

Expert Consensus on Cognitive Behavioral Therapy Techniques and Strategies for Enhancing Pre-Service Teachers' Resilience: A Fuzzy Delphi Analysis

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ABSTRACT

Psychological resilience is increasingly recognised as an essential competency that enables pre-service teachers to cope effectively with the academic, professional and personal demands of teacher education programmes. Although Cognitive Behavioral Therapy (CBT) has consistently demonstrated its effectiveness in enhancing resilience, limited attention has been given to identifying and prioritising the specific CBT techniques that should underpin resilience-focused interventions during the module development process. This study aimed to establish expert consensus on the most appropriate CBT techniques and strategies for enhancing psychological resilience among pre-service teachers using the Fuzzy Delphi Method (FDM). A quantitative research design was employed involving twelve experts in psychology, counselling and Cognitive Behavioral Therapy selected through purposive sampling. The research instrument comprised nine CBT techniques and strategies developed from an extensive review of the literature and validated by experts prior to data collection. Data were analysed using the Fuzzy Delphi Method based on three acceptance criteria: a threshold value (d) of ≤ 0.20 , an expert consensus level of at least 75%, and a defuzzification value (α -cut) of ≥ 0.50 . The findings indicated that seven of the nine proposed CBT techniques and strategies fulfilled all acceptance criteria. Adaptation and recovery techniques, assertiveness training and problem-solving techniques obtained the highest defuzzification values and unanimous expert consensus, indicating that these techniques should be prioritized in the development of resilience-focused CBT interventions. By establishing expert consensus before intervention development, this study extends the existing literature beyond intervention evaluation and provides an empirically informed basis for selecting CBT techniques that are appropriate for strengthening psychological resilience among pre-service teachers. The findings offer practical guidance for the development of a structured CBT intervention module and provide direction for future resilience interventions within teacher education.

Keywords: Cognitive Behavioral Therapy (CBT); psychological resilience; pre-service teachers; Fuzzy Delphi Method; expert consensus

INTRODUCTION

Mental health and psychological resilience among higher education students have received increasing global attention due to their significant influence on psychological well-being, academic achievement and professional development (Brewer et al., 2019). Psychological resilience refers to an individual's capacity to adapt, recover and maintain positive psychological functioning when confronted with adversity, stress or significant life changes (Garcia-Martinez et al., 2022; Wuest & Subramaniam, 2021). Individuals with higher levels of resilience

are generally more capable of managing stressful situations effectively, maintaining emotional well-being and adapting successfully to challenging environments (Mazidah et al., 2020).

Within teacher education programmes, psychological resilience has become an increasingly important professional competency. Throughout their preparation for the teaching profession, pre-service teachers encounter numerous academic, professional and personal challenges, including adjusting to university life, fulfilling demanding academic requirements, completing teaching practicum placements, establishing relationships with mentor teachers and adapting to diverse educational environments (Meierdirk & Fleischer, 2022; Zhang et al., 2022). Previous studies have consistently demonstrated that resilience among pre-service teachers is influenced by multiple factors, including social support, school environment, personality characteristics, self-efficacy and psychological well-being (Beutel et al., 2019; Fernandes et al., 2019; Garcia-Martinez et al., 2022; Yada et al., 2021). Conversely, inadequate resilience may increase vulnerability to stress and anxiety while negatively affecting professional adjustment and long-term career development (Nor Ezdianie & Muhamad Noh, 2020).

To strengthen resilience, various psychological interventions have been developed, among which Cognitive Behavioral Therapy (CBT) is recognised as one of the most extensively researched and empirically supported approaches. CBT focuses on identifying and modifying maladaptive cognitive patterns, promoting adaptive behaviours and developing effective coping strategies that enable individuals to respond more constructively to stressful situations. Previous research has consistently demonstrated that CBT interventions improve resilience through cognitive restructuring, problem-solving training, relaxation techniques, behavioural activation and the enhancement of social support (Aurora et al., 2023; Bagheri Sheykhgafshe et al., 2023; Baker et al., 2021; Behrendt et al., 2023; Firoozmokhtar et al., 2024; Furukawa et al., 2022; Janzarik et al., 2022; Ojala et al., 2019; Pan et al., 2023; Pasaribu & Zarfiel, 2019; Sahin & Turk, 2021; Tarfarosh & Khan Achakzai, 2022; Yaser et al., 2016).

Despite the substantial body of evidence supporting the effectiveness of CBT interventions, previous studies have predominantly focused on evaluating intervention outcomes after programmes or modules had already been developed and implemented. Comparatively little attention has been given to determining which CBT techniques and strategies should be prioritised during the module development process, particularly for interventions targeting pre-service teachers. The absence of expert-validated evidence regarding the most appropriate CBT components may compromise the development of theoretically sound and practically relevant intervention modules. Consequently, establishing expert consensus on the selection of CBT techniques and strategies represents an essential preliminary step in ensuring that intervention modules are both evidence-based and responsive to the developmental needs of pre-service teachers.

To address this gap, the present study employed the Fuzzy Delphi Method (FDM) to establish expert consensus on the most appropriate Cognitive Behavioral Therapy techniques and strategies for enhancing psychological resilience among pre-service teachers. Specifically, this study sought to identify the CBT techniques that achieved expert consensus and to determine their relative priority based on FDM analysis. The findings are expected to provide a rigorous empirical foundation for the development of a systematic, evidence-based CBT intervention module capable of strengthening psychological resilience among pre-service teachers as they prepare for the complexities of the teaching profession.

LITERATURE REVIEW

Cognitive Behavioral Therapy and Psychological Resilience

Cognitive Behavioral Therapy (CBT) is widely recognised as one of the most effective evidence-based psychological interventions for addressing a broad spectrum of mental health issues, including stress, anxiety, depression and resilience (Hofmann et al., 2013; Sahin & Turk, 2021; Yusni et al., 2020). The theoretical foundation of CBT is based on the interaction between cognition, emotion and behaviour, whereby dysfunctional thoughts contribute to maladaptive emotional responses and behavioural patterns. Through structured therapeutic techniques, CBT assists individuals in identifying irrational beliefs, restructuring maladaptive

cognitions and developing healthier behavioural responses to stressful situations (Hofmann et al., 2013; Wan Anor et al., 2017). Its structured, collaborative, goal-oriented and problem-focused nature has contributed to its extensive application across various educational, clinical and organisational settings.

Beyond individual counselling, CBT has demonstrated considerable effectiveness in group-based interventions. Group CBT provides participants with opportunities to exchange experiences, receive peer support and acquire adaptive coping skills through collaborative learning and guided therapeutic activities (Pahlavanzadeh et al., 2017; Yusni et al., 2020). Such interactions facilitate cognitive restructuring while simultaneously enhancing emotional regulation and interpersonal competence, both of which are essential for strengthening psychological resilience (Golshani et al., 2021; Zhou et al., 2021).

Previous empirical studies have implemented a diverse range of CBT techniques depending on the characteristics of the target population and the objectives of the intervention. Frequently employed techniques include psychoeducation, cognitive restructuring, problem-solving training, relaxation exercises, breathing techniques, assertiveness training, self-monitoring, reflective journaling, homework assignments and behavioural experiments (Aurora et al., 2023; Bagheri Sheykhangafshe et al., 2023; Baker et al., 2021; Behrendt et al., 2023; Firoozmokhtar et al., 2024; Furukawa et al., 2022; Janzarik et al., 2022; Karaca et al., 2019; Ojala et al., 2019; Pahlavanzadeh et al., 2017; Pan et al., 2023; Pasaribu & Zarfiel, 2019; Sahin & Turk, 2021; Sahranavard et al., 2019; Schubert et al., 2022; Tarfarosh & Khan Achakzai, 2022; Yaser et al., 2016). These techniques aim to enhance individuals' capacity to recognise maladaptive thinking patterns, regulate emotional responses, develop adaptive coping strategies and improve overall psychological functioning.

Despite this diversity, several CBT techniques consistently emerge across the literature as fundamental components of resilience-focused interventions. Cognitive restructuring is frequently identified as a core mechanism for modifying dysfunctional thinking patterns that contribute to psychological distress. Similarly, relaxation and controlled breathing techniques are widely recognised for reducing physiological responses to stress and promoting emotional regulation. Problem-solving training enables individuals to approach challenging situations more systematically and confidently, whereas psychoeducation enhances awareness of stress reactions and equips participants with practical coping strategies. In addition, assertiveness training, reflective journaling, behavioural experiments, homework assignments and self-monitoring have been shown to reinforce adaptive behavioural change by encouraging continuous reflection and skill application beyond therapeutic sessions (Karaca et al., 2019; Sahin & Turk, 2021; Sahranavard et al., 2019; Schubert et al., 2022).

Although previous studies consistently support the effectiveness of CBT in enhancing resilience, considerable variation remains regarding the selection and combination of intervention techniques. Some interventions primarily emphasise cognitive restructuring and relaxation strategies, whereas others prioritise assertiveness training, journaling, behavioural experiments, or problem-solving skills. This inconsistency suggests that no universally accepted framework currently exists regarding which CBT techniques should constitute the core components of resilience interventions designed specifically for pre-service teachers. Consequently, the selection of intervention components often depends on researchers' preferences rather than on systematic empirical validation.

Given this limitation, establishing expert consensus is essential to identify the most appropriate CBT techniques prior to module development. Rather than evaluating intervention effectiveness after implementation, consensus-based validation enables researchers to determine which therapeutic components are considered most relevant, feasible and evidence-based by experts within the field. Accordingly, the present study employs the Fuzzy Delphi Method (FDM) to establish expert consensus on the CBT techniques and strategies that should form the foundation of a resilience intervention module for pre-service teachers.

METHODOLOGY

Research Design

This study employed a quantitative research design using the Fuzzy Delphi Method (FDM) to establish expert consensus on the most appropriate Cognitive Behavioral Therapy (CBT) techniques and strategies for enhancing

psychological resilience among pre-service teachers. The Fuzzy Delphi Method combines the traditional Delphi technique with fuzzy set theory to systematically analyse expert judgements by transforming linguistic responses into triangular fuzzy numbers. This approach is particularly suitable for achieving expert consensus during the early stages of intervention development, as it reduces ambiguity in expert judgement while facilitating systematic decision-making regarding the selection of intervention components (Mohd Ridhuan & Nurul Rabihah, 2020; Ramlan & Ghazali, 2018).

Participants

Twelve experts were selected through purposive sampling to participate in this study. The selection of the expert panel was based on recognised expertise in psychology, counselling and Cognitive Behavioral Therapy (CBT), as these disciplines are directly related to the development of resilience-based psychological interventions. Consistent with the recommendations of Creswell and Creswell (2017), all experts possessed a minimum of five years of professional experience. The panel size also complied with the recommendations of Jones and Twiss (1978) and Adler and Ziglio (1996), who suggested that Delphi studies generally involve between 10 and 15 experts.

The expert panel comprised three professors, one associate professor, five senior academics holding doctoral qualifications and three professional practitioners. Regarding professional experience, eight experts had more than fifteen years of experience, two had between eleven and fifteen years, and two had between five and ten years. In addition to their professional experience, the experts had substantial academic and professional involvement in counselling, psychology, CBT, teacher education and intervention development, ensuring that the panel represented diverse yet complementary areas of expertise relevant to the objectives of the study.

Instrument Development

The questionnaire was developed through an extensive review of empirical studies reporting the application of Cognitive Behavioral Therapy techniques and strategies to enhance psychological resilience, stress management and psychological well-being. CBT techniques that were consistently identified across previous studies were synthesised and organised into nine proposed intervention components, which subsequently formed the basis of the questionnaire items.

Prior to data collection, the preliminary questionnaire was reviewed by experts in Cognitive Behavioral Therapy, counselling, language and the Fuzzy Delphi Method to evaluate its content relevance, conceptual clarity and linguistic appropriateness. Minor revisions were made based on the experts' recommendations before the final version of the questionnaire was administered to the Delphi panel.

The final instrument consisted of nine items representing the proposed CBT techniques and strategies. Each item was rated using a seven-point Likert scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). The seven-point scale enabled experts to express more refined judgements regarding the appropriateness and importance of each proposed technique.

Data Collection Procedure

Data were collected using an online questionnaire distributed to all members of the expert panel via email. To facilitate participation and improve the response rate, the survey link was also shared through WhatsApp. Experts were informed of the purpose of the study and provided sufficient time to complete the questionnaire independently. The use of electronic distribution enabled efficient data collection while providing flexibility for experts to participate according to their availability.

Data Analysis

The collected data were analysed using the Fuzzy Delphi Method (FDM) following the procedures proposed by Mohd Ridhuan and Nurul Rabihah (2020). Responses obtained from the seven-point Likert scale were first converted into Triangular Fuzzy Numbers represented by the minimum (m_1), most plausible (m_2) and maximum

(m_3) values. This transformation reduced uncertainty associated with subjective expert judgements while enabling systematic quantitative analysis of consensus.

All analyses were conducted using Microsoft Excel together with the Fuzzy Delphi analytical template developed by Mohd Ridhuan and Nurul Rabihah (2020). Three acceptance criteria were used to determine whether each proposed CBT technique achieved expert consensus:

1. Threshold Value (d): Items with a threshold value of ≤ 0.20 were considered to have achieved an acceptable level of agreement among experts (Cheng & Lin, 2002).
2. Expert Consensus Percentage: Each item was required to obtain at least 75% expert agreement to be accepted. Items that failed to achieve this criterion would normally require reassessment in a subsequent Delphi round (Chu & Hwang, 2008).
3. Defuzzification Value (α -cut): Each item was required to achieve a defuzzification value of ≥ 0.50 , indicating satisfactory expert agreement (Tang & Wu, 2010).

Items that fulfilled all three criteria were accepted as appropriate components for inclusion in the proposed CBT intervention module. The defuzzification values were subsequently used to rank the relative importance of the accepted CBT techniques, with higher values indicating greater priority for inclusion in the resilience-focused intervention module.

RESULTS

Expert Consensus on CBT Techniques and Strategies for Enhancing Psychological Resilience among Pre-Service Teachers

The findings were obtained through the application of the Fuzzy Delphi Method (FDM) to determine expert consensus regarding the most appropriate Cognitive Behavioral Therapy (CBT) techniques and strategies for enhancing psychological resilience among pre-service teachers. The analysis was conducted based on three acceptance criteria: threshold value ($d \leq 0.20$), expert consensus percentage ($\geq 75\%$) and defuzzification value (α -cut ≥ 0.50).

As presented in Table 3, seven of the nine proposed CBT techniques satisfied all three acceptance criteria and were therefore accepted as appropriate components for inclusion in the proposed CBT intervention module. These techniques demonstrated threshold values below 0.20, expert consensus exceeding 75% and defuzzification values above the required minimum of 0.50.

Among the accepted techniques, adaptation and recovery techniques, assertiveness training and problem-solving techniques emerged as the highest-ranked components. All three techniques achieved identical defuzzification scores ($A = 0.869$), threshold values ($d = 0.042$) and unanimous expert agreement (100% consensus), indicating exceptionally strong consensus regarding their importance in strengthening psychological resilience among pre-service teachers.

The fourth-ranked technique, psychoeducation focusing on breathing and relaxation techniques, also demonstrated substantial expert agreement, with a defuzzification value of 0.839, a threshold value of 0.115 and an expert consensus level of 91.7%. This finding highlights the perceived importance of physiological self-regulation strategies in managing stress and promoting resilience.

Similarly, cognitive restructuring, which involves identifying and challenging maladaptive thoughts, achieved a high level of expert agreement ($A = 0.825$; $d = 0.147$; 100% consensus). The results suggest that modifying dysfunctional thinking patterns remains a central therapeutic mechanism for resilience enhancement.

Furthermore, social support was identified as another important intervention component, obtaining a defuzzification value of 0.822, a threshold value of 0.189 and 83.33% expert consensus. Although ranked slightly

lower than the preceding techniques, social support was nevertheless regarded as an essential element for promoting adaptive coping and emotional resilience.

The final accepted technique was reflective journaling and behavioural experiments, which achieved a defuzzification value of 0.800, a threshold value of 0.174 and 91.67% expert consensus. These findings indicate that reflective practice and experiential learning are considered valuable strategies for facilitating self-awareness and behavioural change among pre-service teachers.

Conversely, two proposed techniques failed to satisfy the predetermined FDM acceptance criteria. The integration of religious approaches recorded a threshold value of 0.456 and an expert consensus level of only 25%, while positive self-reinforcement and positive attitude development obtained a threshold value of 0.490 and an expert consensus level of 8.3%. Although both techniques exceeded the minimum defuzzification value, they failed to achieve the required threshold and consensus levels and were therefore excluded as core components of the proposed CBT intervention module.

Overall, the results demonstrate that expert consensus strongly favoured seven evidence-based CBT techniques for enhancing psychological resilience among pre-service teachers. The consistently high consensus achieved for adaptation and recovery techniques; assertiveness training and problem-solving techniques suggests that these interventions should serve as the principal components in the development of a resilience-focused CBT module.

Rank	CBT Technique	Defuzzification (A)	Consensus (%)	Decision
1	Adaptation and Recovery Techniques	0.869	100	Accepted
1	Assertiveness Training	0.869	100	Accepted
1	Problem-solving Techniques	0.869	100	Accepted
4	Breathing and Relaxation Psychoeducation	0.839	91.7	Accepted
5	Cognitive Restructuring	0.825	100	Accepted
6	Social Support	0.822	83.3	Accepted
7	Reflective Journaling and Behavioural Experiments	0.800	91.7	Accepted
8	Religious Integration	0.708	25	Rejected
9	Positive Self-Reinforcement	0.683	8.3	Rejected

DISCUSSION

This study employed the Fuzzy Delphi Method (FDM) to establish expert consensus on the Cognitive Behavioral Therapy (CBT) techniques and strategies considered most appropriate for enhancing psychological resilience among pre-service teachers. Seven of the nine proposed techniques fulfilled all FDM acceptance criteria, indicating strong expert agreement regarding their relevance for inclusion in a resilience-focused CBT intervention module. Rather than evaluating the effectiveness of an existing intervention, this study focused on identifying and prioritising evidence-based CBT techniques during the intervention development phase. This approach provides a systematic and empirically informed basis for selecting intervention components before module implementation.

Among the identified techniques, adaptation and recovery techniques, assertiveness training and problem-solving techniques received the highest level of expert consensus. The unanimous endorsement of these

techniques suggests that experts regarded adaptive coping, effective interpersonal communication and problem-solving abilities as fundamental competencies for strengthening resilience among pre-service teachers. Teacher education programmes require students to manage multiple academic responsibilities, practicum demands and interpersonal challenges. Consequently, resilience extends beyond the ability to modify negative thinking patterns; it also requires the capacity to respond constructively to challenging situations, recover from setbacks and make appropriate decisions under pressure. This interpretation is consistent with previous studies reporting that problem-solving and assertiveness training enhance resilience by improving coping flexibility, self-confidence and psychological well-being across educational and clinical settings (Karaca et al., 2019; Sahin & Turk, 2021; Sahranavard et al., 2019).

Breathing and relaxation psychoeducation together with cognitive restructuring were also identified as important components of the proposed intervention. These findings reinforce the multidimensional nature of resilience within the CBT framework. Breathing and relaxation techniques primarily address the physiological manifestations of stress by promoting emotional regulation and reducing autonomic arousal, whereas cognitive restructuring targets maladaptive beliefs and automatic thoughts that contribute to psychological distress. The inclusion of both techniques suggests that experts recognised the importance of integrating physiological and cognitive regulation strategies when designing resilience interventions for pre-service teachers. This finding is consistent with Hofmann et al. (2013), who identified cognitive restructuring as a core therapeutic mechanism of CBT, as well as studies demonstrating that relaxation-based interventions effectively reduce stress and strengthen emotional regulation (Ahmad et al., 2022; Golshani et al., 2021; Pahlavanzadeh et al., 2017).

Social support and reflective journaling with behavioural experiments were likewise endorsed as essential components of the proposed intervention. Their inclusion suggests that resilience development is not solely an individual cognitive process but is also influenced by supportive interpersonal relationships and opportunities for structured self-reflection. Social support provides emotional encouragement and practical assistance that facilitate adaptive coping during periods of stress, while reflective journaling and behavioural experiments encourage individuals to evaluate their experiences, challenge ineffective behavioural patterns and reinforce newly acquired coping skills. These findings are consistent with previous studies highlighting the importance of social connectedness, reflective practice and experiential learning in promoting resilience and psychological well-being (Beutel et al., 2019; Zhou et al., 2021; Zahra et al., 2021).

Interestingly, although religious integration and positive self-reinforcement achieved acceptable defuzzification values, they did not satisfy the required threshold values and expert consensus criteria. This finding should not be interpreted as indicating that these approaches are ineffective. Rather, it suggests that the experts considered these techniques less suitable as universal core components within a structured CBT intervention designed for a diverse population of pre-service teachers. Unlike the accepted techniques, these approaches may be more strongly influenced by individual beliefs, cultural background and personal preferences. Consequently, experts appeared to prioritise CBT techniques that demonstrate stronger empirical support, greater conceptual consistency and broader applicability across educational settings.

A key contribution of this study lies in its emphasis on expert consensus during the intervention development process. Previous studies have predominantly examined the effectiveness of CBT interventions after implementation, whereas the present study focused on determining which intervention components should be prioritised before module development. Establishing expert consensus at this stage strengthens the content validity of the proposed intervention module by ensuring that its components are informed by both empirical evidence and multidisciplinary expert judgement. This systematic approach provides greater methodological transparency and offers a stronger foundation for developing resilience-focused CBT interventions within teacher education.

From a practical perspective, the findings provide evidence-based guidance for counsellors, counsellor educators and teacher educators involved in developing resilience enhancement programmes for pre-service teachers. The prioritised CBT techniques identified through expert consensus may serve as the core components of a structured intervention module aimed at strengthening adaptive coping, emotional regulation and psychological resilience before future teachers enter the teaching profession.

CONCLUSION

This study employed the Fuzzy Delphi Method (FDM) to establish expert consensus on the most appropriate Cognitive Behavioral Therapy (CBT) techniques and strategies for enhancing psychological resilience among pre-service teachers. The findings demonstrated that seven CBT techniques fulfilled the predetermined consensus criteria, namely adaptation and recovery techniques, assertiveness training, problem-solving techniques, breathing and relaxation psychoeducation, cognitive restructuring, social support and reflective journaling with behavioural experiments. These findings provide empirical support for the systematic selection of intervention components prior to module development and offer a robust foundation for constructing a resilience-focused CBT intervention module for pre-service teachers.

From a theoretical perspective, this study extends the application of Cognitive Behavioral Therapy (CBT) within teacher education by identifying expert-endorsed therapeutic techniques specifically tailored to strengthen psychological resilience among pre-service teachers. Unlike previous studies that primarily examined the effectiveness of CBT interventions after implementation, this study contributes to the literature by establishing expert consensus during the intervention development phase through the Fuzzy Delphi Method. This systematic approach enhances the content validity of the proposed module and bridges the gap between theoretical evidence and practical intervention design.

From a practical perspective, the findings provide evidence-based guidance for counsellors, counsellor educators, teacher educators and higher education institutions in designing structured resilience intervention programmes. The identified CBT techniques may serve as core components in psychoeducational modules, preventive mental health programmes and professional development initiatives aimed at preparing future teachers to manage occupational stress, adapt to professional challenges and sustain psychological well-being throughout their teaching careers.

Despite these contributions, several limitations should be acknowledged. The findings are derived solely from expert consensus and therefore do not provide empirical evidence regarding the effectiveness of the proposed intervention module. Furthermore, the expert panel consisted of a relatively small number of specialists, which is appropriate for the Fuzzy Delphi Method but may limit the generalisability of the findings to other educational contexts. Consequently, future research should focus on developing the proposed CBT intervention module and evaluating its effectiveness using experimental or quasi-experimental designs involving pre-service teachers. Longitudinal studies are also recommended to examine the sustained effects of the intervention on psychological resilience, stress reduction, psychological well-being and professional adjustment during the transition from teacher preparation programmes to actual teaching practice.

Ultimately, strengthening the psychological resilience of pre-service teachers should be regarded not merely as an intervention to address stress, but as a strategic investment in developing competent, adaptable and emotionally resilient educators capable of responding effectively to the evolving demands of twenty-first-century education.

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