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Author(s)	Soh Kay Cheng
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MEASURING TEACHER BEHAVIOURS THAT FOSTER CREATIVITY

Soh Kay Cheng
National Institute of Education
Nanyang Technological University
Singapore

Abstract: Based on previous research, A. J. Cropley (1997) delineated nine behavioural characteristics of the teacher's classroom behaviours that are believed to foster student creativity. These form the conceptual framework for the development of a 45-item self-rating scale. Five items were generated for each of the nine behavioural characteristics. The teachers also rated themselves on creativity on a set of adjectives adapted from Domino's (1970) Creative Scale. When the items for each sub-scale were factor analysed, an unidimensional factor was obtained, explaining sizeable total variance. The nine sub-scales cover creativity fostering behaviours, namely, *Independence, Integration, Motivation, Judgement, Flexibility, Evaluation, Question, Opportunities, and Frustration*. High reliabilities (Cronbach's alpha coefficients 0.69 to .86) were found. Low to moderate correlations between sub-scale responses and self-ratings of creativity were found. Differences between sexes and ethnic groups were consistent with previous findings found in the literature. Possible further research is discussed.

Introduction

Teachers play a critical role in fostering student creativity by directly reinforcing student creativity through interaction with them and by rewarding their creative efforts and outcomes as well as recognizing their creative traits. Teachers also indirectly influence student creativity by creating a classroom environment supportive of creativity through her words and deeds. Thus, what the teacher does or does not do in relation to student creativity constitutes a vital factor in the social context of the classroom environment.

The need to study teachers' creativity fostering behaviour cannot be over-emphasised. Creativity researchers, especially those who have an interest in education in general and teacher education in particular, will agree that there remains a gap of empirically validated knowledge of creativity fostering behaviour of teachers. One possible reason for this gap is the obvious absence of suitable measuring instruments for gauging teachers' creativity fostering behaviour in the classroom context, as progress in research is contingent on measurement.

In this regard, the configuration of behavioral characteristics of creativity fostering teachers as proposed by Cropley (1997) is a good starting point: Having discussed the various conditions and factors of student creativity, Cropley (1997) listed the following as creativity fostering teachers' classroom behaviour:

1. Encouraging students to learn independently.
2. Have a co-operative, socially integrative style of teaching.
3. Motivate their students to master factual knowledge, so that they have a solid base for divergent thinking.
4. Delay judging students' ideas until they have been thoroughly worked out and clearly formulated.
5. Encourage flexible thinking.
6. Promote self-evaluation in students.
7. Take students' suggestions and questions seriously.
8. Offer students opportunities to work with a wide variety of materials and under many different conditions.
9. Help students to learn to cope with frustration and failure, so that they have the courage to try the new and unusual.

The present study is a humble attempt to fill the measurement gap by constructing such an instrument and check its validity.

Method

Scale development. To achieve this, five behaviour manifestation statements were generated for each of Cropley's nine behavioural characteristics of creativity fostering teachers. These statements then formed the six-point frequency scales for self-report by the teachers. The 45 items were then scrutinised by 20 students who are experienced teachers attending the present writer's graduate seminars on the psychology of creativity. They evaluated the items for relevance and classification, in addition to editing the language and expression. The 45-item questionnaire as a whole is titled Creativity Fostering Teacher Index (CFTIndex) with suitable titles reflecting the nature of each of the nine constituent scales.

Data Collection. The CFTIndex was responded to by 117 teachers contacted through the students from a wide range of schools and junior colleges (Table 1). Three-quarters of the respondents are female, and about 60% are 35 or younger. Slightly more than half of them are ethnic Chinese while the rest are Malay, Indian, Eurasian and other races. About 60% of the respondents hold a university degree and there is an almost equal split in level of teaching. While about 60% teach languages, the remaining 40% are equally divided into science (and mathematics) and humanities. As participation in this study was voluntary, the respondents formed a convenient sample and no claim of representation of the teacher population of Singapore is made.

Table 1
The Respondents

		Percentages (N=117)
Sex	Male	25.6
	Female	74.4
Age	20-25	10.3
	26-30	29.9
	31-35	17.9
	36 and above	41.9
Race	Chinese	55.6
	Malay	21.4
	Indian	17.9
	Eurasian and others	5.1
Qualification	Degree	61.5
	Non-degree	38.5
Level	Primary	53.8
	Secondary	46.2
Subject	Language	62.4
	Science, Mathematics	19.7
	Humanities and others	17.9

Results

Factor-Analysis. Factor analysis with varimax rotation was run separately for each set of five items. All items loaded sizably onto its respective creativity fostering behavior and the percentage of total variance explained vary from 47% (Evaluation) to 65% (Frustration). When the nine *scale scores* were submitted for factor analysis with varimax rotation, only one factor explaining 69.95% total variance was obtained (Table 2).

Table 2
Results of Factor-Analysing the Scales

	Factor loadings	Correlations with CFTIndex
Independence	.77	.77
Integration	.84	.85
Motivation	.70	.71
Judgment	.88	.88
Flexibility	.88	.88
Evaluation	.84	.84
Question	.85	.84
Opportunities	.91	.90
Frustration	.84	.84

Note: All correlation coefficients significant ($p < 0.01$). This factor explains .95% total variance and the scale has a Cronbach's alpha of .96

Table 3
Inter-correlations among Scales

	Cronbach's Alpha	1	2	3	4	5	6	7	8	9
1. Independence	.76	-								
2. Integration	.85	.62	-							
3. Motivation	.74	.49	.56	-						
4. Judgment	.83	.70	.71	.59	-					
5. Flexibility	.78	.58	.71	.55	.78	-				
6. Evaluation	.69	.60	.68	.55	.69	.72	-			
7. Question	.82	.52	.67	.48	.76	.80	.67	-		
8. Opportunities	.83	.65	.71	.59	.69	.82	.70	.80	-	
9. Frustration	.86	.65	.65	.57	.46	.66	.65	.70	.75	-

Note: All correlation coefficients significant ($p < 0.01$)

Reliabilities and Inter-correlations. As Table 3 shows, the Cronbach's alpha coefficients vary from a moderate .69 (Evaluation) to a high .86 (Frustration), with a median of .82. The correlations vary from a moderate .49 (Independence-Motivation) to a high .82 (Flexibility-Opportunities). The median of correlations is .67. Thus, in addition to being highly reliable, the moderate inter-correlations indicate that the scales are reasonably independent of one another while still measuring something in common. As would be unexpectedly, the correlations of the nine scales with the CFTIndex as a whole are general high, varying from .71 (Motivation) to .90 (Opportunities) and the Cronbach's alpha coefficient for CFTIndex is a high .96 (Table 2).

Preliminary Validation. While the high reliabilities are encouraging, the validity of the CFTIndex needs support of other evidence. At this early stage of development, concurrent validity serves the purpose sufficiently well. For this reason, Domino's (1970) Creativity Scale for the identification of potentially creative persons was adapted. This is a set of 16 adjectives selected from the original 59 through five rounds of factor analysis. These adjectives were used to form a creativity scale which has a Cronbach's alpha coefficient of .96 (Table 4). All scales correlate significantly with creative person indicators, although not as highly as one would desire. The correlation coefficients vary from a low .25 to a moderate .45 (Table 5).

Table 4
Factor Analysis Results of Adjectives Scale

Adjectives	Factor loadings	Adjectives	Factor loadings	Adjectives	Factor loadings
Alert	.519	Enthusiastic	.618	Interests wide	.742
Capable	.526	Independent	.546	Logical	.305
Clear-thinking	.488	Industrious	.576	Original	.703
Confident	.709	Ingenious	.817	Resourceful	.715
Curious	.739	Insightful	.679	% variance	59.68
Energetic	.616	Intelligent	.628	Cronbach'a alpha	.96

Table 5
Correlations between CFTI Scales and Adjectives Scale

CFTI Scales	r's with Adjectives Scale
1. Independence	.39
2. Integration	.45
3. Motivation	.35
4. Judgment	.44
5. Flexibility	.40
6. Evaluation	.25
7. Question	.33
8. Opportunities	.36
9. Frustration	.40
10. CFTIndex	.45

Note: All correlation coefficients are significant ($p < 0.01$)

Conclusion and Possible Further Work

The present study is a preliminary attempt to meet the measurement need of creativity fostering teacher behaviour by developing and validating the CFTIndex, with the hope that more empirical work of this nature will be taken up by interested creativity researchers. The attempt could be deemed reasonably successful to the extent that the structure of the scales is consistent with the various teacher behavior believed to be creativity fostering (Cropley, 1997) and to the extent that self-ratings by teachers on the scales correlate meaningfully with their self-description of creative personality.

However, it is obvious that more work needs be done to further evaluate the validity and usefulness of the CFTIndex and to enhance our standing of creative fostering behavior of teachers. At this stage, the CFTIndex provides only self-report data of the teachers, the validity of such data need be further evaluated. Some possible approaches include:

1. Checking with ratings on teacher behavior given by students who are at the receiving end of classroom interaction

2. Checking against objective measures by independent observers who may be a fellow-teacher, supervisor, or creativity researcher
3. Check whether teachers who show more creativity fostering behavior have students who show higher level of creativity in the classroom

Experimental studies could also be mounted to find out

1. Whether creativity fostering behaviour can be trained,
2. Whether students become more creative when teachers change their creativity fostering behaviour.

Obviously, much more work is needed to establish a definitive link between teachers' creativity fostering behavior and student creativity as is assumed by discourse hitherto. The CFTIndex might have opened the window for a proper viewing.

Note

For the CFTIndex and more details, see Soh, K. C. (2000) Indexing creativity fostering teacher behavior: A preliminary validation study. *Journal of Creative Behavior*, Vol. 34, No. 2, 118-134.

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