

CREATIVE TEACHING AND ITS ASSESSMENT

Ananda Kumar Palaniappan
Faculty of Education, University of Malaya,
Kuala Lumpur, MALAYSIA
anandak@um.edu.my

Abstract

In recent years, there has been much emphasis and motivation for teaching both at the secondary school and tertiary level to move from the traditional 'chalk and talk' to a more creative and innovative teaching methodology. The Malaysian Education Ministry has initiated many training programs as well as curricular and evaluation changes to initiate this change which also included critical thinking. Various policies have been formulated together with huge investments on infrastructure and funding to accelerate this change. Hence, it is imperative to evaluate to what extent creative teaching has actually being carried out. In order to do this, it is vital to have a valid and reliable measure of creative teaching. This paper aims to first present the various components of creative teaching as theorized and reported in literature. Based on significant findings and factors gleaned from these reviews a creative teaching inventory was designed This instrument was tested for its reliability and validity. Secondly, this paper aims to discuss the issues and factors influencing the implementation of creative teaching in the classroom. Among them are the issues relating to creative teaching and learning which involve not only the pedagogical aspect but also the content and the learning processes. Teacher and student variables, such as attitude and perception were also found to be significant in determining the efficacy of creative teaching. The findings from internal reliability tests based on data from secondary school teachers indicate that this inventory is a stable measure of creative teaching. Factor analyses provide the empirical support for the validity of this instrument. However, it is suggested that further investigations using teachers at other levels of education may throw more light on the validity and reliability of this instrument and the findings. Pedagogical, curricular and policy implications based on the findings are also discussed.

Introduction

If recent newspaper reports are anything to go by, it can be said that there has been an increasing number of discipline problems in schools which have been attributed to the teaching and learning processes, the curriculum and the school environment including peer pressure. Teachers as well as students are becoming more and more disillusioned by the teaching and learning processes that are often dictated by policies and authorities that seldom take into account the need for creativity in making education more interesting and motivating. Students' say in these important processes designed for them and involving them appears to become increasingly insignificant. Most of the teaching and the learning processes and activities that take place have already been predetermined by the policy makers and the curriculum and teachers merely act as managers, executing what has been laid down for them. Teachers have often clamored to be given the freedom to choose what, how and when they should teach the skills dictated by the authorities. They feel that they need the freedom to choose their way of teaching instead of being told how. If given the opportunity to teach creatively without any constraints, they feel they will be able to help alleviate some of the disciplinary problems facing schools and help enhance students' creativity and curiosity in the process (The liberal Art of Science, 1990).

Given the importance of creative teaching, the need for conceptualizing and researching creative teaching has often been raised in intellectual discussions in conferences and seminars. Most of the articles reviewed indicate that creative teaching has been seen as a way of minimizing disciplinary problems in schools by making lessons more interesting. This paper intends to discuss a model of creative teaching which is currently being used in workshops designed for teachers and trainers in Malaysian schools and universities. Using this model, an instrument is designed to assess creative teaching. This paper reports the validity and reliability of this instrument as well as the level of creative teaching found among a randomly selected sample of secondary school teachers.

Creative Teaching

Creative teaching has been variously defined. Most of the definitions have focused on teaching creativity, i.e. teaching creative thinking with the aim of enhancing creative thinking skills among students. There is another aspect of creative teaching that has been neglected in the definition of creative teaching, i.e. teaching creatively. This paper intends to present a model of creative teaching that comprises teaching creatively and teaching creativity.

For the purpose of this study, teaching creatively is defined as a process of incorporating creative processes and components of creativity in the teaching process. It also incorporates the teachers' creative personality characteristics and creative thinking processes which he or she uses to design the instruction strategies to enhance learning and motivate the students. An example of creative teaching would be when a creative music

teacher uses several tape recorders to teach the developmental section of Beethoven's 'Eroica' which students have found difficult to understand. (Rubin, 1985).

Teaching creativity is defined as a process of designing and strategizing instruction in such a way so as to facilitate thinking skills especially creative thinking skills among students. For example, teachers teaching creativity to enhance originality in thinking in a language class may ask students to develop a new ending for a favorite story or rewrite an ending to a story they know.

Based on the above interpretation of creative teaching, a model of creative teaching is proposed. It looks at creative and innovative teaching from a systems point of view. This holistic approach will enable teachers and trainers to ensure the success of the model in not only assessing creative teaching but also factors that impact on creative teaching.

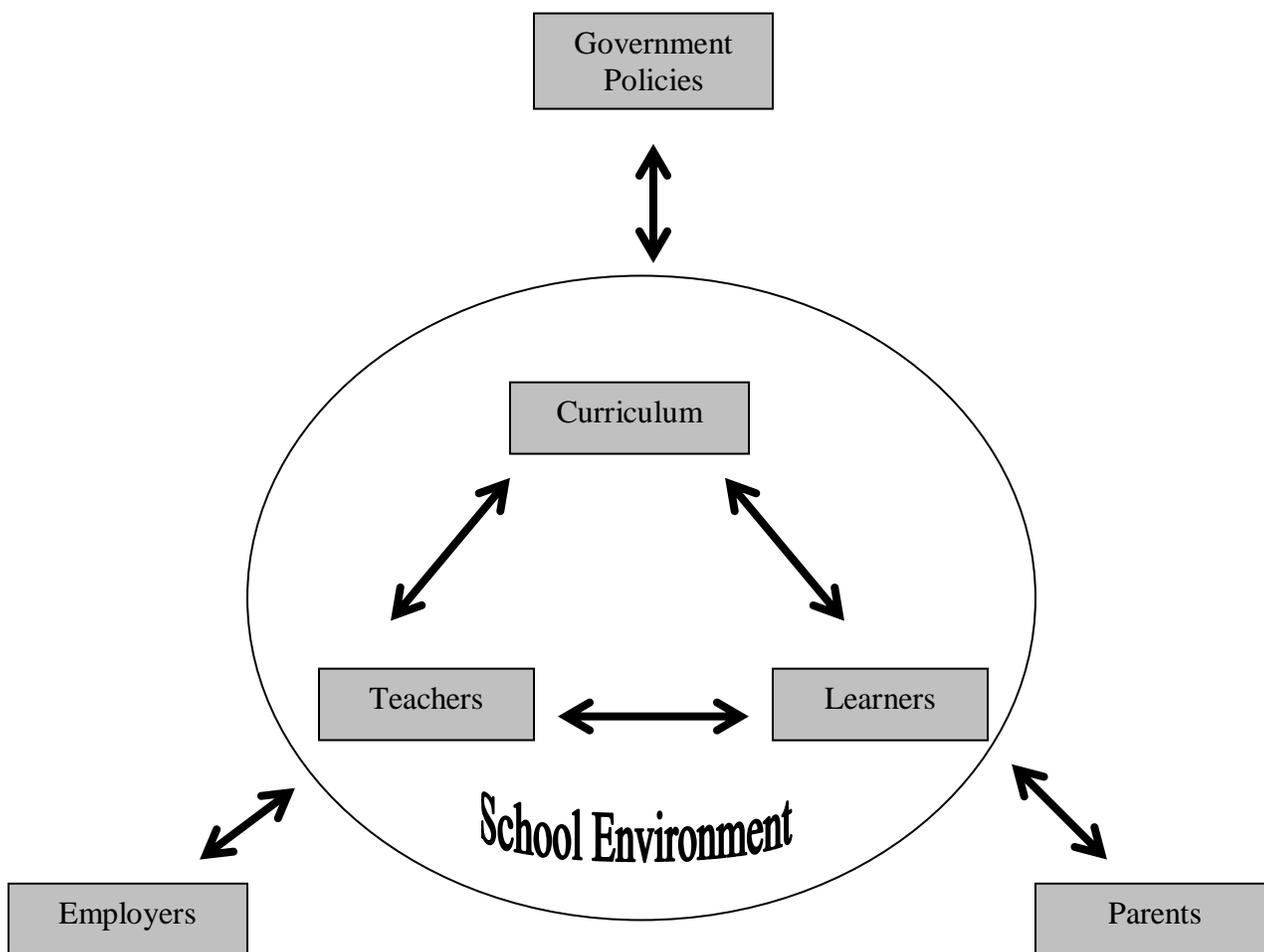


Figure 1: A Systems View Model for Creative Teaching (Palaniappan, 2004)

In the systems view of creative teaching (Figure 1), for creative teaching to take place, it is crucial that all significant factors affecting creative teaching are taken into account when designing the creative teaching and learning process. These significant factors can be categorized as those within the school environment and those outside the school environment. Significant factors within the school environment include the learners, teachers and the curriculum. The success of any creative teaching strategy depends on the characteristics of the learners which includes among others the learners' creative personality characteristics, creative motivation and creativity.

The teacher variable is crucial in creative teaching. Many factors relating to the teacher determines whether creative teaching will take place or not. Among them are teacher's level of motivation towards teaching creativity and creatively, teachers' own level of creativity, and teachers' pedagogical experiences.

The curriculum plays an equally important role. It should set the stage for creative teaching to take place. There should be a deliberate attempt to provide for the presentation of content creatively and also to enhance the creativity of the students. This forms a two prong approach to curriculum design that is vital for creative teaching. For example, the curriculum should provide for innovative pedagogical approaches for teachers to use their own creativity and explore other strategies to present material and elicit students' creative responses and interaction.

All three factors mentioned above depend on the school environment. The school environment encompasses other teachers and colleagues, the principal, and other students as well as the policies governing the day to day running of the school and infrastructure of the school made available to the teachers and students. For example, support from other teachers form a valuable source of creative energy for the teacher. A supportive principal who is willing to allow teachers to try unconventional teaching methods is also crucial. Creative students also provide the creative climate that teachers and other students need to grow creatively. Students grouping together to think of an easier way to raise funds for a good cause or design a new way to build an intelligent traffic system for the local town council are just some of the creative activities that can be organized.

Among the factors outside the school environment vital for enabling creative teaching to occur in school are the parents, government policies, the future employers and the industry demands on the schools. Parents play a vital role in creative teaching. Teachers wishing to take students on field trips which expose students to a multitude of stimuli crucial for creative thinking to take place would need the support of parents.

Government policies relating to education especially in the area of curriculum development and reference text for teachers and textbooks for students play an equally important role. Teachers may not be motivated to teach creatively if they are constrained by the curriculum and the strict policies regarding testing and evaluation. Research has shown that rigorous testing may kill students' creativity as students will be focusing more on studying for

examinations rather than reflecting and exploring the world around them purposefully for the benefit of society.

The needs of employers or industry determine what is emphasized in schools especially in schools which are industry oriented. Generally, employees seek creative and innovative individuals. Hence, the government and schools are duty bound to produce employees who are creative and innovative. For example, if IT companies need employees who are able to foresee future software and hardware needs and design software and hardware that are innovative, they will seek out and employ creative individuals.

Components of Creativity

It is vital to understand that there is no one definition of creativity that is able to encompass all ideas and findings about what creativity is. It has taken on different meanings to different people. To the musicians, it is the production of some hitherto unheard of, yet appealing, music and to artists, it is the depiction of an unusual mood or story via colors and figures. To the physicists, it may be an original and useful invention or discovery like Einstein's theory of relativity. However, these different versions of creativity indicate an underlying fact: creativity includes among other things, the production of clever, original and useful ideas.

Rhodes (1961) classified the myriad of definitions of creativity into four categories, namely, 1) Process, 2) Person, 3) Press and 4) Products. "Process" definitions mainly describe the stages of creative processes working in the psyche of the creator. It refers to the behavior directed towards creative achievement. "Person" definitions refer to the potential for creative achievement in which creativity is seen as a set of characteristics of the person. "Product" definitions refer to the end product where manifestations of a person's creativity is located. "Press" definitions refer to the environmental conditions that are necessary for creative activities. It can be seen that creative teaching can also be looked at based on this classification of creativity (Figure 2).

The process by which creative people think has been said to occur in many different ways. One of the earliest ideas was proposed by a German physiologist and physicist, Herman Helmholtz whose work was reported in a book by Graham Wallas (1926) entitled *The Art of Thought*. Four stages of creative process were suggested: Preparation, Incubation, Inspiration (Illumination) and Verification. The preparation step involves observing, listening, asking, reading, collecting, comparing, contrasting, analyzing and relating all kinds of objects and information. The incubation step is both conscious and unconscious, involving thinking about parts, relationships and reasoning. Inspiration or Illumination appears during the fallow period following incubation where tensions are released so that one can be creative. Verification is a period of hard work which involves converting an idea into an object.

Creative Thinking Skills

J. P. Guilford, E. P. Torrance, J. W. Getzels, P. W. Jackson, C. W. Taylor, K. Yamamoto and D. W. MacKinnon are some of the foremost researchers of creativity. Of particular importance are the ideas of Guilford (1959) and Torrance (1962) which are widely used even today. Guilford (1959) hypothesized four creative thinking abilities, namely, Originality, Fluency, Flexibility and Elaboration based on his Structure of Intellect model.

Originality is the ability to produce uncommon responses, usual or unconventional associations. Fluency is the ability to produce a variety of ideas or hypotheses concerning possible solutions to problems; Flexibility is the ability to adapt to changing instructions, to be free from inertia of thought and to use a variety of approaches and Elaboration is the ability to fill out ideas with details.

Creative Teaching Model

Based on Rhodes (1961) classification of creativity and the various divergent thinking dimensions of Guilford (1959), a creative teaching model was designed. Product and the process components of the creative thinking model involve all four divergent thinking dimensions as shown (Figure 2).

The **Product** component of creative teaching can be seen in terms of originality, fluency, flexibility and elaboration. The example of the teaching approach in music described above can be considered an original product of creative teaching. The teaching strategies or methods or the material developed by the teachers is indicative of the product fluency while the different strategies or methods or materials developed is considered as reflecting the flexibility of the product component of creative teaching. Elaboration in creative teaching product refers to the embellishment of the strategies, methods or materials developed by the teacher.

Similarly, the **Process** dimension of creative teaching can also be looked as the cognitive processes that goes on in the minds of creative teachers in their teaching process which encompasses the pre-teaching planning, teaching and the post-teaching activities. Teachers who are original tend to think in unusual ways to modify the existing methods or materials or create entirely new ones. Teachers who are fluent are always able to generate a multitude of ideas in a short span of time to come up with methods or materials for effective teaching. Flexible teachers tend to come up with ideas that are very different while teachers who are elaborative have a tendency to think of ways to add on ideas or embellish existing methods or materials to increase the motivation of the students and enhance learning.

The **Person** component of creative teaching refers to the personality aspect of teachers. Teachers who are inquisitive, have high level of initiative, take risks and are non-conformist tend to be very creative and innovative in their teaching. Studies have shown that teachers who have high creative perception as measured by Khatena-Torrance Creative Perception Inventory (Khatena & Torrance, 1976ab) tend to teach creatively.

The **Press** component of creative teaching refers to the environment and the infrastructure that aid creative teaching. This refers to the support teachers get from their principal and fellow colleagues as well as the students in their efforts in creative teaching.

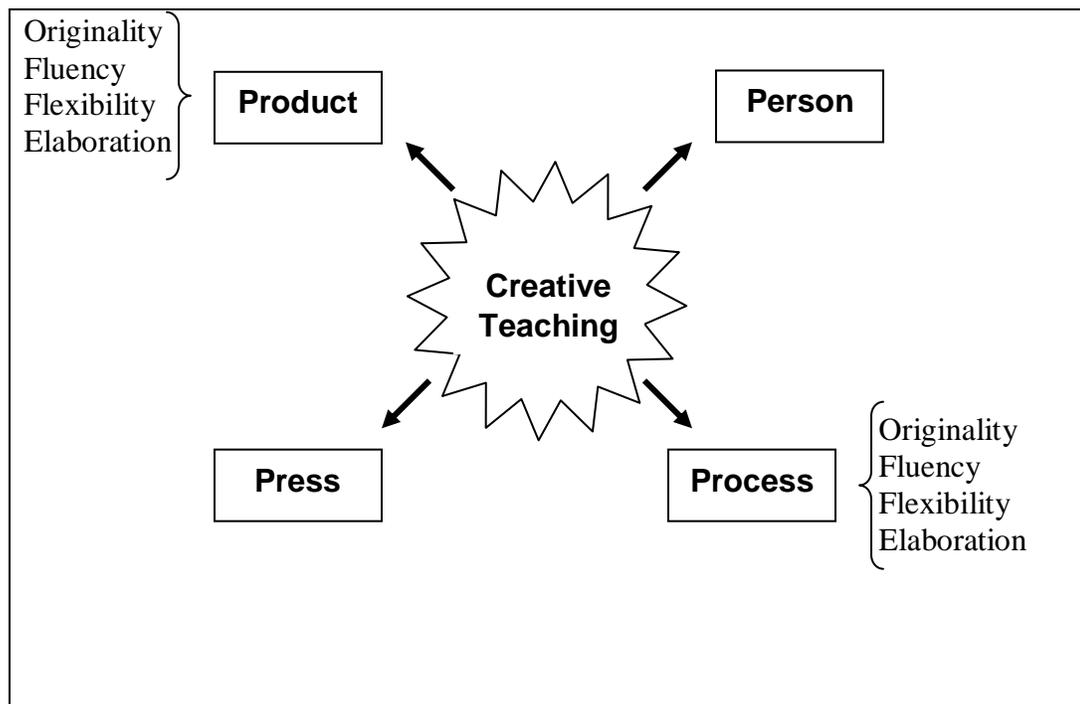


Figure 2: Creative Teaching Model (Palaniappan, 2004)

Teaching Creativity

The other dimension of creative teaching is teaching creativity, where teachers have expert knowledge what creativity is, and are able to design lessons, activities and evaluations that enhance the students' creativity effectively. Several studies have been undertaken to ascertain to what extent creative teachers have been able to enhance the level of creativity of students through their teaching and designing of special learning events. A checklist (Table 1) based on the creative teaching model (Figure 1) is currently being tested in an on-going research to ascertain its ability to evaluate the level of creative teaching undertaken by a teacher.

Table 1
Creative Teaching Checklist (Palaniappan, 2004)

	PROCESS				PRODUCT				PERSON	PRESS
	OR	FL	FX	EL	OR	FL	FX	EL		
TEACHING CREATIVELY										
TEACHING CREATIVITY										

OR- Originality FL – Fluency FX – Flexibility EL - Elaboration

The two components of creative teaching, teaching creatively and teaching creativity, are evaluated based on the four dimensions of creativity, namely, Process, Product, Person and Press. Process and Product component are evaluated based on the four dimensions of creative thinking, namely, Originality, Fluency, Flexibility and Elaboration.

Methodology

The first part of this study involved the generation of the conceptual model for creative teaching based on a comprehensive literature review. Based on the model, items were constructed that tapped into the essence of the various components of creative teaching. This instrument was then pilot tested and its validity and reliability ascertained.

The second part of the study employed the survey research design to collect the relevant data to assess the level of creative teaching undertaken in schools.

Sample

Sample comprised 78 teachers chosen randomly from a population teachers in more than 100 secondary schools in the Klang valley in Selangor, a state in Malaysia. The teachers' ages were equally distributed in the three age groups: 22 (less than 29 years), 24 (from 30 to 39 years) and 27 (age 40 and above); 5 teachers did not disclose their ages. There were 39 male and female teachers. 67.9% of them were graduates. About 55% of them have less than 10 years of teaching experience, 35% of them 11 – 20 years and the rest have more than 20 years of teaching experience. About 43 % of the teachers teach Math and Science

subjects while the rest teach the Bahasa Malaysia, the national language of Malaysia, English, Geography and History.

Instruments

The validated and reliable instrument called the Creative Teaching Inventory (CTI) comprising 25 five-point likert scale items was then administered to these randomly selected teachers and the responses scored for the overall score of creative teaching and the individual factor scores obtained from Factor Analysis. Nine items (items 2, 5, 8, 10, 12, 15, 17, 20 and 21) which were negatively phrased were reversed scored and the total score was the sum of all 25 items.

Results

Validity and Reliability Analysis

The data obtained from the 78 secondary school teachers were subjected the Factor Analysis to ascertain the construct validity of the instrument and also correlated with another instrument assessing Creative Perception to ascertain the criterion-related validity. Item Analyses were undertaken to obtain the overall Cronbach Alpha as well the internal reliabilities of the various factors. Tables 2 and 3 and Figure 3 shows the results of the Factor Analyses. The factor analysis indicate that the Kaiser-Meyer-Olken Measure of sampling adequacy is .78 which is higher than .60. This indicates that the variables are factorizable. The Bartlett's test of sphericity is significant at $p < .05$. This indicates that the items are related and therefore factorizable.

Table 2
Sampling Adequacy and Test of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.783
Bartlett's Test of Sphericity	Approx. Chi-Square	1082.012
	df	300
	Sig.	.000

The scree plot shown in Figure 3 indicates that there are at least 6 factors with an eigenvalue that is greater than 1. This is also indicated in Table 3. Assigning of the items to the various factors shown in Table 3 indicates that Factor 6 has only one item. Hence, Factor 6 is not included in further analysis.

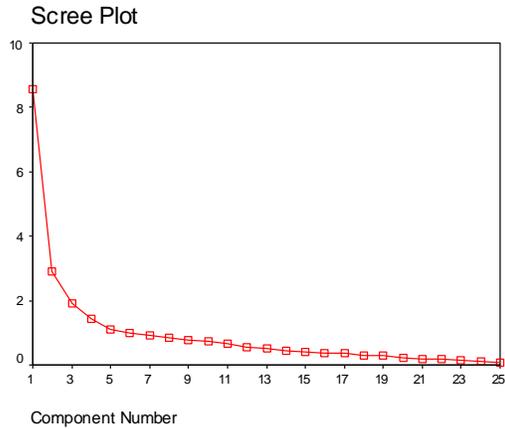


Figure 3
Scree plot of Factor Analysis of CTI

Table 3
Varimax Rotated Components Matrix

	Rotated Component Matrix					
	Component					
	1	2	3	4	5	6
V1	.639					.364
V2						-.656
V3	.574	.560				
V4	.596	.529				
V5		.374			.472	.361
V6		.619		.336	.422	
V7	.455	.398				.318
V8			.311		.787	
V9		.757				
V10			.807			
V11	.747					
V12			.524		.602	
V13		.690				
V14		.697				.303
V15			.789			
V16	.554	.542				
V17			.704			-.382
V18	.582	.513				
V19	.588					
V20				.736		
V21	.338			.743		
V22	.775					
V23	.815					
V24	.771					
V25	.669		-.327	.388		

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 21 iterations.

Table 4
Factor Analysis of Creative Teaching Inventory

Factor	Items No	Items	No of Items	Factor Loadings	Cronbach Alpha
1 Innovative	1	<i>My students look forward to my class.</i>	12	5.59	.92
	3	<i>I always like to use different approaches for the same topic.</i>			
	4	<i>I like to use different ideas.</i>			
	7	<i>I can easily find replacement for things that are insufficient.</i>			
	11	<i>I like to organize activities that have never been undertaken.</i>			
	16	<i>I like to find new ways to teach a difficult topic to enhance students' understanding</i>			
	18	<i>I like to find new ways to make my students understand what has been taught.</i>			
	19	<i>I like to teach my classes.</i>			
	22	<i>I like to try to use new teaching approaches.</i>			
	23	<i>I like to search for new ways to entertain my students.</i>			
	24	<i>I always look forward to teach my classes.</i>			
25	<i>I like to get new things for my students to think about.</i>				
2 Spontaneous	6	<i>I get ideas spontaneously when I am teaching.</i>	4	3.85	.78
	9	<i>I can give spontaneous examples to enhance students' understanding.</i>			
	13	<i>I like relating what has been taught to everyday examples.</i>			
	14	<i>There are many ways of a teaching and learning.</i>			
3 Dedication	10	<i>I prefer students who give answers that are found in the recommended text books.</i>	3	2.63	.81
	15	<i>I do not have time to think about new approaches.</i>			
	17	<i>It is difficult to incorporate innovative in teaching and at the same complete the syllabus.</i>			
4 Unsatisfied	20	<i>I like to use the usual methods to teach.</i>	2	1.77	.56
	21	<i>I am satisfied with the way I teach.</i>			
5 Adventurous	5	<i>It is good to use approaches that we know will succeed.</i>	3	1.70	.65
	8	<i>Students who give weird ideas waste valuable teaching time.</i>			
	12	<i>It is difficult to use examples that are unique.</i>			

Overall internal reliability of CTI, Cronbach Alpha = .80

Factor analyses provide the empirical support for the construct validity of this instrument. Initially 6 factors were identified. However, the last factor had only 1 item (Item 2) and was not analyzed in subsequent analyses. The factors identified were named based on the items within these factors. They were Innovative (12 items), Spontaneous (4 items), Dedication (3 items), Unsatisfied (2 items) and Adventurous (3 items). The Innovative Factor has the highest loadings of 5.59 while the Adventurous Factor has the lowest loading of 1.70.

Criterion related validity

The scores obtained were correlated with the criterion Creative Perception as assessed using the Khatena-Torrance Creative Perception Inventory (Khatena & Torrance, 1998). Table 5 shows the results of these correlational analyses between Creative Teaching as measured by CTI and subscale of KTCPI, Something About Myself (SAM).. The results indicate that Creative Teaching scores are significantly correlated to creative personality factors such as Initiative, Self-strength and Intellectuality. Although the overall score of Creative Teaching did not correlate significantly with SAM but the main factor score of CTI, Innovative is significantly correlated with SAM, Initiative, Self-strength and Artistry. Generally, most of the factor scores appear to be related to Initiative, Self-strength and Artistry.

Table 5
Correlations between Creative Teaching and Creative Perception (SAM)

		CRETEACH	INNOVATI	SPONTANE	DEDICATI	UNSATISF	NEWAPP
SOMETHING ABOUT MYSELF	Pearson Correlation	.201	.283*	.098	-.042	.086	-.050
	Sig. (2-tailed)	.078	.012	.392	.714	.455	.667
Environmental Sensitivity	Pearson Correlation	.008	.054	-.003	-.103	.017	-.023
	Sig. (2-tailed)	.941	.638	.980	.370	.880	.844
Initiative	Pearson Correlation	.284*	.462**	.296**	-.066	-.284*	-.124
	Sig. (2-tailed)	.012	.000	.009	.565	.012	.280
Self-Strength	Pearson Correlation	.379**	.308**	.120	.347**	.027	.213
	Sig. (2-tailed)	.001	.006	.297	.002	.815	.061
Intellectuality	Pearson Correlation	.263*	.162	.097	.248*	.115	.177
	Sig. (2-tailed)	.020	.156	.398	.028	.316	.121
Individuality	Pearson Correlation	.191	.186	-.061	.219	.000	.095
	Sig. (2-tailed)	.093	.102	.598	.054	1.000	.408
Artistry	Pearson Correlation	.165	.276*	.224*	.045	-.290*	-.140
	Sig. (2-tailed)	.149	.014	.048	.694	.010	.221

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

CRETEACH – Creative Teaching

SPONTANE – Spontaneous

UNSATISF – Unsatisfied

INNOVATI – Innovative

DEDICATI – Dedication

NEWAPP - Adventurous

Table 6 shows the correlations between Creative Teaching and the other subscale of KTCPI, What Kind of Person Are You? (WKOPAY). Creative Teaching scores were found to be significantly correlated with two creative personality characteristics, namely, Inquisitiveness and Awareness of Others. Although Creative Teaching scores do not significantly correlate with WKOPAY, a creative personality measure, but its main factor score, Innovative is significantly correlated to WKOPAY and Inquisitiveness. Generally, most of the factor scores of CTI appear to significantly correlated with WKOPAY, Inquisitiveness and Awareness of Others.

Table 6
Correlations between Creative Teaching and Creative Perception (WKOPAY)

		CRETEACH	INNOVATI	SPONTANE	DEDICATI	UNSATISF	NEWAPP
WHAT KIND OF PERSON ARE YOU	Pearson Correlation	.096	.333**	.255*	-.137	-.222	-.409**
	Sig. (2-tailed)	.403	.003	.024	.231	.050	.000
Acceptance of Authority	Pearson Correlation	.040	.091	.155	.001	-.188	-.129
	Sig. (2-tailed)	.729	.427	.176	.994	.100	.261
Self-Confidence	Pearson Correlation	.221	.081	.022	.268*	.180	.220
	Sig. (2-tailed)	.051	.482	.849	.018	.115	.053
Inquisitiveness	Pearson Correlation	.415**	.449**	.327**	.199	-.197	-.008
	Sig. (2-tailed)	.000	.000	.003	.081	.084	.943
Awareness of Others	Pearson Correlation	.303**	.185	.076	.241*	.085	.240*
	Sig. (2-tailed)	.007	.106	.506	.034	.458	.034

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

CRETEACH – Creative Teaching
SPONTANE – Spontaneous
UNSATISF – Unsatisfied

INNOVATI – Innovative
DEDICATI – Dedication
NEWAPP - Adventurous

The Cronbach Alpha values obtained from internal reliability / consistency analyses indicate that the overall inventory has a high internal reliability or consistency of .80. Table 3 shows the Innovative factor has the highest internal consistency of .92, followed by the Dedication Factor (.81), Spontaneous Factor (.78), Adventurous Factor (.65) and Unsatisfied Factor (.56). Hence, Innovative, Dedication and Spontaneous Factors have high internal reliabilities while the Adventurous and Unsatisfied Factors have moderate internal consistencies. Hence, these factors can be used in the assessment of creative teaching.

To ascertain the nature of Creative Teaching and its Factors employed by the randomly selected teachers, descriptive analyses were undertaken. Table 7 shows the means, SDs, minimum, maximum and the percentile scores obtained by these teachers. Figure 4 shows that the distribution of Creative Teaching scores is normal. The 75th percentile score for Creative Teaching (101.25) can be used as the cut-off point for further interpretation of teaching engaging in Creative Teaching. Similar the 75th percentile score of 56 for

Innovative, 19 for Spontaneity, 12 for Dedication, 5 for Unsatisfaction and 10.25 for Adventurous can be used to assess teachers' creative teaching based on these factors.

Table 7
Descriptive Analyses of Creative Teaching Inventory Scores

		creteach	innovati	spontane	dedicati	unsatisf	newapp
Mean		93.28	49.50	17.14	9.97	4.00	8.53
Std. Deviation		10.172	6.662	2.024	3.045	1.405	2.627
Minimum		68	30	11	3	2	4
Maximum		115	60	20	15	10	14
Percentiles	25	87.75	45.00	16.00	7.00	3.00	6.00
	50	93.00	49.00	17.50	10.00	4.00	9.00
	75	101.25	56.00	19.00	12.00	5.00	10.25

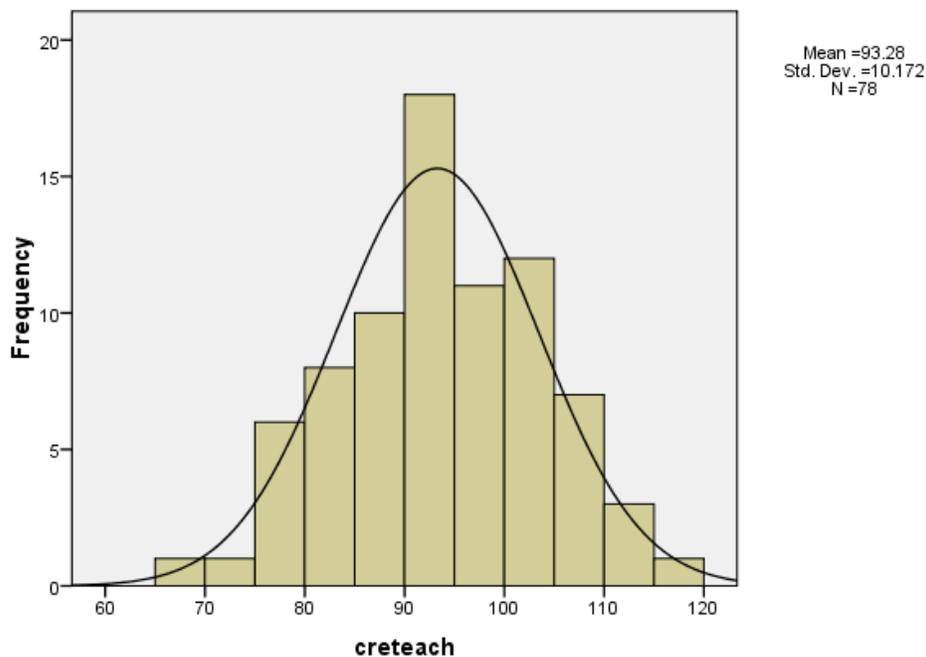


Figure 4. *Histogram of Creative Teaching Scores*

Conclusion

This paper introduced a creative teaching model that is built on the theoretical foundations of Guilford's and Torrance's work. It presents the various components of creativity and divergent thinking skills as applied to creative teaching. The instrument designed for assessing creative teaching, Creative Teaching Inventory (CTI) appears to a high level of construct and criterion-related validity. It also has high internal reliability. The factor analyses indicate there are 5 factors: Innovative (12 items), Spontaneous (4 items), Dedication (3 items), Unsatisfied (2 items) and Adventurous (3 items). The internal consistency of these factors shown by the Cronbach values indicate that the factors have high internal reliability. Further replication of this investigation is recommended to validate the model and its usefulness in assessing teachers' ability to teach creativity and creatively.

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