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Development and validation of pre-service teachers' resilience (PTR) scale

Lee, Soojeong
University of Arizona, USA (sjlee23@arizona.edu)
Zhao, Jing
University of Arizona, USA (jingzhao1@arizona.edu)
Chen, Yijia
University of Arizona, USA (yijiachen@arizona.edu)
Hong, Ji ✉
University of Arizona, USA (jihong@arizona.edu)
Nie, Youyan
Nanyang Technological University, Singapore (youyan.nie@nie.edu.sg)
Soleas, Eleftherios
Queen's University, Canada (eks3@queensu.ca)

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Abstract

This study aims to develop and validate the Pre-service Teachers' Resilience (PTR) scale. While teacher resilience is a dynamic and multifaceted capacity, this study focuses on the emotional and social dimensions of resilience. The scale was developed rigorously, tested for internal consistency, and followed with Exploratory Factor Analysis with 241 pre-service teachers in Canada. It was further validated using Confirmatory Factor Analysis with 480 pre-service teachers in the U.S. Results showed high internal consistency and a two-factor model: i) managing emotional well-being and ii) seeking social support. We also discussed the implications of this finding concerning pre-service teacher training and support.

Keywords: pre-service teacher resilience, emotional wellbeing, social support, instrument development, instrument validation

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1. Introduction

Over the past decade, teacher resilience has become a critical area of research within the complex economic, social, and political contexts which surround the teaching profession (e.g., Scheopner, 2010). Today, teaching is often considered one of the most complex and demanding professions (Gu & Day, 2007; Johnson et al., 2015), associated with high levels of daily stress and a higher risk for burnout (Fernet et al., 2012). Key sources of stress and adversity within the education system include high workloads, classroom management difficulties, limited resources and support, challenging student behavior, addressing the diverse needs of students, pressure from educational policy reforms, demanding school settings, relational and emotional demands of the role, low professional status of teachers, and structural inequities in educational system (e.g., Fernet et al., 2012; Friedman, 2004; Huisman et al., 2010; Kyriacou, 2001; Wilhelm et al., 2000; Wilson, 2002). These stress factors have also been linked to high attrition and low retention rates among teachers in many countries (e.g., Brasfield et al., 2019; Squires et al., 2019). Such challenges highlight the critical need for resilience among teachers, particularly for pre-service teachers who are at the beginning of their careers and thus do not benefit from experience and deeper networks of support in the school setting.

Resilience is essential for teachers to maintain their personal well-being, teaching effectiveness, job satisfaction, and retention in the profession (e.g., Gu & Day, 2013; Mansfield et al., 2016). Much research has shown that teachers with strong resilience are better equipped to manage stress, sustain their motivation, and maintain a positive outlook in the face of inevitable adversities in education (e.g., Bobek, 2002; Castro et al., 2010). For instance, resilient teachers are more likely to employ creative problem-solving strategies to overcome difficulties or engage in effective classroom management techniques that foster a productive learning environment (Le Cornu, 2009). As a result, they can build stronger relationships with students, which enhances student engagement and academic achievement (Mansfield et al., 2016). Conversely, teachers who lack resilience are at higher risk for burnout, emotional exhaustion, and attrition, leading to instability in schools and negative impacts on student learning outcomes (Hong, 2012; Chang, 2009).

Resilience is even more crucial for pre-service teachers as they prepare to enter the teaching profession. The transition from student to teacher is a challenging process, both physically and emotionally (Day et al., 2011). In this process, pre-service teachers must learn to navigate the demands of two distinct worlds: the teacher education program and the school environment. Balancing these responsibilities, however, can cause stress and potentially impact their well-being, which may further affect their commitment to completing the program or even their decision to begin a teaching career (Rots et al., 2014). Thus, building resilience during this stage helps pre-service teachers cope with this transition by equipping them with the skills needed to manage stress, adapt to unforeseen challenges, and maintain their enthusiasm for teaching (Tait, 2008). Resilient pre-service teachers are more likely to stay in the profession longer, pursue continuous professional development, and adapt to new educational trends, ensuring they remain effective educators throughout their careers (Kiltz, Fokkens-Bruinsma, & Jansen, 2023). Thus, cultivating resilience in pre-service teachers is vital not only for their present functioning as university students but also for their ongoing engagement in the teaching profession.

2. Theoretical Framework

2.1 Conceptualizing Resilience: Emotional and Social Dimensions

Earlier research conceptualized resilience as a stable and innate trait that enables an individual to bounce back from adverse events (Patterson, 2002). However, a more recent understanding of resilience sees it not as an

innate, fixed quality, but as a capacity--defined as a complex and multi-dimensional concept that encompasses capacity, process, adaptation, and outcome, with these dimensions deeply intertwined.

As a capacity, resilience allows individuals to actively navigate adversity, demonstrating both adaptation and positive outcomes. It reflects the human potential to continually adjust to and overcome personal vulnerability and environmental stressors, which enables individuals to "bounce back" and maintain physical and mental health when confronted with risks (Newman, 2005; Wuest & Subramaniam, 2021). As an active, ongoing process of adaptation, resilience involves not only recovering from challenges but also evolving and growing through these experiences. This adaptive capacity is shaped by the dynamic interaction between individuals and their environments, as they adjust to continuously changing personal and external stressors (Kowitarttawatee & Limphaibool, 2022; Shin et al., 2012). Ultimately, resilience leads to outcomes where individuals emerge stronger and more capable of handling future challenges. Thus, resilience is multifaceted, involving the capacity to adapt, the process of recovery, and the achievement of positive, sometimes unexpected, results (Fraser et al., 1999; Luthar et al., 2000).

Teacher resilience is a multifaceted and complex concept that can be understood from different perspectives (Mansfield, 2020). Research has identified multiple dimensions of teacher resilience across various individual, social, and cultural contexts (e.g., Daniilidou & Platsidou, 2018; Liu et al., 2024; Mansfield et al., 2012). For example, Mansfield et al. (2012) proposed a four-dimensional framework, encompassing professional (teaching practice), emotional (emotional response and management), motivational (motivation), and social (social interactions in the workplace) dimensions. This framework has since been applied in studies on teacher resilience across diverse contexts (e.g., Peixoto et al., 2018, 2020).

While each dimension uniquely contributes to teacher resilience, emotional and social dimensions have been saliently addressed in the literature. The emotional dimension involves a teacher's ability to regulate their emotions, maintain a positive outlook, and use humor as a coping mechanism (Trang & Thang, 2023). Teaching is an emotionally demanding profession (Li & Liu, 2021), and teachers encounter both pleasant emotions (e.g., joy, satisfaction, and excitement) and unpleasant emotions (e.g., frustration, anger, stress, and burnout), when they interact with students, colleagues, and school leaders (Hong et al., 2016; Chu & Liu, 2022; Tait, 2008). Teachers' pleasant emotions, such as joy, satisfaction, and excitement, can enhance teachers' ability to confront adversity with optimism, maintain a professional and positive approach to their work, and contribute to promoting resilience (Gu & Day, 2007; Tait, 2008). Particularly, humor, described as part of "creative wellness" (Curry & O'Brien, 2012, p. 182), can provide a protective resource for teachers and help them relieve stressful situations, manage negative emotions, and gain a sense of emotional control (Ghaslani et al., 2023; Sharplin et al., 2011).

Conversely, unpleasant emotions such as stress and burnout can diminish teachers' motivation to stay in the profession, impact their professional development and students' learning (Hughes, 2001), and undermine their resilience (Hong, 2012). Thus, the emotional dimension encompasses two key aspects of emotional resilience: the capacity to maintain pleasant emotions and the ability to manage unpleasant emotions to navigate stressful situations (Liu et al., 2023). This emotional management ability is critical to teachers, which can help them navigate pressures and challenges inherent in their teaching profession (Trang & Thang, 2023). In this sense, resilient teachers can be characterized as persons "who possess the ability to effectively regulate their emotions, consider issues as they stand, and retain positive emotions, such as composure, optimism, and humor" (Liu et al., 2023, p.10). Additionally, the emotional dimension also involves setting emotional boundaries. Establishing appropriate emotional boundaries allows teachers to feel secure, take risks, and exercise autonomy (Meister & Ahrens, 2011). It can also help teachers reduce burnout and stress (Le Cornu, 2013) and find a balance between a sense of professionalism and a useful level of involvement (Aultman et al., 2009).

The second dimension, social support, is another key factor in enhancing teacher resilience. Teachers especially need to build and maintain social networks early in their careers, as these supports help them better

adapt to the work environment and career requirements (Brien et al., 2022; Mansfield et al., 2016; Versfeld et al., 2023). Social support encompasses various relational dynamics, including personal relationships, interactions with various stakeholders in school (e.g., colleagues, administrators, students, parents, and staff), and connections outside the school context. In terms of personal relationships, family and friends play a crucial role in fostering resilience (e.g., Beltman et al., 2020; Fox & Walter, 2022; Le Cornu, 2013; Lemon & McDonoug, 2023; Rizqi, 2017; Mansfield et al., 2012; Wuest & Subramaniam, 2021). To be specific, Lemon and McDonoug (2023) highlighted that teachers can increase resilience through activities asking for help, such as fostering supportive relationships and actively contacting friends. Similarly, Rizqi (2017) emphasized that strong social supports from family and friends play an important role in teacher resilience because it helps alleviate emotional tension and provides immediate assistance during challenging situations.

Second, colleagues, administrators, students, parents, and staff are also important in supporting teacher resilience (e.g., Bavli & Kortel, 2023; Beltman et al., 2011; Beltman et al., 2020; Brunetti, 2006; Drew & Sosnowski, 2015; Gu & Day, 2013; Gu & Li, 2014; Huisman et al., 2010; Jiang & Jiang, 2024; Johnson et al., 2015; Kangas-Dick & O'Shaughnessy, 2020; Le Cornu, 2013; Lemon & McDonoug, 2023; Mansfield et al., 2012, 2016, 2020; Pennington et al., 2021; Rizqi, 2017; Vallés & Clarà, 2023; Versfeld et al., 2023; Wuest & Subramaniam, 2021; Zhu & Li, 2023). For example, Beltman and colleagues (2011) noted that resilience can be supported by strong, open, well-organized leadership and constructive feedback from school leaders, dealing with difficult work with colleagues, and positive relationships with students. Kangas-Dick and O'Shaughnessy (2020) especially emphasized the role of administrators in fostering teacher resilience. They suggested that administrators need to set clear and achievable expectations, encourage trusting and collaborative relationships, build a supportive leadership team, implement effective behavior management strategies, create a positive school climate, and provide social support. They also highlighted the importance of close and positive relationships between teachers and students in enhancing resilience. In addition, Wuest and Subramaniam (2021) emphasized the importance of supportive and positive relationships among teachers themselves.

Finally, relationships with communities outside the school contexts can also influence teacher resilience (Le Cornu, 2013; Lemon & McDonoug, 2023; Rizqi, 2017; Wuest & Subramaniam, 2021). For instance, institutional support, such as teacher associations providing opportunities for exchanging ideas among colleagues (Rizqi, 2017), engagement with social media and professional networks (Lemon & McDonoug, 2023), and participation in conferences to foster new connections (Le Cornu, 2013) have been shown to enhance teacher resilience.

2.2 The Need to Develop a Resilience Instrument for Pre-service Teachers

Most of the existing resilience scales were developed for non-teacher participants. For example, the Connor-Davidson Resilience Scale (CD-RISC) was created from data collected across six groups: a community sample, primary care outpatients, general psychiatric, clinical trial of generalized anxiety disorder, and clinical trials of posttraumatic stress disorder (PTSD) (Connor & Davidson, 2003). A shortened version of the CD-RISC was developed using undergraduate students from non-education fields (Campbell-Sills & Stein, 2007). The Resilience Scale (RS) scale was based on senior citizens (Wagnild & Young, 1993), while the Brief Resilience Scale (BRS) was derived from undergraduate students in non-educational fields and cardiac rehabilitation patients (Smith et al., 2008). The Brief Resilient Coping Scale (BRCS) was developed from a sample of individuals with rheumatoid arthritis (Sinclair & Wallston, 2004), the Resilience Scale for Adult (RSA) from military college students (Friborg et al., 2003), and the Organizational Resilience Scale (ORS) from graduate students in non-educational fields (Kantur & Say, 2015).

There are only two scales that were specifically developed for teachers: Teachers' Resilience Scale (TRS) and the Multidimensional Teacher Resilience Scale (MTRS). The TRS, which is derived from the CD-RISC and RSA, includes 26 items across four constructions: Personal Competences and Persistence (n=9), Spiritual Influence (n=3), Family Cohesion (n=7), and Social Skills and Peer Support (n=7). This scale was developed to measure in-service teachers' resilience (e.g., Boczkowska et al., 2024; Daniilidou & Platsidou, 2018; Papazis et

al., 2023; Stavraki & Karagianni, 2020). The MTRS also consisting of 26 items, covers four constructions: Emotional (n=5), Social (n=5), Motivational (n=11), and Professional (n=6). The Emotional dimension involves positive emotions and emotional management. The Social dimension includes supportive relationships with students and colleagues. The Motivational dimension covers intrinsic motivation, persistence, expectations, and goals. The Professional dimension focuses on self-efficacy beliefs and pedagogical competencies. The MTRS has been used to measure in-service teachers' resilience (e.g., Daniilidou et al., 2020; Peixoto et al., 2020).

Although the TRS and MTRS were specifically developed to measure teachers' resilience, they focused primarily on in-service teachers. As noted in Peixoto and colleagues' (2020) validation study, their sample consisted of teachers who were advanced in age and experience. This emphasized the need for further studies that include teachers of various ages and experience levels to provide more robust conclusions about the structure of teacher resilience. In the same vein, given the critical role of resilience for pre-service teachers, (Day et al., 2011; Kiltz et al., 2023; Rots et al., 2014; Tait, 2008), it is essential to develop a scale designed to measure resilience in pre-service teachers. An appropriate measurement scale would provide valuable insights into their ability to cope with challenges during their training, ultimately helping them better prepare for teaching practices.

Based on this theoretical framework and the need to develop a scale to measure pre-service teachers' resilience, this study aims to develop and validate a quantitative measure of pre-service teachers' resilience, with a particular focus on the emotional and social dimensions of resilience. While much of the teacher resilience literature has dominantly employed qualitative interviews, quantitative scales to measure pre-service teachers' resilience are largely lacking (Brunetti, 2006; Castro et al., 2010). To develop "more complete, concrete, and nuanced answers" to complex research questions as well as "confirm or refute a theory to a greater degree" (Heyvaert et al., 2013, p. 671), it is necessary to integrate both quantitative and qualitative methodologies. Thus, this study is expected to contribute to diversifying research methods in teacher resilience studies.

2.3 Research Questions

- Do the different constructs in the Pre-service Teachers' Resilience Scale (PTR) demonstrate high internal consistency and factor structure?
- Is the Pre-service Teachers' Resilience Scale (PTR) replicable and validated with pre-service teachers in different samples?

3. Method

Rational Empirical Strategy of Test Construction

It is essential to combine theory and empirical investigation in the process of developing and validating an instrument (Blake & Sackett, 1999; Pekrun et al., 2004; Schwartz, 1978). Relying solely on theory for instrument verification can lead to unproven and potentially unreliable measurements based on personal beliefs (Morey et al., 1985; Pekrun et al., 2002). As such, best practices for scale construction necessitate empirical studies to test the reliability and validity of a newly designed theoretical instrument. However, relying only on empirical analysis carries risks, including biases from researchers involved in instrument development and the specific samples used for verification (Butcher, 2000). Therefore, to address these concerns, we have integrated both theoretical and empirical considerations to design and validate the instrument through a process known as the rational-empirical strategy of test construction (Pekrun et al., 2002, 2004; Schwartz, 1978).

Participants - To validate the scale, this study included two groups of pre-service teachers in different countries. **Sample1 (Canada)**. The Sample 1 consisted of 241 Canadian pre-service teachers. There were 19 male and 222 female teachers, with a mean age of 21.4 years. Among them, 143 participants majored in early childhood or elementary education, and 98 majored in secondary education. **Sample 2 (USA)**. Sample 2 consisted of 480

pre-service teachers in a Midwestern state of the United States. There were 99 males and 381 females, with a mean age of 22.9 years. Among them, 300 majored in early childhood or elementary education, and 180 majored in secondary education.

Instrument Item Construction - The researchers first reviewed the extensive literature on teacher resilience to identify common themes found across literature regarding resilient strategies to develop items. Moreover, an expert panel consisting of three renowned scholars in the field of teacher resilience research, along with the researchers involved in this project, was formed. Initially, each member of the expert panel independently reviewed each item of the PTR for its relevance, clarity, and importance. After completing the individual reviews, the expert panel and researchers discussed each item in depth by triangulating various literature sources addressed above. Through the review and discussion processes, items of PTR were revised and refined.

Data Analysis - First, the PTR scale was tested for internal consistency, then investigated using exploratory factor analysis (EFA) with Canadian pre-service teachers, and finally validated with U.S. pre-service teachers using confirmatory factor analysis (CFA). CFA was performed using AMOS and the remaining statistical analyses were performed using SPSS.

4. Results

4.1 Scale Development in Sample 1

The initial version of the scale includes 23 items with a 6-point Likert scale ranging from 1 (almost never) to 6 (almost always). The mean score of these items was 4.69, with a minimum of 3.18, maximum of 5.52, and variance of .26. The researchers performed a series of EFA to determine the number of factors and identify the items that have cross-loadings or misloadings in other factors. Two factors were extracted, i.e. emotional and social resilience. The cross-loadings or misloading items were removed, and a shortened version of the teacher resilience scale was developed. This shortened version included 2 factors and 9 items, including 4 items on emotional resilience and 5 items on social resilience. These two factors accounted for 56.59% of the total variance. The EFA results on factor loading for each item and Cronbach's α coefficient for each sub-scale are presented in Table 1.

Table 1

Exploratory Factor Analysis Results for Factor Loading on the Revised Teacher Emotional Scale (Sample 1)

Sub-scale and Item	Factor Loading	
Emotional α = .706		
I am able to handle unpleasant or painful emotions.	.849	
When under stress, I can still handle my emotions.	.815	
I know how to establish boundaries between myself and negative encounters.	.600	
When difficulties arise, I try to be optimistic.	.557	
Social α = .795		
I seek support from others when I need to interact with antagonistic people.		.830
I try to gain appropriate social support.		.796
I rely on close secure relationships when I am stressed.		.769
I seek out someone to provide help when I need it.		.693
I seek out opportunities to discuss issues of concern.		.617

Note. Factor loadings less than .3 were not shown in the table.

Cross-Validation in Sample 2 - The PTR scale was further cross-validated in Sample 2. CFA was conducted to confirm the factorial structure identified in Sample 1. The two-factor model provided a good data-model fit, X^2=61.747, *df* =25, *p*<.001, TLI=.944, CFI=.961, RMSEA=.055 (Cheung & Rensvold, 2002). The CFA results on factor loading for each item and Cronbach's α coefficient for each sub-scale are presented in Table 2.

Table 2
Confirmatory Factor Analysis Results for Factor Loading on the Revised Teacher Resilience Scale (Sample 2)

Sub-scale and Item	Factor Loading
Emotional *α* = .698	
I am able to handle unpleasant or painful emotions.	.449
When under stress, I can still handle my emotions.	.520
I know how to establish boundaries between myself and negative encounters.	.636
When difficulties arise, I try to be optimistic.	.720
Social *α* = .756	
I seek support from others when I need to interact with antagonistic people.	.624
I try to gain appropriate social support.	.691
I rely on close secure relationships when I am stressed.	.627
I seek out someone to provide help when I need it.	.662
I seek out opportunities to discuss issues of concern.	.492

Construct-related Validity - Construct–related validity was tested by correlating different teacher resilience measures with Grit and teacher efficacy. The results are presented in Table 3.

Table 3
Construct-related validity

	Grit-interest	Grit-effort	Teacher Efficacy
	Canada		
Resilience-emotion	-.046	.367**	.257**
Resilience-social	.154*	.194**	.159*
	USA		
Resilience-emotion	.096	.434**	.221**
Resilience-social	.008	.298**	.246**

Note. *p<.05, **p<.01

5. Discussion & Implication

In this article, we developed and validated the PTR Scale, which consisted of two dimensions: emotional resilience and social resilience. Emotional resilience evaluates how well teachers deal with unpleasant emotions and set emotional boundaries, while social resilience measures teachers' capacity to seek help and support from others when facing difficult situations. The results showed that the scale demonstrated good construct-related validity among pre-service teachers in two different countries.

A supportive school culture is vital for providing pre-service teachers with a sense of security through belonging and social connection, especially during stressful times (Fox & Walter, 2022; Gu & Li, 2014). Several strategies would help foster social support: (i) scheduling regular professional exchange meetings for pre-service teachers to create a safe environment where they can express their confusion and needs; (ii) assigning experienced tutors to build a strong tutor support system for pre-service teachers to facilitate personalized feedback and experience sharing (Johnson et al., 2015); (iii) providing career direction clarification through career planning lectures and one-on-one guidance to support their professional growth (Izadinia, 2016); (iv) implementing anonymous feedback boxes or online feedback forms to ensure that pre-service teachers express their true feelings without being named; (v) conducting regular questionnaire surveys to collect pre-service teachers' stressors and needs, provide support resources after analysis, and feedback on overall trend and improvement measures in collective meetings; and (vi) establishing a teaching resource library or an online sharing platform to collect high-quality teaching designs, classroom management cases, and course plans, so as

to facilitate the reference and utilization of pre-service teachers at any time (Burron & Pegg, 2021).

Social support and emotional support are mutually supportive and inseparable. Social support serves as a strategic mechanism for mitigating emotional stress. Through help-seeking, pre-service teachers can obtain necessary resources and information from mentors, colleagues, or administrators to reduce emotional stress and improve coping skills (Huisman et al., 2010). Also, research has shown that extensive social support networks, such as family, friends, and colleagues, provide emotional support to teachers, help them relieve professional stress, and build resilience (Fox & Walter, 2022).

In emotional support strategies, maintaining a positive and optimistic attitude and sense of humor is helpful for a teacher to maintain emotional composure in a high-pressure environment and effectively control unpleasant emotions (Mansfield et al., 2012). Also, practicing effective self-care and mindfulness training is an important way to manage emotional health (Ghaslani et al., 2023; Neumann & Tillott, 2022). Schools can support teachers' emotional health through a series of systematic emotional management and self-care measures. For instance, (i) schools can provide pre-service teachers with "Professional Development" courses during student teaching and organize emotional management training. Positive thinking exercises, mindfulness meditation, and emotional regulation skills would be helpful to better identify and manage emotions (Garner et al., 2018; Hue & Lau, 2015); (ii) pre-service teachers can be encouraged to spend a few minutes every day to reflect on the positive experience in learning and teaching, recording successful moments or humorous moments, cultivating positive thinking habits through continuous positive reflection, and enhancing their attention to positive emotions; and (iii) teacher education programs can foster a cultural atmosphere that is inclusive and encourages humor, such as introducing relaxed interaction in classes, sharing humorous stories, or holding fun activities, so that pre-service teachers can feel relaxed and experience a sense of belonging in a supportive environment.

This study offers theoretical, practical, and methodological implications. While resilience is dynamic and multifaceted, unpacking two dimensions of resilience (emotional and social) provides a more refined conceptual understanding of resilience. This understanding also provides practical implications for pre-service teacher education. Resilience development should be viewed and taught as a process to build capacity, not as a simple trait, and thus incorporating the importance and necessity of these strategies in the teacher education curriculum is likely to enhance pre-service teachers' awareness and understanding of resilience, which may impact the way they manage various challenges in the teaching profession. Methodologically, this study aligns with the rational-empirical strategy of test construction, in that theory and empirical investigation are combined in developing and validating an instrument (Pekrun et al., 2002; Schwartz, 1978). The development of a quantitative instrument is expected to contribute to expanding the horizon of teacher resilience research by diversifying methodological choices.

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