Creativity nurturing behaviour scale for teachers

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Abstract

Purpose – Today, innovation and creativity are the buzz words in the galore of not only business but also of education. The need to foster creativity and innovation has long been a priority in the educational and corporate spheres. The purpose of this paper is to propose the scale for the measurement of teacher's creativity nurturing behaviour.

Design/methodology/approach – The sample consists of 356 primary school teachers from various category, e.g. municipal schools, private schools, Indian Certificate Secondary Education board, Central Board of Secondary Education (CBSE) board, regional board. The data are collected through the questionnaire with 15 items and four constructs: abstraction, inquisitiveness, motivation and critical thinking. The data have been analysed through SPSS and AMOS.

Findings – The result shows good fit of the model with four constructs or latent variables.

Originality/value – This paper is original and a scale development for creativity nurturing behavior.

Keywords Education, Creativity, Teachers, Critical thinking, Creativity nurturing behaviour

Paper type Research paper

Introduction

Creativity is one of the crucial facets of humanity. Its an elusive and imprecisely defined concept. In different contexts creativity is considered one of the key elements of life satisfaction, a motivating factor in learning, as well as a driver of innovation and economic productivity. The proposition that all individuals have creativity as a latent skill that is a life-long process (Maslow, 1968; May, 1975; Rogers, 1970; Torrance, 1987; Treffinger, 1989) makes the case for the creative learning and creative teaching (Esquievel, 1995).

Woodman *et al.* (1993) propose that besides the individual's personality, creativity is enhanced or constrained by the social influences and contextual factors. The school students are influenced by the teachers and their behaviour, which would be one of the strong contextual factors for nurturing creativity in the students. Nurturing creativity in educational contexts inspires and supports student success, increases personal and social engagement through learning, and lead to greater student satisfaction and higher levels of self-efficacy.

Creativity and innovation as a skill would be required to be successful as working professionals for the school students of today. (Bellanca and Brandt, 2010; Trilling and Fadel, 2009; Wagner, 2012). Skills associated with creativity allow children to use, create, refine, analyse, and evaluate a wide range of ideas in order to improve and maximise creative efforts (Trilling and Fadel, 2009). In order to prepare students to be successful in the future, school administrators and teachers must understand and prioritise opportunities that allow students to become self-directed and creative learners, capable of independent work and clear communication. Since, the behaviour of teachers can impact the creativity of their students; it is important to measure the creativity fostering ability of teachers. The objective of this research is to develop a scale to measure the teacher's creativity- nurturing behaviour.

Literature review

There is a lot of research in the area of creativity. But literature shows that the research in the area of nurturing creativity is limited and especially there is a dearth of research to measure teacher's creativity nurturing behavior (TCNB).

Creativity

In the earlier times, creativity was considered the genetic endowment of rare individuals (Galton, 1869; Terman, 1925). With the evolution of the research in the field of intelligence, creativity was considered as a construct related to intelligence but also as a unique and distinct aspect of human experience (Esquievel, 1995) which could be further developed and nurtured (Hallman, 1967; Hutchinson, 1967; Isaksen and Parnes, 1985; Rose and Lin, 1984; Torrance, 1972, 1981; Torrance and Safter, 1986; Vernon, 1989; Woodman and Schoenfeldt, 1990).

Creativity as a term is used in different contexts in different connotations (Moran, 2010; Runco, 2007; Sharma, 2015). But psychologists define creativity as a novel yet appropriate solution to a problem, or response to a situation (Amabile, 1996; Feldman *et al.*, 1994; Moran and John-Steiner, 2003; Runco, 2007; Sternberg, 1999). Creativity is a unique human trait that reflects our ability to adapt to changing circumstances and our effective cognitive abilities to combine and improve upon ideas to which we are exposed (Runco, 2007). Creativity is not purely a cognitive phenomenon associated with high intelligence, but a motivational, emotional, and intellectual approach to learning that all individuals can embrace (Cropley, 1992). Harvey (2014) posits that combination of cognitive, social, and environmental resources facilitate creativity which implies the role of the social and environmental facilitators who primarily are teachers in the context of the schools. The behaviour of the resource or a facilitator would be a deciding factor in the contribution of the creativity nurturing.

Creativity is a critical skill especially in the contemporary times. It is important for learning, life skills, career development and also for effective communication and collaboration (Bellanca and Brandt, 2010; Trilling and Fadel, 2009). Creativity is an adaptive component of life, which stimulates divergent thought processes, problem solving and applied ingenuity and ushers a path to higher achievement and feelings of personal self-efficacy (Beghetto, 2006; Moran, 2010).

Creativity is one of the key factors that drive civilisation forward (Hennessey and Amabile, 2010). Different stakeholders of society: Educators, parents, employers, and policy-makers vouch that creativity would help the mankind to address the future problems including education, health care, the environment, and the economy (Moran, 2010). The existing research opines that the society rich with creative capital leads to improved socioeconomic factors, and contributes to increased standards of living, greater personal freedom, and global equality/prosperity (Council of Canadian Academies, 2009; Manley and Lucas, 2010; Ministry of Research and Innovation, 2008; Runco, 2007). In order to reap the social and economic benefits of creative and innovative abilities, the students of today who would be the future workforce, should be encouraged to think creatively and experience the intrinsic rewards of creative behaviour.

Creativity and education

The evolution of the education field is marked by various movements which have advocated creative teaching (Treffinger, 1983).The relationship of creativity and education has been studied by few researchers (Aud *et al.*, 2007; Hennessey and Amabile, 2010; Soh, 2000). The need to focus on creativity has augmented throughout the academic fraternity across the world.

The available literature shows the linkages of creativity and the education emphasising on the importance of creativity-fostering behaviours of the educating agents (Tan and Majid, 2011; Soh, 2000; Walker, 1969; Esquievel, 1995).Several studies have shown that teachers who

encourage creativity also improve student reasoning, memory, problem solving and student engagement, all of which lead to improved learning and holistic development (Guilford, 1967; Isaksen and Treffinger, 2004; Karpova *et al.*, 2011; Moran, 2010; Torrance, 1963).

Different scholars have advocated different ways of nurturing creativity. The creative thinking abilities could be identified and nurtured through direct instruction methods (Guilford, 1967; Torrance, 1963) like an enquiry-discovery or problem solving approach which provides experiential learning to students and help in novel idea creation, and hone complementary skills such as fluency, flexibility, elaboration, and originality (Fasco, 2001). The cognitive connections developed through authentic learning situations create and strengthen divergent thinking processes and allow for building new and different problem-solving skills.

Teacher's creativity nurturing behaviour (TCNB)
TCNB has been studied by many researchers. (Aljughaiman and Mowrer-Reynolds, 2005; Bamburg, 1994; Rosenthal and Jacobson, 1968; Runco and Johnson, 2002; Saracho, 2011; Scott, 1999). Teacher's creativity fostering behaviour is considered the competence for the teaching effectiveness (Duncan, 1987; Houston, 1990; McKinnon, 1978). Effective teachers exhibit enthusiasm, empathy, dedication to students, flexibility, openness, creativity, imagination (Whitlock and DuCette's, 1989; Dacey, 1989; Torrance and Myers,1970; Stein, 1974; Mcgreevy, 1990), resourceful and willingness to "get off the beaten track" (Torrance and Myers, 1970). McGreevy (1990) added a sense of humour, a willingness to share "a personal side"; a spontaneity in the classroom. Halpin *et al.* (1990) elaborated on the TCNB and suggested open communication, a flexible and democratic classroom atmosphere and identifying individual needs and growth pattern as the required attitude towards teaching. Torrance and Safter (1990) suggested questioning, stimulating curiosity, stressing divergent thinking, experimentation, challenging constructively and presenting ambiguity as few of the TCNB activities.

To nurture creative skills, teachers should encourage student participation in activities aimed at creativity fostering and reward divergent ideas and problem solving. The teachers could provide opportunities to students, to communicate their ideas to others. The teachers must encourage unusual questions of the students by exhibiting their interest and admiration rather than by getting annoyed (Beghetto, 2010). The teachers should encourage risk-taking, self-discipline, group trust, and tolerance for ambiguity (Piirto, 2010) and also allow them to foster self-directed learning and divergent thinking skills.

Based on Zajonc (1965) social facilitation model, Cropley (1997) identifies nine behaviours of teachers who foster creativity. He states Creativity fostering teachers encourage students to learn independently and have a co-operative, socially integrative style of teaching. Such teachers considers that mastery in factual knowledge facilitate divergent thinking and give enough time to formulate ideas encouraging flexible thinking. The students are encouraged to evaluate themselves and cope up with the stress of failure. The suggestions and questions of students are taken seriously. Soh (2000) devised the measurement scale on following parameters: independence, integration, motivation, judgement, flexibility, evaluation, question, opportunities, and frustration (Soh, 2000).

Research design and methodology
The research is exploratory and data has been collected through a questionnaire. The sample was drawn from 356 school teachers in India. This study has three stages.

Stage 1. Item generation
Conceptualization. The first step of this study is to understand the TCNB. The researchers focus on different required TCNBs like freedom, assimilation, experimentation, motivation, judgement, flexibility, evaluation, question, opportunities, and frustration (Soh, 2000; Cropley, 1997).

Step II: item generation process. The item generation should be based on inductive and/ or deductive approach (Hinkin *et al.*, 1995). The deductive approach is the generation of items based on literature review. The literature broadly focusses on the following behaviours to nurture creativity: freedom of expression to student, helping in assimilation of the knowledge, ability of decision making, flexibility in assigned tasks, rationale of assessment, kindle inquisitiveness, stimulate prospect identification and ability to learn from failures rather than give-up attitude. On each of these parameters, five items were generated, adding up to 45 items.

The inductive approach to item generation has been achieved through two focussed group discussions (FGD's) of the school teachers with each group consisting eight teachers. Also the semi-structured interviews were conducted with the principals of five schools. Based on the FGD's and semi-structured interview, the items were reduced to 35.

Step III: content validity. The content validity needs to be checked before the administration of the questionnaire to avoid the irrelevance of the items (Schriesheim *et al.*, 1993). To validate the items, the 35-item questionnaire was validated by five school principals and ten school teachers. Based on the responses of the experts, the data were checked for the differences in expert opinion. The items with the agreement by 90 per cent experts were accepted for the next stage of questionnaire development. The 20 items were accepted at this stage.

Stage 2: scale construction. The 20-item questionnaire was then administered to around 500 school teachers. The responses were based on 6-point Likert scale, ranging from 1 (completely disagree) to 6 (agree completely). Higher scores indicate teacher's creativity nurturing behaviour. After accounting for invalid and blank data 356 valid responses were considered for further analysis.

Step I: respondents. Survey participants in this study were 156 male and 200 female school teachers in India. Participants were teaching in schools affiliated to the International General Certificate of Secondary Education, Indian Certificate Secondary Education, Central Board of Secondary Education, Gujarat Secondary Education Board, Rajasthan Secondary Education Board (RSEB). The sample is both from private as well as government schools including Municipal schools.

Step II: sample adequacy. The representative sample size was arrived through the conservative rule of 15 cases per item recommended for multiple regression analysis, since SEM is similar to multiple regressions (Stevens, 1996). For the current study (20-item questionnaire), sample size of 300 (20×15) would be considered as adequate. Making allowance for invalid data, the final data set was of 356 respondents. Further, for models with two or four factors, at least 100 or for better results 200 sample size is recommended while using confirmatory factor analysis (CFA) (Loehlin, 1992). In the current study, the four factor model is considered for which the considered sample size is adequate.

Step III: reliability and validity. The construct reliability of the scale is measured by cronbach's alpha and the acceptable value of the Cronbach α is 0.7 or more (Nunnally, 1978). The Cronbach's α of all the four factors is more than 0.7, indicating the reliability of the scale. (Table I) The overall Cronbach's α is 0.846. The convergent validity is measured by Composite reliability (CR) and the average variance extracted (AVE). Each construct's AVE is larger than 0.5 and each construct's CR is larger than 0.7 which are the acceptable values

Factor	CR	AVE	MSV	ASV	Cronbach's α
1	0.82	0.48	0.44	0.371	0.80
2	0.837	0.638	0.44	0.302	0.72
3	0.813	0.603	0.40	0.284	0.72
4	0.855	0.615	0.27	0.198	0.72

Table I.
Reliability and
validity of the
constructs

for AVE and CR, respectively (Fornell and Larcker, 1981). Subsequently, we can confirm that the items measure just one construct and the convergent validity of a model is satisfied.

The discriminant validity is the extent to which measures of a given construct differ from measures of other constructs in the same model (Barclay *et al.*, 1995; Hair *et al.*, 2010). The AVE of all constructs is more than maximum shared variance (MSV) and Average Shared Variance (ASV), exhibiting the discriminant validity of the constructs (Table I).

Stage 3: Scale evaluation. Exploratory Factor Analysis (EFA) using SPSS 21.0 software was conducted on the data obtained through the responses of 20-item questionnaire. EFA suggested four factors for model and reduction of items to 15. To confirm the factor structure CFA (CFA) was performed on 15 items. Structural Equation Modelling software AMOS 7.0 was used to perform the CFA.

Results and analysis

Exploratory factor analysis

The principal component analysis (PCA) was conducted on the data gathered on the 20 items. Kaiser-Meyer Olkin (KMO) and Barlett's test of sphericity was calculated to assess the adequacy of the data for EFA. KMO = 0.80 and Bartlett's test of sphericity = 649.67 (df = 105, $p = 0.000$) which shows the adequacy of the data. Costello and Osborne (2005) suggests that the items with loading of 0.5 or more are considered strong, though in social sciences, the items with loading of 0.4 can also be considered. Five items of the 15 items had loadings less than 0.50, so the items were dropped. PCA suggested five factors but two factors with only two items were also dropped for further study, as the factors with three or more items should only be considered as separate factor (Costello and Osborne, 2005).

The four factors having eigen value greater than 1 accounted for 61.7 percentage of total variance. The first factor accounted for 33.3 per cent variance; second factor explained 11.26 per cent variance; the third factor added 9.56 percentages and finally the last factor accounted for 7.42 per cent of the total variance. The results of the initial factor analysis are given in the list given below.

20 items scale:

(1) I question the students' ideas, to ponder them to explore it further.

(2) To develop critical thinking, I enquire students about their idea.

(3) I keep track of the progress in the students' ideas.

(4) I give heed to every student's query.

(5) I give students the opportunity to share their ideas and thoughts.

(6) I regularly give group assignments as part of the pedagogy.

(7) The students have opportunity to share their ideas and suggestions during the class.

(8) The students are expected to work cooperatively in group.

(9) I provide opportunity to students to evaluate and judge themselves.

(10) I motivate students to apply the teachings in different contexts.

(11) I reinforce the students' behaviour to apply their learning in different contexts.

(12) The students are motivated to apply their learning in different situations.

(13) I am open to listening to the distressed students.

(14) I counsel students who fail in the task, to boost their morale.

(15) I support students to learn from their failures.

(16) I encourage students to learn the basics of the topic.

(17) I lay emphasis on the proficient learning of essential knowledge and skills.

(18) Before sharing my viewpoint on the student's idea, I urge them to explore it further.

(19) I don't react immediately to the suggestions of the students rather give them time.

(20) I don't force students to strictly adhere to the directions.

Notes: Extraction method: PCA. Rotation method: Varimax.

The 15 items and four factor structure that emerged was labelled – inquisitiveness, abstraction, critical thinking and motivation (Table II). In view of the satisfactory results of the EFA, CFA was undertaken for the four latent and 15 observed variables. The TCNB is a 15-item self-rating scale that contains three theoretically distinct subscales (Table III). Questions are scored using a six-point Likert scale, ranging from 1 (completely disagree) to 6 (agree completely). Higher scores indicate teachers'creativity nurturing behaviour.

Confirmatory factor analysis
The three factors with adequate loadings obtained through the PCA were assessed through a CFA, using AMOS 7.0, to test the goodness of model fit shown in Figure 1.

Factor	Factor label	Description
1.	Abstraction	Ability to provide opportunity to the student to explore his/her idea
2.	Inquisitiveness	Ability to encourage student to question to understand the concept and thoughts
3.	Motivation	Ability to boost the morale of the student and encourage learning from failures rather than to develop give-up attitude
4.	Critical Thinking	Ability to stimulate objective analysis and evaluation of an issue in order to form a judgement

Table II.
Description of the factors

Items	Means	SD	Estimate
Factor 1: abstraction			
I regularly give group assignments as part of the pedagogy	4.89	1.35	0.630
The students have opportunity to share their ideas and suggestions during the class	4.96	1.13	0.633
The students are expected to work cooperatively in group	4.78	1.18	0.778
I question the students' ideas, to ponder them to explore it further	4.88	1.136	0.769
I do not react immediately to the suggestions of the students rather give them time	4.72	1.154	0.597
Factor 2: inquisitiveness			
I keep track of the progress in the students' ideas	5.46	0.751	0.767
I give heed to every student's query	5.19	0.903	0.842
I give students the opportunity to share their ideas and thoughts	5.36	0.990	0.583
Factor 3: motivation			
I encourage students to learn the basics of the topic	5.10	0.990	0.753
I lay emphasis on the proficient learning of essential knowledge and skills	5.44	0.847	0.567
I am open to listening to the distressed students	5.38	0.971	0.743
Factor 4: critical thinking			
I motivate students to apply the teachings in different contexts	5.19	1.071	0.684
The students are motivated to apply their learning in different situations	5.31	0.971	0.670
To develop critical thinking, I enquire students about their idea	4.72	1.184	0.507
I provide opportunity to students to evaluate and judge themselves	4.39	1.256	0.663

Table III.
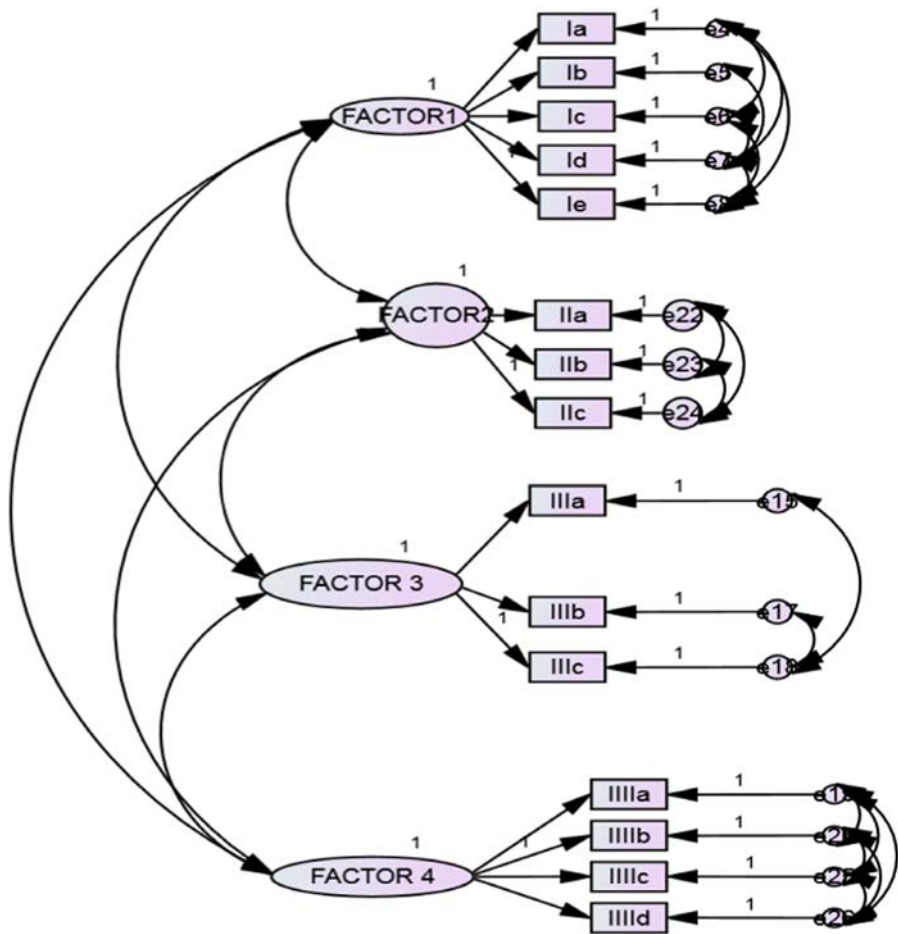15-item scale, means, SD and estimate

www.

Figure 1.
Model fit

Model fit. The output of the AMOS showed a χ^2 value of 195.54, with 70 degrees of freedom and significance level of $p = 0.000$ thereby indicating an initial moderately good fit of the data to the hypothesised model. According to several researchers, χ^2 value has limitations (Bentler and Bonnet, 1980) and therefore other alternative indices should also be checked for a good model fit (Hooper *et al.*, 2008).

Squared root mean residual (SRMR) = 0.14; Comparative Fit Index (CFI) = 0.80; CMIN (χ^2/degrees of freedom) = 3.43, Good Fit Index (GFI) = 0.80; Tucker and Lewis index (TLI) = 0.69; Incremental Fit Index (IFI) = 0.75; Relative Fit Index (RFI) = 0.73 and root mean square error of approximation (RMSEA) = 0.11. The Modification Indices table reflected the high variances in the error term which is free. So, to attain model fit, these free parameters were fixed (Schreiber *et al.*, 2006) which drastically improved the indices of model fit showing the good fit of the model.

The improved model fit indices for the hypothesised model were: SRMR = 0.08; CFI = 0.84; CMIN = 2.79, GFI = 0.84; TLI = 0.80; IFI = 0.82; RFI = 0.83 and RMSEA = 0.09. The fit indices values indicate a good model fit of the measurement model and the data (Byrne, 2001) and the uni-dimensionality of the factors can be established (Anderson and Gerbing, 1988).

Convergent validity
As per Anderson and Gerbing (1988), the significance of the path estimates between the items used for the measurement model and their respective latent construct was an indication of the convergent validity of the model. The AMOS output reflected significant standardized estimates of all the measurement items (Table IV). A significant value of each of the items supports the convergent validity of the scale.

CR > AVE and AVE is 0.5 or more for all the constructs, reflecting convergent validity of the scale (Table I).

Discriminant validity
As per Fornell and Larcker (1981) testing system, discriminant validity can be assessed by comparing the amount of average variance captured by the constructs (Table I) with the inter-construct squared correlations (Table IV). The results show that the AVE values are greater than MSV and ASV involving the constructs and thus supporting the discriminant validity.

Composite reliability
Tucker and Lewis (1973) developed the reliability measure for maximum likelihood therefore for the purpose of current study the CR of the scale was measured. The CR of the present scale using the Raykov (1997), method was 0.82 which reflects a healthy overall value of the scale.

Discussion and implications
"Systematic, sustained and concerted action is required to significantly enhance the creative and innovative capacities of young people in ways that are relevant to employability" Expert Group (2014). The increasing unemployment rate of even the students with the professional degrees, is an evidence towards the lack of required skill set in these graduates (Chappar, 2017). Creativity is ranked in top three skill sets of the employable workforce (Batey, 2011; Dempsey, 2010) and hence to be successful as the future working professionals, creativity would be the critical skill for today's school students (Bellanca and Brandt, 2010; Trilling and Fadel, 2009; Wagner, 2012). Trilling and Fadel (2009) posit that the creativity would develop abstraction and critical thinking amongst the children and to develop this the social and contextual factors play an important role which builds the strong case for the teachers to have creativity nurturing behaviour to usher the path of the students (Esquievel, 1995). Hence to develop the human capital for future, its crucial to understand, if the teachers are equipped with the right behaviour to nurture creativity amongst the students. The current study has identified the constructs of TCNB and developed the scale to measure this behaviour. The scale has 15 items under the following four constructs: critical thinking, abstraction, inquisitiveness and motivation. The behaviour that develops critical thinking is required to stimulate objective analysis and evaluation of an issue in order to form a judgement. The four items like "The students are motivated to apply their learning in different situations" are developed to analyse the

	Estimate	Squared correlation estimates
Factor 1 ↔ factor 5	0.520	0.270
Factor 1 ↔ factor 4	0.635	0.403
Factor 4 ↔ factor 2	0.554	0.306
Factor 5 ↔ factor 2	0.418	0.174
Factor 4 ↔ factor 5	0.395	0.156
Factor 1 ↔ factor 2	0.664	0.440

Table IV.
Inter-construct
correlations

"critical thinking" stimulating behaviour. The five items like "I question the students' ideas, to ponder them to explore it further" measures the ability of teacher to encourage "abstraction", which helps the student to explore their ideas. The ability to "motivate" students is measured through three items like "I lay emphasis on the proficient learning of essential knowledge and skills", which boost the morale of the students and also develop the instinct to learn from the failures, rather than giving-up. The three items like "I give heed to every student's query" measures the ability to develop "inquisitiveness". The sample rates high on "Inquisitiveness" and "Motivation" but needs to be trained for "abstraction" and "critical thinking". The teachers can be measured for all the four constructs and the TCNB with higher value is considered to possess TCNB. The future research should be focussed on understanding the teachers' perception about creativity and also to address an important factor of the "School Environment" and identify the enablers and the inhibitors for the creativity nurturing amongst the school students.

Implications
The scale can be used for the skill development training need analysis of the school teachers. The construct where the respondent scores low, should be the "area of improvement" and then "learning and development" plan should be laid down, to focus on the development of the teachers. The psychosocial training can be conducted to develop "self-efficacy" (Cicotto *et al*, 2014) among school teachers to modify their behaviour to change it to "creativity nurturing behaviour". The training workshop could be the consequential process of the scale measurement.

Conclusion
The creativity is a byzantine and poorly defined construct that encompasses a wide range of behaviours, skills, and ideas. The measurement of such behaviours facilitate in identifying the competency gap to achieve the task of "developing creative workforce". Teachers' creativity Nurturing Behaviour, act as catalyst in the development of the creative pupil. Hence, the TCNB measurement scale would help in identifying the gap in teachers' behaviour, which could be bridged by imparting training to the teachers. Hence it could help in achievement of the horrendous task of "Nurturing creativity" among the school students and prepare them to contribute towards the economic development and growth.

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