

# Analyzing How Relationships, Determination, Dedication, and Gratitude Affect Teacher Resilience in Top-Tier Competitive Secondary Schools in Thailand

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## Abstract

The purpose of this paper was to determine which components influenced a Thai secondary-school teacher's resilience. From the literature review, 48 questionnaire items were initially evaluated by using both an exploratory factor analysis (EFA) and the input from three experts. Subsequently, a confirmatory factor analysis (CFA) and goodness-of-fit analysis were used on the remaining 28 item questionnaire. The questionnaire was divided into two parts, with Part 1 concerned with items about each teacher's personal characteristics. Part 2 made use of a 5-level opinion scale to determine each teacher's opinion about the five main constructs. Stratified random sampling was used to obtain the EFA sample size of 336 and 196 for the CFA. The correlation coefficients between variables were examined using the Kaiser-Meter-Olkin (KMO) test and Bartlett's test of sphericity. The components included relationships, gratitude, dedication, determination, and their effect on teacher resilience. When ranked in importance, relationships were judged most important, followed by determination, dedication, and gratitude. The study is novel in that it is only one in a handful of studies which have investigated the importance of teacher gratitude and its importance on teacher work resilience.

**Keywords:** Assertiveness, competitive schools, grit, perseverance, Thailand, top-tier schools.

## 1. Introduction

Excellence-oriented work in the face of ever-changing and challenging situations requires a new way of thinking to create a new paradigm to cope with ever-changing phenomenon. Although there is nothing new about change, what is new is the pace, intensity, and severity of the change, with the COVID-19 global pandemic being an excellent example of deeply disruptive events impacting all aspects and sectors of all global societies. This includes but is not limited to trade, tourism, aviation, finance, industrial production, and education. Added to this list are unrelated problems to COVID such as regional wars, climate change, and numerous natural mega-disasters (e.g., earthquakes, tsunamis, floods, & volcanic

eruptions). When combined, current times are scary to even the strongest of individuals.

Within education since the beginning of the COVID-19 pandemic and the associated lock downs and lock outs of students and teachers from their classrooms, there has been an accelerated pace of change under what has become known as the 'New Normal' (Callo & Yazon, 2020; Sittisak et al., 2022; UNESCO, 2020). Simultaneously, 1,000s of papers have been written for educational leaders in how to deal with this change with a common and reoccurring theme being the use of information communication technology (ICT) in all its forms to move the classroom and learning into 'cyberspace' or the 'cloud' using the Internet (Kanawapee et al., 2022; Poondej &

Lerdpornkulrat, 2019; Wannapiron & Pimdee, 2022).

Although many papers have presented the advantages of ICT and Internet use, a smaller number have raised warning flags and voiced deep concerns about using ICT to replace the classroom and teacher/student/classmate social interaction that comes from a physical classroom environment.

One study voicing concern in the elimination of traditional classrooms and their support and social interaction processes is UNESCO (2016). In their study it was explicitly stated that central to a school's mission is the student well-being and promotion which is achieved by students learning and developing social competencies in structured settings. Also is the role that schools should take in feeding the disadvantaged and providing proper daily nutrition.

Others have reported that the pandemic brought far-reaching changes to all aspects of each person's life (Okan et al., 2020). These stressful changes have included social distancing, restrictive movements, high-stress levels, confusion, and other mental health issues (Holm-Hadulla et al., 2021; Jiang et al., 2021; Okan et al., 2020; Ornell et al., 2020; Yurayat & Tuklang, 2023; Zandifar et al., 2020). Additionally, even once the pandemic is gone, it will likely have a long-term impact on individual mental health (Ornell et al., 2020).

However, even before the global pandemic began in early 2020, many academics and teachers had elaborated on various pedagogies which seemed to fit and were effective in an online educational world (Pattanaphanchai, 2019). These included the flipped classroom model, which was often times combined with blended learning (Siripongdee et al., 2021). Other papers have highlighted the effectiveness of *Professional Learning Communities* (PLCs), which DuFour (2004, 2007) reported are not courses or programs but instead stakeholder communities that empower change within schools at all levels. Although, these can be implemented without ICT, they are highly effective when combined with social media and

devices such as smartphones. Moreover, PLCs and their hybrids such as *School Learning Communities* (SLCs) are focused on collaborative teacher communities and other educational stakeholders such as parents and the related school communities (Kerdtip & Angkulwattanakit, 2023). Therefore, teachers and administrators must work collaboratively while focused on individual cooperation and the community's collective energy (Ontario Principals' Council, 2009).

As technology and software developed over time, so did the methods that were used to implement and use them. Even though terms such as *main frame*, *terminal*, and *modem* have been swept away into the dustbins of language (Herath, 2021), they have been replaced with terms such as the *cloud computing*, the *smartphone*, and *broadband Internet*.

As before, each technology's effectiveness is limited by their speed, cost, technical support availability/capability, end-user (student/teacher) familiarity, and teacher/trainer training and education. Change over the many years has been quick and unfortunately highly stressful to many teachers involved in implementing change with the newer technologies.

Furthermore, some research in Thailand in recent years has lightly touched on the periphery of these problems by suggesting that *teacher-centered education* is a tool of the past and should be eliminated (Ameliana, 2017; Upadhya & Lynch, 2019). Often referred to as '*chalk and talk*' (Pimdee et al., 2023), many have suggested that education needs to move forward with *student-centered learning* where ICT plays a pivotal role in its execution. However, once again, many educators are hesitant to dip their toe in these new waters as they have not been prepared for the methodologies or don't have the needed school or personal budgets for the needed technology. Other limiting factors include missing or archaic infrastructure that simply does not work or limitations placed on staff use by administrators who do not understand the technology's purpose (Semsri et al., 2022).

However, what is very infrequently discussed is the resilience of the teachers to jump from one fire into another fire, often times with little or no support. An excellent example of this was at the onset of the pandemic in Thailand, Thailand's Ministry of Education strongly stated the importance of online classes, social distancing, and remote education (UNESCO, 2020). However, the burden of learning how to transition to these new technologies was placed on the shoulders of the educators who were expected to use them and teach with them. This then became known as the '*New Normal*' within Thailand's educational sector. Also, many students at many schools were expected to pick-up the cost of using the required devices and infrastructure while simultaneously staring into a tiny smartphone screen for many hours each day. This eventually led to some very unhappy students and some public protests by them (Kanawapee et al., 2022).

Therefore, what teachers and students seem to need is '*grit*' which Southwick et al. (2020) articulated as the pursuit of long-term goals with both *passion* and *perseverance*. Also, according to the authors, '*grit*' can predict high achievement in a range of individual performance domains. However, the idea of '*grit*' is nothing new to the educational literature and can be traced back to 1926 when Cox (1926) concluded that high-achievers are not only characterized by high intellect, but also by *persistence* of motive and effort. As we see, the words *grit*, *persistence* and *resilience* are closely related with some probably considering '*grit*' a form of slang for persistence and resilience.

Therefore, from this overview of teacher resilience, the authors identified four main components for review and inclusion in the study. These are detailed in the following Literature Review.

## Literature Review

### Resilience

In Thailand, several studies have reported on an individual's *Resilience Quotient* (RQ) which

Weraarchakul et al. (2016) referred to as the ability to '*spring back*' in the face of adversity. This is consistent with Passi (2014) who saw the critical importance of *resilience* in global student medical education and Tempksi et al. (2012) who viewed *resilience* as an emotional competence that is possible to acquire if properly trained.

This is consistent with a systematic literature review concerning how resilience in teachers is promoted (Kangas-Dick & O'Shaughnessy, 2020), from which it was reported that teachers indicated that resilience plays an essential role in preventing attrition and burnout in schools. The authors further suggested that school level programs which integrate resilience programs appear most effective when teachers and students can collaborate in safe environments. Mansfield et al. (2016) also examined building teacher resilience and found that resilience can be developed in teacher education. The authors also proposed that resilience includes relationships, emotions, wellbeing, and motivation. The authors also suggest that resilience involves motivation and emotional competence and use of coping strategies such as goal setting, problem solving, and maintaining work-life balance.

If it possible to train individuals in how to acquire grit, persistence, or resilience, it is the educators, monks, or priests that the responsibility will fall to. As we sadly know, the teaching of resilience is most probably not highlighted in every teacher's academic syllabus. Fortunately, however, the concept of resilience is imbedded in ancient philosophy, religion, and tradition.

One example of this is the Buddhist *Iddhipada* or '*The Four Qualities for Success*' in which '*viriyā*' is characterized by Vimala and Gaur (2022) as a Buddhist meaning for 'energy', 'persistence', 'excitement', or 'exertion'. In a more contemporary study concerning religion's effect on resilience, the authors concluded that habitual engagement of religious reappraisal and high levels of perceived coping abilities results in greater adaptive behaviors that promote increased resilience, reduce distress symptoms,

and increase emotional well-being (Dolcos et al., 2021).

The key component of resilience at work is the ability to allocate time for work and various activities with family members in a balanced and adequate manner. This includes time for exercise and maintaining good health, as good health directly affects work efficiency.

### **Relationships – Student/Teacher**

Numerous studies have investigated the essential nature of student-teacher relationships in a child's development, but lesser known is how these relationships impact the professional well-being and personal lives of teachers (Spilt et al., 2011). Interpersonal relationship theories suggest that educators have a basic need for relatedness with their classroom student. It is also reported that teachers internalize their experiences with students which guides their emotional responses in daily interactions which then effects their long-term well-being.

Extensive research on teacher wellbeing has largely focused on burnout and stress, with minimal research on how interpersonal relationships between students and teachers affects teacher wellbeing (Spilt et al., 2011). Therefore, this research is critical as of 26 occupations studied, teaching ranks as of the highest in stress-related outcomes, with the emotional involvement of teachers with their students considered a major reason in the findings (Johnson et al. 2005). Also, according to the Lazarus 'Transactional Model of Stress and Coping' the intensity of stress depends on the importance of the value or goal that is threatened (Lazarus, 1991) and the event's relevance to one's goals, values, or needs which can trigger unpleasant emotions such as anger or fear. Conversely, an incident can lead to positive emotions if it facilitates a goal or motive realization.

This is consistent with a meta-analysis from Roorda et al. (2011) in which it was reported that a teacher's effective quality in the teacher-student relationship is critical in the student's school engagement, wellbeing, and academic

success. However, although a teacher's mental wellbeing and health is relatively stable, job stress and satisfaction research suggest that prolonged exposure to chronic stressors and unsuccessful coping impact the wellbeing of teaching staff (Bakker & de Vries, 2021; Spilt et al., 2011).

### **Gratitude**

According to Howells (2014), gratitude plays a significant role in enhancing teacher-student relationships but the area of research is somewhat limited. Validation for this idea comes from earlier studies in which gratitude has been reported as crucial in building and maintaining healthy relationships. One such study from nursing education determined that gratitude had an effect of their career resilience (Wei et al., 2019). This is consistent with another study concerning counsellors' creativity, in which the authors concluded that gratitude and resilience contributed directly in predicting creativity (Arnout & Almoied, 2021).

Howells (2014), has also reported that although numerous studies have determined that gratitude in school environments enhances prosocial behaviors, stronger relationships, and increased school community engagement, studies are very few concerning teachers' gratitude. These included a paper from Hong Kong which focused on how gratitude affected teacher wellbeing (Chan, 2013) and two other papers on how gratitude affects student-teacher education (Chan, 2010; Howells and Cumming, 2012).

Outside of education, another study has reported that the relationship between perceived organizational support and gratitude was stronger when employees focused on past relationships (Wen, 2018).

McCullough et al. (2001) has stated that gratitude is an experience related to how individuals manage morality in their lives. It is a response to the kindness that individuals receive, and it is intended to stimulate desirable behavior between giver and receiver. People who feel or express gratitude will be happier in their work, see the world positively, be more awake, and

tend to help or support others more than those who do not feel gratitude.

In Hong Kong Chan (2013) researched teacher well-being, gratitude and forgiveness and determined that all three were significantly correlated. Moreover, the author found that gratitude and forgiveness predicted well-being and that integrating forgiveness and gratitude into teacher stress intervention was recommended. Meanwhile, Emmons & Shelton (2002) discussed the benefits of gratitude, stating that it can be linked to positive emotions. Fredrickson (2004) also argued that gratitude does not necessarily require reciprocation, but it can create positive emotions that extend to others and expand one's thinking. Positive emotions lead to expanded thinking and behavior, which creates a learning experience for the future and internalizes the information for the individual. Gratitude also helps individuals to persevere in the face of adversity and in the midst of the ups and downs of good mental and physical health.

These ideas are consistent with Hwei and Abdullah's (2013) whose findings on acceptance, forgiveness, and gratitude determined that gratitude was more effective in promoting recovery than acceptance and forgiveness. In the practice of teaching and other professions, mistakes are inevitable in order to achieve the greatest success, so it is important to work meticulously and minimize mistakes. Mistakes can create negative feelings towards individuals and schools, but in reality, mistakes can be learned from and can increase skills in that area.

### **Dedication**

Chanpheun's (2014) study found that the relationship between individuals and organizations is an attitude or feeling that they are involved and are a part of the organization.

Relationships also involve being accepted within the organization and having a good sense of responsibility and intention to use their available efforts to work towards the goals of the organization. Additionally, there is a desire

to continue being a member of the organization and a willingness to devote physical and mental effort to help the organization achieve its goals.

Eisenberger et al. (2001) state that if employees perceive that the organization values them, cares about their well-being, recognizes the importance of their work, and provides the expected rewards and support, they will feel indebted, have a sense of loyalty to the organization, and feel obliged to reciprocate by working for the organization.

This recognition and support from the organization will motivate employees to show their commitment to the organization with a sense of loyalty, concern, and interest in the organization's well-being, feeling that they should continue to work for the organization and show their dedication to it (Meira & Hancer, 2021). This is consistent with Dessler's (1997) assertion that improving the quality of life at work is an important process that is related to managing organizational resources and can promote a positive psychological environment for employees, inspiring motivation and creating a positive work environment that can enhance employee and organizational performance.

### **Determination**

Keogh et al. (2012) investigated student teacher self-determination in Australia and concluded that peer-based support processes benefited novice teachers and reduced high professional attrition rates.

### **Research Problem**

Even before the global COVID 19 pandemic, the use of new technologies and their related online teaching/learning pedagogies was many times a difficult and stressful undertaking. As the pandemic's severity was realized, social distancing requirements forced the immediate need for these technologies and online teaching (UNESCO, 2020). However, many school systems and their stakeholders were unprepared, unskilled, and under-funded for the needed implementations. Expectations on both teachers

and students became even higher, leading to stress, mental illness, and even protests. In Thailand's highly competitive top-tier secondary schools, teacher resilience, grit, and persistence became a critical issue as teacher attrition can be high when these issues are not maximized to their fullest. Fortunately, multiple studies have suggested that teacher resilience can be enforced through various methods including teacher peer counselling and school learning communities where dialogue is possible among all stakeholders. Thus, the motivation for this study and the passion for its success.

### Research Objectives

1. Using qualitative methods, the authors will undertake a review of the literature and select the components which are shown to affect teacher resilience.
2. From the components selected, the authors will then undertake an exploratory factor analysis (EFA) and develop a questionnaire from which a panel of experts will assess the content validity and reliability.
3. After the EFA and confirmatory factor analysis (CFA) and goodness-of-fit (GOF) will be used to analyze the factors affecting a top-tier secondary-school teacher's resilience while working under the supervision and guidelines set forth by Thailand's Office of the Basic Education Commission (OBEC).
4. To identify and study the levels of teacher resilience.

### Methods

This research used a quantitative research process by using both an exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). An EFA is a useful way to gain insight into the structure underlying a questionnaire or survey, especially when authored developed (Kerdtip & Angkulwattanakit, 2023). It also allows researchers to identify patterns within the data and make assumptions about the type of exploratory factors that may be present. CFA is

used to confirm these assumptions and test for the validity of the model. By using EFA before CFA, researchers are able to have confidence that the confirmatory results are accurate (Kyriazos, 2018).

### Ethics Clearance

Prior to the research participation of the OBEC secondary-school teachers and invited experts, the authors consulted their university's Human Research Ethics Committee. After consultation, permission was granted for the study with study permission requiring that every participant review and sign a form which outlined and explained the study's objectives. The form also assured each participant that their data privacy was assured. Participants were also informed that they could drop out of the study at any time if they so desired. After all, participants had reviewed and signed their respective agreements, the forms were secured in a faculty filing cabinet.

### Population and Sample

The sample was obtained from high school teachers who taught in top-tier schools under regulatory control of Thailand's OBEC. For the study, 'top-tier' was defined as schools who were ranked within the Top 10 in Thailand from 2020 - 2021 who had been in the Top 10 for a minimum of three consecutive years (Cleary, 2013; Matichon Online, 2022). Using this criteria, seven schools qualified. These were the 1) Horwang School, 2) Samsen Wittayalai School, 3) Suksanari School, 4) Nawaminthrachinutit Satriwittaya Phutthamonthon School, 5) Potisarnpittayakorn School, 6) Debsirin School and 7) Rattanakosinsomphod Bangkhunthian School (Matichon Online, 2022; National Institute of Educational Testing Service, 2021; National Institute of Educational Testing Service, 2021, Office of the Basic education commission, 2022).

Sample size determination can come from numerous sources, including authors who suggest sample size minimums based on

observed variables (Hair et al., 2021), population size (Kyriazos, 2018), population tables (Yamane, 1973), formulas (Singh & Masuku, 2014), model complexity, or type of methodology used (e.g., EFA, CFA, or SEM) (Pimdee et al., 2023). Therefore, the authors adopted multiple minimum sample size suggestions based on a minimum of 200 participants for CFA/SEM research models (Hair et al., 2021; Schumacker & Lomax, 2016). However, Mertler (2016) has reported that in educational research for population sizes of approximately 1,500, a sample size of 300 should be sufficient. Kyriazos (2018) subsequently added that in order to maintain stringent survey standards, a sample size of 400 is a good target. Therefore, after consideration of the experts' advice and the 48 observed variables developed for the model, an initial target of 432 teacher participants was set as the target sample number.

### Research Tools

The questionnaire was divided into 2 parts, with Part 1 concerned with each teacher's general information of teachers. Part 2 used a five-level opinion scale to assess each teacher's opinions concerning 48 items related to their resilience.

The index of item congruency (IOC) was used to check the consistency and validity of the questionnaire's content by three experts, including school directors and a school psychologist. After score assessment, all items having a value between 0.60 and 1.00 were kept. A questionnaire 'try out' was additionally undertaken using 30 OBEC supervised secondary schools' teachers who did not participate in the subsequent study's final survey. The confidence value was assessed using Cronbach's alpha which was determined to be 0.961.

### Data Collection

Data collection was undertaken in seven top-tier secondary-school under supervision of

Thailand's Office of the Basic Education Commission (OBEC). From the use of cluster or area sampling and the triangulation method combined with simple random sampling, 336 teachers were identified who were subsequently sent a questionnaire copy in a sealed envelope to their school. Respondents were asked for assistance in filling out the survey and asked to sign an ethics clearance form. The study then used 336 responses for the initial EFA and 196 responses for the subsequent CFA.

### Data Analysis

Construct validity of factors influencing teacher resilience in Thai top-tier secondary-schools was conducted using an EFA and LISREL 9.1 statistical software. Moreover, the correlation coefficient between the EFA's potential variables was examined using the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. Although results can range from 0 to 1 after using the KMO, accepted standards suggest that values need to be from 0.8 to 1.0 to be adequate. Thus, the KMO test establishes the suitability of the data matrix for the factor analysis and the data structure suitability for factor extraction (Shrestha, 2021). From the analysis result of .970, the variables were determined to be suitable, related, and consistent. Furthermore, Bartlett's test of sphericity is used to indicate relationship strength between the variables (Alwan et al., 2020). If the outcome shows that  $p < 0.05$ , it can be concluded that the factor analysis is suitable (Shrestha, 2021).

The authors also undertook a principal component analysis (PCA) as a PCA is a common method for analyzing large datasets containing large numbers of dimensions per observation. Likewise, a PCA is used to obtain a small number of factors which account for maximum variability out of the total variability. Eigen vector values, percentage of variance and the cumulative percentage are used to achieve this (Sheela et al., 2020). Factor extraction during the PCA can commence when an Eigen value is greater than or equal to 1.

Then, the components were analyzed to find the Eigenvalue percentage and cumulative percentage of variance. Matrix correlation was used to extract the components, and principal component analysis was used to select components with an Eigenvalue greater than or equal to 1. The Varimax orthogonal rotation method was then used to clarify the relationship between variables that form a clear component (Acal et al., 2020). The researchers selected variables (questionnaire items) that had a factor loading of at least .50, and each component needed to have a minimum of three variables. (Abdi, 2003). Finally, the components were named based on considering all variables in the component, and the name was assigned to cover the variables through calculating the cumulative variance.

### Confirmatory Factor Analysis (CFA)

A CFA is a research tool used to analyze the confirmatory factors. The researcher used the results of the EFA to conduct a CFA. The tool utilizes basic statistical values obtained from EFA to create a questionnaire consisting of factors related to teacher resilience with top-tier Thai secondary schools. The questionnaire's content validity was assessed by three experts from which the index of Item-Objective Congruency (IOC) method determined an IOC score range of 0.71 to 1.00. The reliability was assessed using Cronbach's Alpha and was determined to be 0.94.

Data analysis was conducted to test the model's conformity with the theory of teacher resilience, using statistical measures such as mean, standard deviation, skewness, and kurtosis. The structural validity of the measurement model was analyzed using the LISREL program to examine the model's conformity with the theory or the data. The statistical measures used to test the model's conformity with the data were chi-square ( $\chi^2$ ), chi-square/degree of freedom ( $\chi^2/df$ ), and the goodness-of-fit index (GFI).

### Research Findings and Discussion

From the analysis of the factors contributing to the resilience of teachers in top-tier secondary schools in Thailand, the following results were observed:

#### Respondents Characteristics (n=336)

From the results shown in Table 1, determination was made that 53.27% of the Thai secondary-school teachers were female. Additionally, 33.33% were between 41-50 years of age, 26.60% between 51-60, and 22.62% between 31-40. This was consistent with the teacher work experience as 60.12% had 10 or more years of teaching experience. Finally, only 1.79% had reached the PhD level, 33/03% at the Master' level, and the majority of 65.18% had a Ba/BS degree.

Table 1 General characteristics of the teachers (n=332)

Item	Frequency	%
Sex		
Male	157	46.73
Female	179	53.27
total	336	100.00
Age		
Less than 31	62	18.45



31 – 40	76	22.62
41 – 50	112	33.33
51 – 60	86	25.60
School work experience		
Less than 5 years	60	17.86
5 – 9 years	74	22.02
10 – 14 years	112	33.33
More than 14 years	90	26.79
Educational Level		
Bachelor degree	219	65.18
Master degree	111	33.03
Ph.D./Ed.D.	6	1.79
total	336	100.00

### Part 1

Results of the exploratory factor analysis (EFA) of the factors contributing to the resilience of teachers in high-competition schools in Thailand.

From Table 2, it can be seen that the KMO (Kaiser-Meyer-Olkin Measure of Sampling Adequacy) value is .970, which is greater than

.50, indicating that the data used for analysis is suitable. The Barlett's test of sphericity was used to test the hypothesis that the correlation matrix is an identity matrix. The chi-square value was found to be 12907.974 and the statistical significance value (Sig.) was .000, which is less than .05. This indicates that the correlation matrix obtained is not an identity matrix, meaning that all 48 variables are correlated and suitable for factor analysis.

Table 2 Results of the EFA Assessment of the Appropriateness of the Correlation Matrix Between Variables

Variables	KMO		Bartlett's test	
	Appropriate value	Value obtained from analysis	Appropriate value	Analysis Value
48 variables	Greater than .50. (Greater than .90 is considered very good.)	.970	$p < .05$	$p = .000$

Orthogonal rotation is a technique used in factor analysis to simplify the interpretation of the factors by making them independent of each other. This means that the factors are rotated in such a way that they are perpendicular to each other, or "orthogonal," allowing each factor to represent a unique aspect of the data.

Varimax is a specific type of orthogonal rotation that is commonly used in factor analysis. In varimax rotation, the factors are rotated to achieve the maximum variance in the factor loadings. This means that the factors are simplified and easier to interpret, as each factor will have higher factor loadings for a smaller number of variables, and lower loadings for the remaining variables.

The study examined the factor structure of teacher resilience in a high-competition school in Thailand. Table 3 shows the Varimax rotation analysis which Abdi (2003) has suggested in the second step in and EFA and a PCA. Overall, the purpose of orthogonal

rotation (such as varimax) is to make the factors more interpretable by simplifying the factor structure and identifying the variables that best represent each factor. Suggested results of a factor analysis using an orthogonal rotation's varimax method is that each factor should have a loading value of at least .50. However, if there are variables with loading values greater than .50 in multiple factors, the researcher selects the highest loading value in that particular factor. The authors then chose the highest weight for each factor, which left 30 variables as discussed in Table 3.

From Table 3, it can be seen that when considering the items with a weight of 0.50 and above, out of the 48 variables that were screened by experts, 28 variables remained which were grouped into 4 components, which when combined can explain the variance as a percentage of 60.606 of the total cumulative variances.

Table 3 The Final 28 Variables with Factor Loadings Greater than .50

Number	Observed Variables and Questionnaire Items	Loadings
	<b>Having good relations with people around me (Relationships).</b>	
13	I have empathy and concern for others even if I don't experience the same situation.	.754
12	I overlook small unpleasant events to maintain warmth and friendship in my school.	.660
23	I always admire others when they do something good, even if there may be disagreements in their thought process regarding the work.	.646
26	I open my mind to listen to the opinions of others without prejudice even though it's a different idea than my own.	.627
14	Even during tense and difficult situations I can still continue to work to meet my goals.	.597
27	I often exchange knowledge with colleagues and reflect on mutual ideas.	.592
11	I think that challenges in the workplace can lead to learning how to work amidst unfavorable environmental conditions, and can also encourage improvement in learning job skills.	.568

22	I believe that one can improve oneself by learning from good examples, both in terms of work and personal life.	.560
18	Even in difficult conditions I am confident that things will change for the better.	.558
17	I appreciate success but do not deny failure, because failure teaches me to be patient and always start again.	.536
28	Even in the midst of difficult competition I can live a simple life and be flexible in my work.	.530
10	When feeling uncomfortable or encountering unexpected events, I receive good encouragement from the family.	.521
	<b>Feeling grateful for what has been received (Gratitude).</b>	
47	I am deeply grateful and sincerely thankful in every way for the assistance I receive.	.717
48	Being considerate towards everything and everyone, whether it's people or nature, is essential to ensure that everything can work smoothly.	.673
46	My work has great value for the organization, society, and the community as a whole.	.563
38	Standards and guidelines can be adjusted according to the context and circumstances that change over time.	.539
36	There is a perspective that being a complete human being does not depend on perfection in work.	.531
41	Loving and being devoted to the work you do, even in the face of challenging circumstances, is important.	.505
	<b>Dedication to work for stability (Dedication).</b>	
19	I allocate my work so I have time to do activities with my family.	.712
44	My income is sufficient in spite of living in the midst of materialism.	.677
43	I believe that rights and benefits for civil servants result in a good quality of basic life.	.630
20	Although I sometimes work late, I still wake up in the morning and am motivated to go to work.	.591
45	I give more importance to being happy at work than compensation or benefits.	.583
5	I often exercise and take care of my health because good health has a direct effect on work.	.574
	<b>Learning something challenging with absolute determination (Determination).</b>	

24	I like challenging work because it is an opportunity to learn and develop myself.	.698
30	I often seek opportunities to study new technology and apply the knowledge to improve innovation in teaching.	.661
15	I use humor to relieve tension both for myself and those around me.	.593
29	I concentrate on the quality of my work until I achieve my goals in spite of a chaotic environments and difficult workloads.	.585

Eigenvalues are a fundamental concept in linear algebra and represent the scaling factor of a linear transformation. In simple terms, eigenvalues are the values which, when a matrix is multiplied by a vector, result in a new vector that points in the same direction as the original vector, but may be scaled (stretched or shrunk) by a certain amount. Mathematically, eigenvalues are the values  $\lambda$  for which the equation  $Av = \lambda v$  holds, where  $A$  is a square matrix and  $v$  is a nonzero vector.

Table 4, also shows that *relationships* had an eigenvalue value equal to 23.430, a cumulative variance percentage of 48.812, and a weight between .521 - .754. This component is defined as "*having good relations with people around me.*"

Gratitude had an eigenvalue value equal to 1.903, a cumulative variance percentage of 52.777, and a weight between .505 - .717. This component is defined as "*feeling grateful for what has been received.*"

Dedication had an eigenvalue value equal to 1.591, a cumulative variance percentage of 56.091, and a weight between .574 - .712. This component is defined as "*dedication to work for stability.*"

Determination had an eigenvalue value equal to 1.115, a cumulative variance percentage of 58.411, and a weight between .585 - .698. This component is defined as "*learning something challenging with absolute determination.*"

Table 4 Components, Eigen Value, % of Variance, % of cumulative variance, and Weights

Component Name	Eigen Values	% of Variance	Cumulative %	Weights
Relationships	23.430	48.812	48.812	.521 - .754
Gratitude	1.903	3.965	52.777	.505 - .717
Dedication	1.591	3.314	56.091	.574 - .712
Determination	1.115	2.320	58.411	.585 - .698

**Part 2 - Confirmatory Factor Analysis (CFA)**

Results of the CFA on Thai secondary-school teacher resilience was found to be consistent with the empirical data after sub-standard variables were removed from the analysis. Moreover, the parameter estimates were obtained using the maximum likelihood method (MLM) which is a commonly used approach in CFAs to estimate the model parameters (McGeough et al., 2021). It is based on the assumption that the observed data are drawn from a multivariate normal distribution, and the goal is to find the set of parameters that maximizes the likelihood of obtaining the observed data. In a CFA, the MLM estimates the factor loadings, factor variances and covariances, and residual variances (Brown,

2003). The procedure starts by specifying a hypothesized model that specifies the relationships between the observed variables and their underlying factors. The MLM then estimates the model parameters by maximizing the likelihood of the observed data under the hypothesized model.

The advantage of MLM is that it provides estimates of the model parameters that best fit the data. Additionally, the MLM produces *standard errors* (SE) (Table 5), which can be used to test the significance of the estimated parameters and to construct confidence intervals.

Table 5 and Figure 1 show the results of the analysis of the CFA components affecting resilience among teachers in top-tier competitive secondary schools in Thailand.

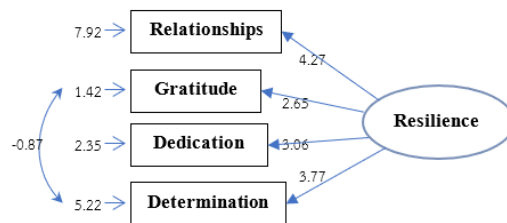


Figure 1 CFA LISREL 9.10 Results

chi-Square=0.07, df=1, p-value=0.7823, RMSEA=0.000

This conclusion is based on the chi-square value not being statistically significant ( $\chi^2=0.07$  df=1,  $p=0.78523$ ) and the root mean square error of approximation (RMSEA) having a value of 0.000. The goodness-of-fit index (GFI) was also 1.00, the adjusted goodness-of-fit index (AGFI) was 1.00, and the comparative

fit index (CFI) was 1.00. When all three indices have a value of 1.00, it indicates that the model fits the data perfectly, and there is no discrepancy between the observed data and the model-implied covariance matrix. The weight component analysis of each of the components was also between 2.65-4.27.

Table 5 CFA Results

Components	Component Weight Value ( $\beta$ )	Standard Error (SE)	t-test Statistic (t)	Coefficient of Determination ( $R^2$ )
Relationships	4.27	0.14	31.32	0.70
Gratitude	2.65	0.07	19.08	0.83

Dedication	3.06	0.09	34.77	0.80
Determination	3.77	0.12	31.68	0.73
$\chi^2=0.07$ , $df=1$ , $p=0.78523$ , CFI=1.00, GFI=1.00, AGFI=1.00, RMR=0.015, RMSEA=0.000				

The t-test analysis used  $|t| \geq 1.96$  as the criteria to confirm the t-value significance (Hair et al., 2021). Therefore, from the results in Table 4, the lowest reported t-value for the four components was *gratitude* (19.08,  $p \leq .01$ ), indicating significant support for the study's CFA model. Testing for the  $R^2$  used values established by Hooper et al. (2008) for analysis ( $\leq 0.20$ ). This was met by all components.

Numerous studies concerning teacher's education *resilience* have indicated that it is influenced by each teacher's career stage and life experiences as well the critical role that teacher education plays in the resilience process (Mansfield et al., 2016). Day and Gu (2014) have also added that increasing teacher quality and raising student learning standards and achievement needs to be focused on efforts to train, build, sustain and renew *teacher resilience*.

According to Umberson and Montez (2010) social *relationships*—both quality and quantity—affect mental health, health behavior, physical health, and mortality risk. Therefore, having a good relationship with others is a necessity of human life and the social development and understanding of people, with the discovery of the meaning of life and mental health all affected by the relationship between individuals.

These same concepts can be expanded into the work environment as well, with Buchanan (1974) stating that the *dedication* to the organization is a bond with a goal. This is consistent with Steers (1991) who also discussed the *dedication* to the organization and the need for a strong relationship in participating in corporate activities.

## Conclusion

Exiting from a global pandemic from which nearly every education system in the world experienced massive upheaval, the authors set out to determine which factors contributed to a teacher's resilience. Using quantitative analysis to develop a 48-item questionnaire, the authors refined the survey instrument using both a panel of experts and an EFA. Subsequently, a CFA and goodness-of-fit was used to further refine the questionnaire to 28 items for four main components hypothesized to affect teacher resilience. These included relationships, gratitude, dedication, and determination. When ranked in importance, relationships were judged most important, followed by determination, dedication, and gratitude.

Thus, the critical need for understanding and developing teacher resilience comes from its critical importance in maintaining high job satisfaction, the ability to respond positively in difficult circumstances, which then leads to highly efficacious and emotionally intelligent teachers (Tait, 2008).

The study is novel in that it is only one in a handful of studies which have investigated the importance of teacher gratitude and its importance on teacher work resilience.

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