qualitative
585 study 1 was able to capture experiences that were not directly measured in study 2. Additionally,
586 this theory-driven intervention was implemented in real-world situations, with a control group.
587 Implementing an intervention in a pre-existing program provides ecological validity and
588 demonstrates the practical feasibility of the intervention.

589 A potential limitation of study 1 is the risk that students were influenced by group dynamics
590 and social desirability to potentially respond in similar ways to the other participants. Further,

591 focus group topics were often prompted by the facilitator which may have limited the identification
592 of findings outside the focus group guide.

593 The focus group comments suggested the intervention increased self-confidence, and PSS
594 awareness but neither were measured quantitatively in study 2. The PSS measure in study 2 was
595 not designed to capture changes in awareness, only presence of the skills. It is therefore difficult
596 to draw quantitative conclusions regarding improvements in PSS awareness, and merits future
597 research.

598 Quantitative limitations include the overall small sample size, with a very small control
599 group in a non-randomized design. There is a risk of selection bias, as we experienced a very large
600 dropout for both locations and only included matched T1/T2 students. No a priori power
601 calculations nor corrections for multiple comparisons were performed due to the exploratory
602 nature of the study.

603 The intervention group and the control group had baseline differences, potentially skewing
604 our results. Given the imbalance between groups, regression to the mean cannot be excluded as an
605 explanation for the Time x Group interactions, particularly as several of these findings reflected a
606 decline in the control group rather than a gain in the intervention group.

607 The quantitative study had a potential risk of confounding. Participants were not blinded
608 to their group allocation as groups were divided by university. Further, the intervention groups
609 differed in the number of teaching sessions delivered, five in the intervention versus one to three
610 in the control groups. The size of the student teaching teams also differed, as the intervention group
611 were in pairs, and the control in groups of four. Both of these confounders give the intervention
612 group a stronger dose of the learning-through-teaching experience than the control.

Implications and Future Directions

Learning-through-teaching may provide a pathway for improving healthcare student well-being (specifically engagement and self-confidence). This program may be useful to promote positive outcomes, but the context of the intervention school is very important. For the program to be effective the intervention universities need to brief the host teachers on the program and how to best support the healthcare students. Additionally, the timing of the intervention may be important, as occurring around student exam periods may decrease the effectiveness of the intervention due to increased stress and resentment of participation requirements. Researchers and universities considering implementing similar interventions need to be attentive to academic programming.

Future research would benefit from investigating learning-through-teaching thoroughly as a framework to improve PSS. Larger multisite randomized studies with a follow-up should be conducted to assess whether findings are consistent across SESS settings and lines of study. Mixed-method designs looking at qualitative data from both groups to understand the between-group differences would further support triangulation of findings. Large scale quantitative data should be collected to examine the relationship between teaching PSS, school context, and well-being outcomes. Additionally, research would benefit from investigating the relationship between PSS and self-confidence.

Finally, the development of a scale measuring PSS awareness, frequency of use, and development would be extremely useful to understand potentially time delayed changes in PSS.

Conclusion

This mixed-methods multi-study investigation of a learning-through-teaching intervention suggests that integrating PSS-enhanced training with the French SESS may support aspects of student well-being and engagement. Although quantitative changes in PSS were not detected, qualitative findings indicate that teaching PSS may facilitate awareness, skill use, and increased confidence. Healthcare students are expected to demonstrate social, emotional, and cognitive skills; the learning-through-teaching approach within the SESS program may offer opportunities to develop these skills while supporting student well-being. Further research is needed to understand the potential of using learning-through-teaching as a mechanism to support PSS use and student well-being, but these findings suggest that the SESS may provide benefits beyond community health promotion.

Abbreviations:

AI : Artificial intelligence

ANOVA : Analysis of variance

Cont : Control group

DASS-21 : Depression Anxiety Stress Scales–21

FG : Focus group

Int: Intervention group

PERMA : Positive Emotion, Engagement, Relationships, Meaning and Accomplishment

PSS : Psychosocial skills

SESS : Service Sanitaire des Étudiants en Santé

T1 : Time 1

T2 : Time 2

TEAL: Tous Épanouis à l'École

UWES : Utrecht Work Engagement Scale

Declarations

Ethics approval and Consent to participate: This study was conducted under the approval of the Grenoble Alpes University Hospital (CHUGA) 38RC23.0267 (version 2, date 30/09/2024) (qualitative) and Nantes University (n°02092025 (N°IRB : IRB00013074), 02/09/2025) (quantitative). Informed consent was obtained from all individual participants included in the study prior to participation.

Consent for Publication: Not applicable. This study did not include any identifiable individual data. All data were collected and analyzed anonymously.

Availability of data and materials: The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request. Reporting checklists are reported in Appendices 3 (COREQ, qualitative) and 4 (TREND, quantitative).

Competing Interests: The authors declare that they have no competing interests.

Funding: This article received no specific funding.

Authors' Contributions:

JL: Conceptualization, Methodology, Investigation, Data curation, Formal analysis (Qualitative), Writing (original draft), Writing (review & editing).

EB: Formal analysis (Qualitative), Writing (original draft), Writing (review & editing).

NE**:** Formal analysis (Quantitative), Writing (original draft), Writing (review & editing).

LD: Conceptualization, Project Administration (Ethics Review), Writing (review & editing).

BB: Conceptualization, Methodology, Supervision, Writing (review & editing).

RS: Conceptualization, Methodology, Supervision, Writing (review & editing).

All authors read and approved the final manuscript.

Acknowledgements: Not applicable

Use of artificial intelligence: ChatGPT (GPT-5.5, OpenAI) was used as a bounded analytic support tool during qualitative analysis for preliminary theme exploration, codebook refinement, disagreement review, matrix preparation, and coherence checks. AI outputs were treated as suggestions and verified by a human against the original transcripts and ATLAS.ti-coded data. AI was not used to write the manuscript and we take full responsibility for the content.

References

1. Carrard V, Berney S, Bourquin C, Ranjbar S, Castelao E, Schlegel K, et al. Mental health and burnout during medical school: Longitudinal evolution and covariates. PLoS ONE. 2024;19(4):e0295100. doi:10.1371/journal.pone.0295100

2. Nair M, Moss N, Bashir A, Garate D, Thomas D, Fu S, et al. Mental health trends among medical students. Bayl Univ Med Cent Proc. 2023;36(3):408–10. Located at: PMID: 37091765. doi:10.1080/08998280.2023.2187207

3. Keyes CLM. The Mental Health Continuum: From Languishing to Flourishing in Life. J Health Soc Behav. 2002 Jun;43(2):207–22. doi:10.2307/3090197

4. World Health Organization [Web Page] [Internet]. 2025 [cited 2026 Jun 4]. Mental health. Available from: https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response

5. Seligman M. PERMA and the building blocks of well-being. J Posit Psychol. 2018;13(4):333–5. doi:10.1080/17439760.2018.1437466

6. Lamboy B, Beck F, Tessier D, Williamson MO, Fréry N, Turgon R, et al. The Key Role of Psychosocial Competencies in Evidence-Based Youth Mental Health Promotion: Academic Support in Consolidating a National Strategy in France. IJERPH. 2022 Dec 11;19(24):16641. doi:10.3390/ijerph192416641

7. Langer J, Elimari N, Bouisse M, Bernet E, Boussat B, Shankland R. Psychosocial Skills as a protective factor for student well-being; a validation of the French version of the Utrecht Work Engagement Scale-Student Short Form. 2026.

8. Bortolatto M de O, Borowski SBV, Costa JA da, Lopes FM. Treinamento em habilidades sociais para universitários: um estudo-piloto. Rev Bras Ter Cogn. 2024 Dec 16;20. doi:10.5935/1808-5687.20240448

9. Cogollo-Milanés Z, Gómez-Bustamante E, Campo-Arias A. Efectividad de un programa para la prevención de consumo de sustancias psicoactivas en estudiantes universitarios. Rev Fac Nac Salud Pública. 2023 Aug 23;41(3). doi:10.17533/udea.rfnsp.e351578

10. Langevin R, Laurent A. Développer les compétences émotionnelles des futurs enseignants en stage et diminuer leur stress perçu grâce à un programme d'intervention : une étude exploratoire. Rev Hybr Educ. 2021 Nov 5;5(1):56–83. doi:10.1522/rhe.v5i1.1258

11. Wan J, Zhou Z. The relationship between state-fear of missing out, loneliness, adaptive perfectionism and social media use in university students: a questionnaire and intervention study. BMC Psychol. 2025 Jul 9;13(1):761. doi:10.1186/s40359-025-03090-4

12. Lim JJ, Verbo VA, Khandelwal G, Nograles NH. Peer Mentoring as a Community of Practice in Medical Education. Clin Teach. 2025 Dec;22(6):e70238. doi:10.1111/tct.70238

13. Thompson C, McDonald J, Kidd T, Falkmer T, Bölte S, Girdler S. “I don’t want to be a patient”: Peer mentoring partnership fosters communication for autistic university students. Scand J Occup Ther. 2020 Nov 16;27(8):625–40. doi:10.1080/11038128.2020.1738545

14. Vasudevan V, Tran B, Burke SM, Tucker P, Irwin JD. Changes in stress-related outcomes among graduate students following the Mindfulness Ambassador Program: A pilot study. PLoS One. 2025 Jan 16;20(1). doi:10.1371/journal.pone.0313499

15. Colaianne BA, Hirshberg MJ, Inkelas KK, Dunne JD, Germano D, Greenberg MT, et al. Can the virtual implementation of a college course on human flourishing improve student flourishing during COVID-19? A multi-university study. J Am Coll Health. 2025 Apr 21;73(4):1837–46. doi:10.1080/07448481.2025.2452968

16. Jayasundara JMPVK, Gilbert T, Kersten S, Meng L. How UK HE STEM Students Were Motivated to Switch Their Cameras on: A Study of the Development of Compassionate Communications in Task-focused Online Group Meetings. Education Sciences. 2022 Apr 30;12(5):317. doi:10.3390/educsci12050317

17. Prigent O, Bureau A, Aromatario O, Cambon L. Impacts et mise en œuvre du service sanitaire des étudiants en santé (SSES) français : étude de cas dans deux académies françaises. Glob Health Promot. 2022 Jun;29(2):107–15. doi:10.1177/17579759211062136

18. Ribosa J, Duran D. Do students learn what they teach when generating teaching materials for others? A meta-analysis through the lens of learning by teaching. Educ Res Rev. 2022 Nov;37:100475. doi:10.1016/j.edurev.2022.100475

19. OpenAI. ChatGPT [Internet]. San Francisco, CA: OpenAI; 2026 [cited 2026 Jul 22]. Available from: https://chatgpt.com/

20. ATLAS.ti Scientific Software Development GmbH. ATLAS.ti 25 Mac – User Manual. 2026 Apr 3.

21. O’Connor C, Joffe H. Intercoder Reliability in Qualitative Research: Debates and Practical Guidelines. Int J Qual Methods. 2020;19:1609406919899220. doi:10.1177/1609406919899220

22. Konstantinidis A. An integrative review of the literature on factors influencing student well-being in the learning environment. International Journal of Educational Research Open. 2024 Dec;7:100384. doi:10.1016/j.ijedro.2024.100384

23. Kobayashi K. Learning by Preparing-to-Teach and Teaching: A Meta-Analysis. Jpn Psychol Res. 2019 Jul;61(3):192–203. doi:10.1111/jpr.12221

24. Fiorella L, Mayer RE. Role of expectations and explanations in learning by teaching. Contemporary Educational Psychology. 2014 Apr;39(2):75–85. doi:10.1016/j.cedpsych.2014.01.001

25. The jamovi project. jamovi [Internet]. 2024. Available from: https://www.jamovi.org

26. R Core Team. R: A Language and Environment for Statistical Computing [R] [Internet]. Vienna, Austria; 2026. Available from: https://www.R-project.org/

27. Tessier D, Shankland R. Les compétences psychosociales. In: Évaluer le bien-être et les ressources psychologiques : À l'école, au travail et en psychothérapie. 2023. p. 311–38.

28. Antony MM, Bieling PJ, Cox BJ, Enns MW, Swinson RP. Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. Psychol Assess. 1998 Jun;10(2):176–81. doi:10.1037/1040-3590.10.2.176

29. Lovibond PF, Lovibond SH. The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. Behaviour Research and Therapy. 1995 Mar;33(3):335–43. doi:10.1016/0005-7967(94)00075-U

30. Kern ML, Waters LE, Adler A, White MA. A multidimensional approach to measuring well-being in students: Application of the PERMA framework. J Posit Psychol. 2015 May 4;10(3):262–71. doi:10.1080/17439760.2014.936962

31. Kötter T, Fuchs S, Heise M, Riemenschneider H, Sanftenberg L, Vajda C, et al. What keeps medical students healthy and well? A systematic review of observational studies on protective factors for health and well-being during medical education. BMC Med Educ. 2019 Dec;19(1):94. doi:10.1186/s12909-019-1532-z

32. Norabuena-Figueroa RP, Rodríguez-Orellana HM, Norabuena-Figueroa ED, Deroncele-Acosta A. Organizational Climate as a Key to Positive Mental Health and Academic Engagement in University Students: A Structural Equation Modeling Approach. EJIHPE. 2025 Feb 2;15(2):17. doi:10.3390/ejihpe15020017

33. Shankland R, Rosset E. Review of Brief School-Based Positive Psychological Interventions: a Taster for Teachers and Educators. Educ Psychol Rev. 2017 Jun;29(2):363–92. doi:10.1007/s10648-016-9357-3

34. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. International Journal for Quality in Health Care. 2007 Sep 16;19(6):349–57. doi:10.1093/intqhc/mzm042

35. Des Jarlais DC, Lyles C, Crepaz N, the TREND Group. Improving the Reporting Quality of Nonrandomized Evaluations of Behavioral and Public Health Interventions: The TREND Statement. Am J Public Health. 2004 Mar;94(3):361–6. doi:10.2105/AJPH.94.3.361

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- InterventionstudySupplamentaryMaterials.docx
- InterventionStudyChecklists.docx