Teacher resilience instrument: Development and validation of a four-factor model

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Article Info	ABSTRACT

The study into teacher resilience has been inadequate due to a lack of measures that apply to educational settings. The items measuring teacher resilience were constructed through literature extensive discussion with the experts in the field and further discussion with the practitioners, i.e., secondary school teachers. The Teacher Resilience Instrument was then tested in a field via survey research method. The sample of the current study consists of 380 secondary school teachers in Bauchi State, Nigeria, through cluster sampling and systematic sampling method. The exploratory and confirmatory factor analysis were used to test the hypothesized model with four dimensions of teacher resilience. The study confirmed that the proposed model was fit and data loading were significant, which leads to the construct validity of the research instrument. Finally, the study highlighted the importance of researching more on teacher resilience to seek its relationship with other factors, pertinent especially to address issues regarding teacher wellbeing and retention.

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1. INTRODUCTION

The fourth industrial age (IR 4.0) would bring massive changes to the way things are done and how people cope with their roles and responsibilities at work. In support of the break out of Industrial Revolution (IR) 4.0 educational visions are being aligned with numerous policies and practical steps to develop the potential of individuals in the rounded and integrated manner, and produce individuals who are knowledgeable, emotionally, spiritually, physically balanced and harmonious. Such expectations may bear a lot of pressure on teachers; thus, it is necessary to provide vibrant visions into the experience of teacher resilience [1]. This is beneficial bearing in mind reports that staggering numbers of teachers are leaving the job- for example, in 2016, 43% of in-service teachers in the United Kingdom (UK), reported that they would leave the job in five years [2].

In order to ensure teacher resilience, there is a need to activate it during pre-service training so that it is nurtured at the early career stage, and then, accomplished through the professional teaching career of the teachers [3]. It is significant towards developing teacher self-efficacy, wellbeing and professional development. Teacher resilience can lead to the desire in teachers to retain teaching as their lifelong profession. This is because resilience is more than an individual characteristic. It is a capacity which arises through relationships between people in the organizational contexts. Some of the characteristics related to resilient individuals have included positive insights, independence, relationships, initiative, creativity, humor

and morality [4]. Generally, it is regarded as the process of successfully achieving certain goals in some way or the other, regardless of having to undergo unusually difficult and pressing situations [5].

Currently, the teaching profession is regularly being bombarded with continuous and pressing changes in the government educational policy that have witnessed increasing expectations in all aspects related to teacher and teaching, which may include but not limited to teachers' responsibilities, workload, quality delivery of the curriculum and technology implementation. Thus, it is vital to try to understand why and how teachers can sustain their capacity to be resilient and continue to work for improvement. Although there are several available instruments used to measure resilience, most of the previous research used them to measure resilience of people in general or those of in clinical context. Studies on teacher resilience have mostly been conducted qualitatively as the concept of resilience is rather difficult to express [6] and what more to be measured.

This present study looked into the measurement of teacher resilience as to cater to the specific context and nature of the teaching profession, and thus, contributes to the body of knowledge. Teacher resilience is usually thought of as a positive way of adaptation when a teacher faces a difficult and stressful situation caused by repetitive stress. By knowing the specific constructs of teacher resilience and able to quantify them through a valid and reliable instrument, it would be much easier to measure and generalize teacher resilience status to a wider group of teachers, and specifically in this case, the Nigerian teachers [1]. Has noted how important it is to measure resilience within the context. It is also more encouraging to view teacher resilience as related to teacher quality, which would inform policies of selection, employment and retention of teachers. This study extended research on resilience by proposing an instrument to measure teacher resilience. It attempts to answer two research questions: i) Is the proposed Teacher Resilience Instrument reliable and valid?; ii) Does the theoretical-based four-factor measurement model fit the data collected among the secondary school teachers? It is hoped that Teacher Resilience Instrument would contribute to the theoretical and practical establishment of the concept of teacher resilience.

2.   LITERATURE REVIEW
2.1. Conceptualizing resilience
Many years ago, the concept of resilience was defined as a phenomenon whereby a person can continuously focus on something positive in response to the pressure and hardship that they have to face [7]. Later in the year 2006, resilience can also mean a relatively optimistic psychological outcome despite the dangerous risks or difficult experiences faced by a person [7]. Resilience is sometimes also conceptualized in terms of an outline of desirable personality and cognitive characteristics of the stress-resistant person [8]. Postulated resilience as a person's ability to overcome obstacles in the face of adversity, and in turn, develop competence academically, socially and professionally [9]. There were five essential characteristics which define resilience among adults, i.e., meaningful life, perseverance, self-reliance, equanimity and existential aloneness; but results of principal component analysis found only two broader factors (personal competence and acceptance of life).

The development in research on resilience also pointed out that resilience is more than social competence which gives mental health; capability must exist with risk to be resilience [10]. However, the definition that has remained stable over time is the one stating that resilience is when a person has a comparatively good result despite having knowledgeable, severe stressor adversities-their outcomes are better than that of other individuals who had the same experiences. Another study which examined the concept of resilience, found that work on resilience has much been focused on by researchers in the fields of both mental health and education [11]. He concluded that in operationalizing the term resilience, it is a critical to focus on the aspect of how people need to be emotionally competent when dealing with failures or when given challenging task. The importance of resilience was noted in caring professions [12], [13]. Teachers as caregivers caring for the students. As such, teachers are the role models for social and emotional competence [14]. It was also stated that resilience assistances the individual facing adversities and difficulties [8], and is constructed through the individual's dynamic interaction with his/her environment [1].

In terms of theory, the most widely known theory of motivation developed by Maslow [15] condenses the human needs hierarchically, starting with the basic psychological needs, followed by safety, having sense of belonging, experiencing love, establishing self-esteem, and finally, achieving self-actualization. Maslow's hierarchy of needs is often expressed in a pyramid shape with the basic needs put at the bottom of it, and self-actualization which is regarded as the most complex needs, at the top. In theory, the need at the bottom end becomes dominant or the most essential one. The most leading needs can serve to activate and guide an individual's behavior and actions in fulfilling it. A person would pursue to seek higher needs when the low needs are met. However, this hierarchy is not as straight forward as it may seem. For instance, there are cases in which self-esteem or self-actualization seems to be more important for certain

people, than love or belonging [15]. Given the hierarchy of needs, in terms of resilience, most teachers would normally have a full set of professional goals. Accordingly, teachers' needs towards achieving the goals would contribute immensely towards the existence of resilience in them.

2.2. Teacher resilience

In a school context, a teacher, for example, may become professionally troubled when dealing with student development and behavior issues. The perception by teachers of the different experiences they encountered may potentially disrupt their professional competence. Teachers' different responses to the kinds of problems they have to face, depends on several factors, including their resilience, self-efficacy beliefs, and the support from colleagues and superiors [3]. In other words, their ability to be resilient fluctuated as a result of the influences of the personal relational and organizational settings in which they worked [16]. According to previous study [17], teacher resilience is as a relational concept in which it might be linked to the accomplishment of the students. The authors carried out a three-year study which involved gathering data via semi-structured face-to-face interviews with a sum of 300 teachers in 100 primary and secondary schools in England, at their different levels of the careers. The study collected huge empirical evidence on the factors which influence teachers to be resilient, thus contributed to the emerging literature in the field. Practically speaking, it gives impact to the knowledge on how to address the issue of retention among teachers.

A few studies have been carried out to measure teacher resilience. For example, previous researchers [18] conducted a survey and measured the instrumental teacher resilience. Measures of teacher resilience was tested with 40 respondents through the use of a five-point Likert-type scale questionnaire, and substantiated with semi-structured interviews with 12 participants. The instrument was tested, and findings of the study informed the policymakers on teacher resilience factors that enhance retention. From the interview, it was found that certain factors such as personal qualities, beliefs, behaviors, skills and areas of knowledge are associated with teacher resilience. Besides, it was also noted that such elements like work environment or context, and the interactions that exist between colleagues, experts and student brings weight to the overall teacher resilience. Yonezawa, Jones, and Singer [4] refined teacher resiliency as a critical educational glitch. In their study, they share findings from case studies of some educators who worked in urban, secondary schools, and elaborated on what teachers need to survive in such contexts. Similar definition has been used to describe teacher's resilience. Teacher resilience is defined as the endurance that drives teachers to continuously contribute to the teaching practices despite the bundle of challenges and recurring obstacles [8].

In another study in Greece [8], it is interesting to find that during the hardship of experiencing economic turndowns, the Greek teachers were resilient enough and managed to stay calm. It is the relationship and strong networks between family and colleagues which kept them resilient in the face of such adversity. Studies on teacher resilience were often carried out among new teachers [19], [20]. Such studies which investigate how graduating, and career teachers perceive resilient teachers are becoming more and more important in order to understand the psychological and sociological aspects which can be offered to novice teachers and support them so that they remain in school and thus reduce turnover rates. Not only teachers need to build resilient characters during their pre-service years, they also need to embrace the strong will to survive in the system by being able to absorb the context they are in. The financial constraint makes teacher resilience deemed pressing in most states in Nigeria, including Bauchi State. Teacher self-efficacy and positive outlook on the profession are important in gearing towards the development of education in Bauchi State, Nigeria. Teacher need to be able to regulate themselves to various situations and determination in the face of unfavorable conditions. In other words, it refers to as the capability to professionally stay composed, positive and determined in the face of difficulties.

3.   RESEARCH METHOD
3.1. Research design

The study commissioned a survey research method to collect cross-sectional data. A questionnaire was distributed to selected secondary school teachers. The returned questionnaires, usable data for further analysis were identified and proceeded to analysis. The study tested the instrument, particularly the measurement of teacher resilience. However, the instrument is useful to test one the level of resilience, to know the level of their wellbeing, and how they need particular intervention in the teaching profession.

3.2. Measurement of resilience

In the present research, the researchers developed items based on literature on resilience. The composition of items takes into consideration a few prevalently used scales, among others, the Resilience Scale [9] and Workplace Resilience Instrument [21]. The scale to measure teacher resilience was in English Language and assessed using a five-point Likert scale. The items for measuring the construct were adapted to suit the operational definition of the construct-resilience in this study refers to a teacher's capability to

regulate themselves in the face of varied situation and unfavorable circumstances in the school context. It is postulated that there might be difference in the dimensions which may emerge from the data due to the fact that the sample used in the original study is not specified to teachers. The questionnaire was also improved in terms of content validity readability, and reliability by testing it among 380 school teachers.

3.3. Sample

The sample of the current study consisted of 380 secondary school teachers in Bauchi State, Nigeria who were selected via a multistage cluster sampling procedure. The data for this study were collected through a survey questionnaire administered to the secondary school teachers in Bauchi State. A total number of 460 of the questionnaires were distributed to the respondents. However, only 380 were successfully retrieved and valid used for the analyses.

3.4. Data analysis

The reliability of a measure represents the extent to which a measuring instrument is consistent and stable across time and different items in the scale [22]. The most common test of inter-item consistency reliability Cronbach's alpha. Henceforth, the Cronbach's alpha was employed in this study to measure the internal consistency of the instrument. Whereas construct validity was checked using exploratory factor analysis (EFA) with principal axis factoring and noblemen direct noblemen rotation.

Instrument validity refers to the extent to which the instrument is measuring what it is supposed to measure. In this research, the content validity was addressed by consulting a small number of panels of expert [23]. These experts made judgement as to whether or not the items chosen are suitable for the measurement of the selected dimensions in the construct of Teacher Resilience. According to previous studies [22], [24], [25], besides content validity, researchers also need to establish construct validity. In this study, the establishment of construct validity involved an exploratory factor analysis using principal axis factoring method analysis, combined with direct oblimin rotation. Factor analysis is seen as a set of technologies for studying the interrelationship among variables, and it is used to verify items loading on the correct factors as identified by previous researchers [26]. These exploratory analyses were carried out via Statistical Packages for Social Sciences (SPSS) version 22.0 software, while the confirmatory factor analysis via e (PLS 2.0) [27].

4.   RESULTS
4.1. Instrument reliability

The means, standard deviations, and reliabilities of the teacher resilience are shown in Table 1. Cronbach α were .78 for self-reliance, .67 for positive outlook, .77 for determination and .67 for equanimity. Observation of alpha values if item deleted did not indicate substantial development of the reliability by deleting any of the items. Additional, analysis of the items loaded in each of the construct seen that the corrected item-total correlations were the cut-off point of .30 [28] for all items in all the dimensions indicating preliminary evidence of convergent validity of the four dimensions.

Table 1. Mean, standard deviation, and Cronbach Alpha values

	Factor 1 Self-reliance 8 items	Factor 2 Positive outlook 5 items	Factor 3 Determination 6 items	Factor 4 Equanimity 3 items
Mean	4.30	4.06	4.41	4.13
Standard deviation	.55	.54	.585	.59
Alpha values	.78	.67	.77	.67

4.2. Exploratory factor analysis

The items were analyzed through exploratory factor analysis EFA through principal axis factoring (PAF) method of extraction and direct noblemen rotation method. The items with an absolute load into four factors, with loading values of .30 and were considered significant contributions towards explaining each teacher resilience construct. Table 2 indicates that 22 of 25 items loaded into designated factor with absolute loading values ranging from .72 to .33, lending from the sampling adequacy and Bartlett's Test of Sphericity value of 2872.593 as significant at (p< 05), proving that the correlation matrix was not an identity matrix thus EFA could be conducted [29]. Items TR3, TR14 and TR25 did not load strongly enough.

Table 2. Factor extraction based on principal axis factoring method and direct oblimin rotation

Items	Factor 1 8 items	Factor 2 5 items	Factor 3 6 items	Factor 4 3 items
TR20 – Although I may not like some of the tasks given to me at work, I would make sure that I do it	.62			
TR16 - I can usually find something to laugh about at work	.49			
TR9 - I can handle many job tasks at one time	.48			
TR7 - I can cope with job difficulties by myself	.44			
TR17 - My self-efficacy gets me through hard times in dealing with problems in school	.40			
TR5 - I can do many tasks on my own	.40			
TR8 - I do not have to rely much on my colleagues at work	.34			
TR13 - I can get through hard times in doing certain tasks by myself	.33			
TR15 - I keep being interested in my profession		.65		
TR12 - I take things one day at a time		.55		
TR24 - I have enough energy to do my work efficiently		.46		
TR11 - I try not to overthink about my workload		.45		
TR19 - I try to be creative in solving problems		.41		
TR4 - I make sure I complete important job tasks			.72	
TR2 - I usually manage one to do my tasks one way or the other			.70	
TR6 - I feel satisfied when I do my work well			.53	
TR18 - In an emergency at school, I am someone my colleagues can rely			.47	
TR1 - When I make plans, I follow through them			.41	
TR10 - I am a determined teacher			.40	
TR21 - My work life has meaning				.63
TR22 - I do not dwell on things that I cannot do anything about				.46
TR23 - When I'm in a difficult situation, I still can focus on my job				.37
Total Eigenvalues		6.559		
Percentage of Variance Explained		27.330		
KMO		.815		
Bartlett's Test of Sphericity		3108.741		
df		276		
Total Variance		57.682		

Note: TR-Teacher Resilience

4.3. Confirmatory factor analysis

The next step in validity check is to submit all 23 items according to the respective four dimensions as emerged in the previous EFA, to confirm the measurement model structure. Confirmatory factor analysis (CFA) does not only display item loadings for the constructs in the teacher resilience but also serves to assess the composite reliability, discriminant validity, as well as convergent validity of the instrument [27], [30]. Figure 1 shows the results from the CFA which indicated the loading values of all dimensions to the construct of resilience and all items to the sub-construct are strong, ranging from 0.64-0.86. This lends evidence of convergent validity; and at the same time, because the loadings were less than 0.90, the discriminant validity was also established. Items TR8. TR13, TR18, TR20, and TR24 were deleted from the analysis due to low loadings (0.40). Table 3 summarizes the final items following the factor structure of teacher resilience based on data from teachers in Nigeria.
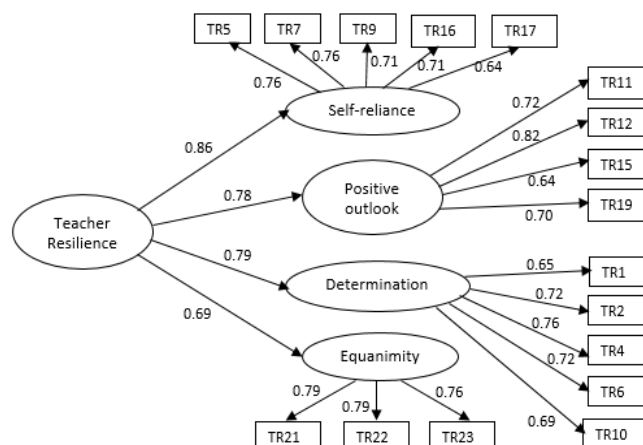

Figure 1. Measurement model of teacher resilience

Table 3. Final item list based on CFA

Instrument	Dimensions (No. of items)	Operational definition	Items
Teacher Resilience (TR)- Item total=17	Self-reliance items (5 items)	Having a sense of self-confidence in the ability to take charge of things that comes along the way	I can do many tasks on my own (TR5) I can cope with job difficulties by myself (TR7) *I do not have to rely much on my colleagues at work (TR8) I can handle many job tasks at one time (TR9) *I can get through hard times in doing certain tasks by myself (TR13) I can usually find something to laugh about at work (TR16) My self-efficacy gets me through hard times in dealing with problems in school (TR17) *Although I may not like some of the tasks given to me at work, I would make sure that I do it (TR20)
	Positive outlook (4 items)	Belief in the good things that comes with any situations	I try not to overthink about my workload (T11) I take things one day at a time (TR12) I keep being interested in my profession (TR15) I try to be creative in solving problems (TR19) *I have enough energy to do my work efficiently (TR24)
	Determination (5 items)	Perseverance and diligence in achieving something	When I make plans, I follow through them (TR1) I usually manage to do my tasks one way or the other (TR2) I make sure I complete important job tasks (TR4) I feel satisfied when I do my work well (TR6) I am a determined teacher (TR10) *In an emergency at school, I am someone my colleagues can rely on (TR18)
	Equanimity (3 items)	Being able to stay in control even during hard times	My work life has meaning (TR21) I do not dwell on things that I can't do anything about (TR22) When I'm in a difficult situation at work, I can still focus on my job (TR23)

Note: *Items which loaded in EFA with values >0.30, but did not load strongly in CFA (values<0.4)

5.   DISCUSSION

The concept of teacher resilience has been developed from the literature on resilience in general, with research predominantly focused upon childhood studies and those who have overcome extreme and significant adversity [3], [31]. However, the emerging trend in research currently suggests that there is a need to observe teacher resilience because the sources of teacher stress in these days occur for many teachers on a daily basis [32]. Teacher resilience has previously been studied more qualitatively in nature, rather than quantitatively, due to the lack of instruments to measure teacher resilience in context. The study of teacher resilience by taking into considerations of the different contextual factors rooted to the fact that resilience becomes more evident when teachers are faced with challenges and risks [1]. In addition to researching the factors that enable teachers to respond to events involving extreme adversity, research on teacher resilience should also focus on uncovering the processes that allow teachers to be resilient daily. By having a specific instrument that measures teacher resilience, further research can be conducted to test the antecedents and outcomes of resilience among teachers.

This study has produced parsimonious measures to test teacher resilience, with a total of 17 items, almost close to the Polish short version of Resilience Scale (RS-14) which has 14 items [33]. The findings of the original research [9] have proposed a five-factor model but resulted in a two-factor structure instead; while the present study proposed four-factor which tested the items or instrument of teacher resilience. These four dimensions with a total of 17 items are labelled and defined as: i) Self-reliance (five items): Having a sense of self-confidence in the ability to take charge of things that comes along the way; ii) Positive outlook (four items): Belief in the good things that comes with any situations; iii) Determination (five items): Perseverance and diligence in achieving something; iv) Equanimity (three items): Being able to stay in control even during hard times.

From these four dimensions of teacher resilience, we can see that self-efficacy seems to be one of the most important factors for Nigerian teachers in overcoming the challenges in the profession. Previous literature have also highlighted the significance of self-efficacy beliefs among teachers, especially the novice teachers [34]. Besides, teachers in this study also felt that having positive mindsets can also help them go through the rough days that they sometimes light have faced in carrying out their roles and responsibilities as teachers. When trying to achieve certain targets, despite the risks and hardship that they have to encounter, resilient teachers would persevere, but at the same time, they believe in the significance of being in control and remaining calm.

The estimated measurement model indicated that the reliability, and validity of the hypothesized four-factor model fits the data. Instrument reliability and validity test conducted in this research process is

deemed essential because previous resilience instruments was originally used among the general adult sample, and not specifically for measuring teachers' resilience. Items in this instrument were refined and fine-tuned to suitably measure the construct of teacher resilience in the school context. Findings of instrument reliability and validity indicates that the instrument is indeed culturally robust. It could withstand not only teachers as sample, but also the school context which it indirectly relates to too when measuring.

6. CONCLUSION

This study has established the validity of using Resilience Scale among teachers in Nigeria and how the factor structure depicts the psychological aspects of resilience amongst the sample used in this research. An essential next step is to replicate the findings in this study with an independent sample. Such a replication would show the generalizability of the measure to other samples and settings. Besides, studies should also look into the relationships between resilience and other variables, such as leadership, mentoring practices, teacher professional development and other relevant factors.

As of the practical implications, the findings suggest that teacher resilience is complex. Thus, it requires special attention for it to be grasped, especially for novice teachers who have just entered the profession, but with little preparation on how it is really like to be teaching in schools. The relatively short experience during teaching practicum is definitely not the true portrayal of the profession, which actually loaded with a lot of expectations and pressure coming from the stakeholders.

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