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Expert Consensus Analysis on CBT Techniques and Strategies for the Stress Management Module for Trainee Teachers Using the Fuzzy Delphi Approach

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Abstract

This study aims to establish expert consensus on the key elements of Cognitive Behavioral Therapy (CBT) techniques and strategies for stress management among trainee teachers by employing the Fuzzy Delphi Method (FDM). The FDM in this study used a seven-point Likert scale to collect insights from 12 experts with relevant academic qualifications and professional experience in psychology, counseling, or CBT. The research questionnaire comprised 12 items related to CBT techniques and strategies for stress management, designed to help individuals apply these methods in coping with daily stress. The findings revealed a high level of expert agreement, with an agreement percentage exceeding 75% and a threshold value below 0.2. Experts identified implementing positive coping strategies as the most crucial element, followed by relaxation techniques and an understanding of the distinction between positive stress (eustress) and negative stress (distress). These elements received the highest ratings, underscoring their importance in stress management. The study provides practical guidance for developing a structured CBT module to help trainee teachers manage stress more effectively. Through a systematic data analysis process, the selected elements are considered relevant and applicable in the context of stress management.

Keywords: Fuzzy Delphi, Cognitive Behavioral Therapy, Stress Management, Relaxation Techniques, Problem-Solving Strategies

Introduction

The issue of teachers opting for early retirement due to workplace stress warrants attention and must be addressed from the teacher training phase. Trainee teachers face pressures similar to those of university students in other fields, as they share the same social

environment, encounter academic demands, adapt to new surroundings, and navigate the challenges of building stable social relationships.

Various factors contribute to the stress faced by trainee teachers, such as the inability to cope with challenges (Abdul Rashid et al., 2021; Mohammad Arif & Sa'odah, 2019), stress during transitional periods (Gustems-Carnicer et al., 2019; Tengku Norhani et al., 2020), challenging practicum experiences (Azizah, 2019; Ngui & Lay, 2018), lack of social support (Mahaya & Nordin, 2019; Ong & Faizul Adib, 2022), the quality of interpersonal relationships (Mahaya & Nordin, 2019), teaching competency (Beuchel et al., 2022), self-efficacy (Ngui & Lay, 2018), academic performance (Bouhaba et al., 2021), and financial issues (Anbukarasi et al., 2018; Nor Hazanah & Ily Izyan, 2020).

Research indicates that if these stresses are not managed, they can negatively impact trainee teachers' mental well-being, motivation, and commitment, subsequently affecting the quality of their teaching when they enter full-time service. Therefore, it is crucial to identify effective strategies to help them manage stress better while facing the challenges of the teaching profession. This aligns with Sustainable Development Goal 4 (SDG 4), which emphasizes inclusive and equitable quality education and promotes lifelong learning opportunities for all (OECD, 2019). By equipping trainee teachers with resilience and effective stress management skills, the quality of education can be enhanced, ultimately contributing to the overall effectiveness of the education system.

One effective strategy to help trainee teachers manage stress is Cognitive Behavioral Therapy (CBT)**,** which has been proven effective in managing stress and altering negative thinking patterns that impact emotional well-being. CBT is widely recognized and effective (Sahin & Turk, 2021) in treating psychological issues such as depression, anxiety disorders, and mood problems. CBT is also used to address anger and problematic behaviors, as well as to correct dysfunctional beliefs and judgments that can negatively affect motivation, behavior, and physiological responses (Nesset et al., 2020).

Given the proven effectiveness of CBT, it is essential to identify the key elements that can be incorporated into a stress management module suitable for trainee teachers. This study aims to achieve expert consensus on the main CBT elements that can be applied in such a module to empower trainee teachers with practical and structured skills. In this context, the fuzzy Delphi method (FDM) can provide insights and consensus from experts on developing a structured and practical stress management module. These elements will be integrated into the module and designed to assist trainee teachers in coping with stress during their studies or in their future teaching careers.

This intervention is supported by the study of Braun et al., (2020), which highlights the importance of identifying the stressors faced by trainee teachers early in their education and equipping them with effective stress management skills to prepare them for challenging work environments (Ssenyonga & Hecker, 2021). If trainee teachers can manage stress effectively, their productivity and quality during their studies or while working can be improved, thereby contributing to the achievement of SDG 4.

Methodology

Research Design

This study adopts a quantitative approach using the Fuzzy Delphi Method (FDM) to achieve expert consensus on the key elements of Cognitive Behavioral Therapy (CBT) techniques and strategies for managing stress among trainee teachers. The FDM integrates fuzzy set theory with the classical Delphi approach, whereby the Likert scale used by experts is converted into a fuzzy scale ranging between 0 and 1. This method allows for a more flexible evaluation of expert opinions, producing three key values for each assessed element: the minimum, most reasonable, and maximum. This approach ensures precision and consistency in gathering expert opinions, subsequently aiding in developing a structured CBT module for more effective stress management among trainee teachers.

The Fuzzy Delphi technique was employed based on the input of relevant experts, as this technique aligns with the study's objective of detailed evaluation of the proposed module. FDM is a rebranded methodology derived from the Delphi Technique (Ramlan, 2017), designed to obtain expert opinions and achieve consensus (Mohd Ridhuan & Nurul Rabihah, 2020).

Research Instrument

The study utilized a questionnaire as the primary instrument to collect quantitative data on the elements of CBT techniques and strategies for stress management among trainee teachers. The questionnaire underwent a rigorous review and validation process by counseling, CBT, language experts, and FDM to ensure linguistic and content validity. The questionnaire was designed to meet the criteria and requirements of the FDM, which involves mathematical formulas to achieve consensus among experts. The choice of this instrument was tailored to the study's specific needs in developing a structured CBT module relevant to stress management.

Data Collection and Analysis Process

The data collection and analysis process adhered to the FDM implementation steps, as outlined below:

a.Step 1: Selection of Experts

In this study, 12 experts were selected using purposive sampling based on their psychology, counseling, and CBT expertise. These experts included individuals with a minimum of five years of experience in CBT. The panel consisted of professionals from diverse backgrounds, including academics, counseling officers, and clinical psychology officers, willing to contribute their insights.

The selection of experts was crucial to ensure that the input provided was accurate and relevant to the study context. According to Creswell and Creswell (2017), individuals with five to 10 years of work experience are deemed qualified to provide credible opinions. Furthermore, the number of experts involved in this study aligns with the recommendations of Jones and Twiss (1978), who suggested that the panel size in Delphi studies should range between 10 and 50 experts. Adler and Ziglo (1996) also proposed that a panel size of 10 to 15 experts is sufficient to achieve significant consensus. The complete profile of the experts is presented in Table 1.

Table 1
Profile of Experts Involved in the FDM Questionnaire.

Expert	Title	Field of Work	Length of Service	CBT Practitioner
1	Professor	Public University Professor/ Clinical Psychologist Officer	More than 15 years	✓
2	Professor	Public University Professor	More than 15 years	✓
3	Professor	Public University Professor	More than 15 years	✓
4	Associate Professor	Associate Professor at Public University	5 to 10 years	✓
5	Dr	Public University Lecturer	5 to 10 years	✓
6	Dr	Teacher Training Institute Lecturer	More than 15 years	✓
7	Dr	Guidance and Counseling Teacher	More than 15 years	✓
8	Dr	Teacher Training Institute Lecturer	More than 15 years	✓
9	Dr	Public University Lecturer/ Clinical Psychologist Officer	5 to 10 years	✓
10	Madam	Clinical Psychologist Officer	11 to 15 years	✓
11	Madam	Institute Counselor	More than 15 years	✓
12	Madam	Institute Counselor	11 to 15 years	✓

b. Step 2: Developing the Expert Questionnaire
During the questionnaire development phase of this study, the questionnaire was constructed based on a combination of literature review analysis and expert interviews conducted in the first round of the FDM. According to Powell (2003), the Delphi method is highly flexible for achieving expert consensus, with the first round typically used to identify specific issues through expert interviews.

This process identified and screened 12 main items related to CBT elements relevant to stress management among trainee teachers. This questionnaire consists of 12 items to obtain expert consensus on the importance of each required CBT element. Each item in the questionnaire was assessed using a 7-point Likert scale with the following scale: 1 - Strongly Disagree, 2 - Very Disagree, 3 - Disagree, 4 - Moderately Agree, 5 - Agree, 6 - Strongly Agree, and 7 - Absolutely Agree. This scale enables experts to provide a more detailed assessment of the importance of each element.

Before the FDM questionnaire was distributed to the identified experts, three experts reviewed it to ensure its validity and clarity of language. This review process involved one of the experts interviewed in the first round, a language expert from the Malaysian Translators Association (PPM), to ensure the clarity and accuracy of terms, and a methodology expert in FDM methods to ensure that the questionnaire adhered to proper FDM principles and procedures. This review aimed to enhance the questionnaire's reliability and ensure that it was clear and suitable for use by respondents in subsequent rounds.

c. Step 3: Distributing the Questionnaire
The researcher distributed the questionnaire in soft copy format via email. The questionnaire was also shared with respondents through WhatsApp and Telegram to facilitate data collection according to the convenience and preferences of the experts. This approach allowed each expert to choose the most suitable questionnaire completion platform.

d. Step 4: Converting Linguistic Variables
This process involves converting linguistic variable scales into Fuzzy numbers using Triangular Fuzzy Numbers. These Triangular Fuzzy Numbers are represented by the values m1, m2, and m3, where m1 refers to the minimum value, m2 is the most reasonable value, and m3 represents the maximum value. These Triangular Fuzzy Numbers are then used to form a Fuzzy scale based on the Likert scale to convert expert evaluations into Fuzzy numbers. The Fuzzy scale employs an odd number of levels, with the higher scales providing more precise results.

A seven-point Likert scale was used to collect data from experts. The data collected were analyzed using Microsoft Excel software with a template developed by Mohd Ridhuan and Nurul Rabihah (2020) to convert the data into Fuzzy form to determine the key elements in the Cognitive Behavioral Therapy module that will be used for stress management.

e. Step 5: Data Analysis
In this fifth step, the first condition must be adhered to by every researcher using the Fuzzy Delphi method as a measurement tool in their study (Mohd Ridhuan & Nurul Rabihah, 2020). According to Cheng and Lin (Cheng & Lin, 2002), if the distance between the mean and the expert assessment data is less than or equal to the threshold value, (d)=0.2, all experts are considered to have reached a consensus.

f. Step 6: Determining the Percentage of Expert Consensus
The second condition for establishing expert consensus is that the overall group consensus must exceed 75.0% for each item evaluated (Zarina & Azizah, 2020). If this condition is not met, a second round must be conducted to obtain a stronger agreement (Chu & Hwang, 2008).

g. Step 7: Data Analysis Using Fuzzy Averages (Defuzzification Process)
The analysis in this step aims to determine the Fuzzy score (A). The third condition that must be met is that the Fuzzy score (A) must exceed or at least equal the median value (α-cut value) of 0.5 (Tang & Wu, 2010). This indicates that experts deem the selected elements important for inclusion in the CBT module for stress management. The Fuzzy score (A) is also used to rank and prioritize the elements according to expert opinions. The formulas used to obtain the Fuzzy score (A) are as follows:

i. $Amax = 1/3 \times (a1 + am + a2)$

ii. $Amax = 1/4 \times (a1 + 2am + a2)$

iii. $Amax = 1/6 \times (a1 + 4am + a2)$

The α-cut value is the median value between '0' and '1', which is α-cut = (0+1)/2 = 0.5. If the value of A obtained is less than the α-cut value of 0.5, the item will be rejected as it does not

achieve expert consensus. Tang and Wu (2010) state that the α-cut value must exceed 0.5 to ensure the elements receive agreement.

Findings of the Study

The findings of this study were derived from the analysis of data collected through the FDM questionnaire completed by the experts. The analysis includes the evaluation of threshold (d) values, the percentage of expert consensus, and the fuzzy evaluation process, which determines the accepted elements and the priority ranking of each element.

Threshold (d) Values and Expert Consensus Percentage

To meet the requirements of FDM, the Threshold (d) value for each element must be ≤ 0.2, and the percentage of expert consensus must exceed 75%. Based on the findings, all evaluated elements achieved low Threshold values, ranging between 0.000 and 0.182, indicating high consensus among the experts. The percentage of expert consensus also demonstrated that all elements exceeded the 75% threshold, with several elements achieving a consensus level of 100%. This indicates strong agreement among experts regarding the relevance and importance of the evaluated CBT elements.

Fuzzy Evaluation and Element Ranking

Each element evaluated using the triangular fuzzy scale (triangular fuzzy numbers) underwent a defuzzification process to produce a fuzzy score (A), which determines the position or ranking of each element. All elements were accepted in this study based on the condition of α-cut ≥ 0.5. Table 2 presents the list of accepted elements, along with their fuzzy scores and rankings, highlighting the importance of each element in the CBT module for stress management.

Overall, the findings of this study indicate that all Cognitive Behavioral Therapy (CBT) elements studied successfully achieved a high level of consensus among experts through FDM evaluation. The Threshold value (d) for each element is below 0.2, indicating a good level of agreement. In contrast, the percentage of agreement for each element exceeds 75%, with some elements reaching a maximum consensus of 100%. The defuzzification process also confirmed that all elements meet the α-cut ≥ 0.5 requirement, demonstrating that each evaluated element is relevant and significant in the CBT module for stress management among trainee teachers. The ranking of accepted elements highlights adopting positive strategies to cope with stress as the most important, followed by other elements, such as applying relaxation techniques and understanding the differences between positive stress (eustress) and negative stress (distress). This suggests that positive and well-planned stress management strategies are highly effective in enhancing the well-being of trainee teachers.

Table 2
List of Accepted Cognitive Behavioral Therapy (CBT) Elements with Fuzzy Scores and Rankings

Item/Element	Threshold Value (d)	Agreement Percentage (%)	Fuzzy Score (A)	Expert Consensus	Ranking
Adopting positive strategies to cope with stress.	0.000	100	0.886	Accepted	1
Applying relaxation techniques to reduce stress.	0.023	100	0.878	Accepted	2
Understanding the difference between positive (eustress) and negative (distress) stress.	0.042	100	0.869	Accepted	3
Developing problem-solving skills to handle daily challenges.	0.057	100	0.869	Accepted	3
Conducting interaction and reflection to understand and manage stress effectively.	0.068	100	0.861	Accepted	5
Recording and understanding cognitive distortions during the recovery process.	0.095	91.67	0.847	Accepted	6
Using CBT principles to manage stress and improve the ability to handle life challenges.	0.122	83.33	0.847	Accepted	6
Using structured CBT activities such as worksheets, images, and videos to manage stress.	0.129	91.67	0.822	Accepted	8
Identifying and challenging negative thoughts.	0.182	91.67	0.817	Accepted	9
Emphasizing techniques to identify and analyze automatic thoughts.	0.182	91.67	0.817	Accepted	9
Practicing mindfulness techniques to manage stress.	0.154	91.67	0.817	Accepted	9
Using Socratic Questioning to guide thinking and change negative thoughts.	0.168	100	0.808	Accepted	12

Discussion

The findings of this study indicate that key elements in Cognitive Behavioral Therapy (CBT), such as adopting positive strategies, applying relaxation techniques, and understanding the distinction between positive stress (eustress) and negative stress (distress), achieved high consensus among the experts. This suggests that CBT-based approaches are highly relevant for helping trainee teachers manage their stress. These results align with previous studies that also utilized these CBT techniques in the context of stress management (Bertuzzi et al., 2022; Changklang & Ranteh, 2023; Janzarik et al., 2022; Joompathong et al., 2022; Kaplan et al., 2023; Tarfarosh & Khan Achakzai, 2022).

Among the CBT elements, adopting positive strategies to cope with stress ranked the highest, indicating that trainee teachers require effective coping skills to handle stressful situations. Adopting positive strategies can help reduce stress by providing individuals with the confidence that they can control the situations they face (Changklang & Ranteh, 2023; Janzarik et al., 2022; Tarfarosh & Khan Achakzai, 2022). This aligns with Lazarus and Folkman's (1984) theory, which states that coping skills, such as positive strategies, can help reduce stress levels. These strategies empower individuals to feel more in control of challenging situations, thereby reducing the negative effects of stress.

The relaxation techniques element was also identified as the second most important requirement in the CBT stress management module. Techniques such as breathing exercises provide trainee teachers with practical methods to control stress levels in real-life situations.

Relaxation techniques offer a simple yet effective way to reduce stress and improve focus. These findings are consistent with previous literature, which also reported frequent use of these techniques in addressing stress issues, as noted by Shahrokhian et al., (2022), Bertuzzi et al., (2022), Ahmad et al., (2022), and Rackoff et al., (2022).

Furthermore, understanding the difference between positive (eustress) and negative (distress) stress and developing problem-solving skills also received a full consensus of 100%. This indicates that trainee teachers need to overcome stress and understand how stress can impact their performance differently. Bertuzzi et al., (2022) utilized the skill of distinguishing between positive and negative stress in their study to help individuals adapt to challenging situations. Meanwhile, problem-solving skills are crucial in helping trainee teachers effectively tackle daily challenges. This technique is also supported by Shahrokhian et al., (2022) and Fauziah et al., (2022), who recognize its necessity in ensuring individuals proactively manage stress.

Although most elements achieved high consensus, some elements, such as recording cognitive distortions and using CBT principles, received lower consensus, with 91.67% and 83.3% agreement percentages, respectively. This may be due to the deep understanding and specific skills required to apply these techniques effectively. The effectiveness of these elements may depend on adequate training and support to ensure trainee teachers can utilize them in real-life situations. Nevertheless, several studies have highlighted these elements as essential components of CBT for stress management. Research by Pan et al., (2023), Shahrokhian et al., (2022), Joompathong et al., (2022), Weiner (2020), and Pasaribu and Zarfiel (2019) utilized these techniques to help individuals identify and challenge thoughts contributing to stress.

The element of using Socratic Questioning ranked last among the CBT elements. This technique requires the ability to deeply evaluate and challenge negative thoughts, which can be challenging for individuals with limited experience in CBT. This suggests that additional training and guidance may be needed to apply this technique effectively. However, its importance in helping individuals overcome stress remains indisputable, as evidenced by several previous studies. Research by Hindman (2022), Fauziah et al., (2022), Khatri and Dunn (2022), and Sahin and Turk (2021) incorporated Socratic Questioning in their studies, demonstrating that it is a valuable element in helping clients evaluate and change negative thoughts related to stress.

From an implication perspective, the findings of this study provide valuable guidance for developing a CBT module tailored to the needs of trainee teachers. The CBT stress management module should emphasize elements with the highest consensus, such as positive strategies and relaxation techniques, while ensuring that other elements are also addressed. Furthermore, more structured training and opportunities for practice in real-life situations could enhance the effectiveness of more complex elements.

Conclusion

This study successfully identified the key elements of cognitive behavioral therapy (CBT) relevant to stress management among trainee teachers. Through the Fuzzy Delphi Method (FDM), the study achieved expert consensus on elements such as positive problem-solving

strategies, relaxation techniques, understanding the difference between positive (eustress) and negative (distress) stress, and problem-solving skills. These findings indicate that the CBT approach can provide trainee teachers with practical and structured skills to manage the stress associated with their duties in the educational field.

The implications of this study involve the potential of CBT as a psychological support tool, which can be implemented through a structured module in teacher training programs to enhance resilience and stress management skills. Furthermore, the developed CBT module could be adapted in broader educational contexts, including schools and universities, where academic stress is an increasingly prominent issue. The study also recommends introducing CBT-based psychological support programs in the training curriculum at educational institutions, which could improve the quality of teaching when trainee teachers enter the profession.

Future research could focus on implementing this CBT module in teacher training institutions to assess its effectiveness empirically. Additionally, the module could be adapted for students at various levels of education to manage academic and social stress. Overall, this study provides a strong foundation for developing more structured and focused CBT modules, which are expected to improve the well-being and effectiveness of trainee teachers in the education profession.

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