

Creative Thinkers: A Valuable Asset in a Developing Country*

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The usual emphasis in the process of education is upon factual learning — information gathering, processing, and recollection. In emphasizing study for high examination performances, teachers and administrators frequently do not promote creative thinking ability. The last two decades (1960s and 1970s) have seen an interest developing in the subject of creativity as a valuable component of thinking and problem solving (Guilford, 1967; Butcher, 1968; Hudson, 1966; Lytton, 1971). A great plethora of journal articles and books has followed the introduction of this 'new' topic in education, and at this point no educational psychology book is thought to be complete without at least a short discussion of creative thinking. Even the field of science has thought it best not to be left behind, as indicated by the following from Pagels (1982):

One cannot underestimate the role of intuition and imagination in the sciences. Students who do well in examinations do not necessarily become creative scientists. On an examination, one is given a specific problem to solve, but in the world of theoretical research, the problem is to find the problem. . . asking the right questions takes imagination.

Throughout the entire schooling period the 'facts' and the 'right' responses are emphasized, and young people are inadvertently taught that imagination and intuition are hindrances rather than aids in learning. It isn't until they are allowed into higher institutions of learning that they begin to have an inkling that there might be something more to knowledge than demonstrated facts. Many times this is to their disadvantage later on, because the belief (nay faith) that there is one right answer is so firmly entrenched that many are unable to overcome a concreteness handicap. An apocraphal definition of concrete thinking says that the mind is all mixed up and permanently set!

Facts, although the building blocks of learning, cannot organize themselves into meanings that are usable, and cannot provide us with a map or

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pattern for new situations. For that, we need adaptability, flexibility, originality, and adventurousness, while keeping in mind, of course, a respect for others.

But doesn't this simply mean that some people are 'more intelligent' than others and therefore can cope better with differing situations? Not necessarily. One of the findings that is being researched heavily now is that there are different kinds of thinking abilities. Whereas previously, memory and evaluation were emphasized as evidence of being intelligent, of late we have been paying attention to being intelligent in a number of different ways. In fact, two people with identical results on an intelligence test may use quite different thought processes.

Intelligence tests, by virtue of the fact that they have been created to measure various abilities such as information storage and retrieval, good judgement, and so on, do ask for 'right' answers. The testee must bring together information and focus it into the channel that will result in a positive credit. Thus the testee uses an operation called *convergent production*. The mind 'scans' through its own filing cabinet, and comes up with a good or poor response. And this is exactly what is happening when someone takes an examination, too. Achievement tests (and this is what examinations are, essentially) require convergent thinking. Another thinking operation is called *divergent*. It diverges from the tried and true, and comes up with the original or the clever, sometimes the adventurous production. The divergent thinker often develops more than one possible response that is 'right' or plausible. Here is where the convergent thinker does not produce. In fact, it seem that the convergent thinker does not encompass the idea that something can have a number of right answers. Also, the convergent thinker knows that an examination is looking for the one right response. The two different styles of thought — convergent and divergent — are not directly opposed. They are related to intellectual ability (Lytton, 1971) and to social class (Hudson, 1966) but are complementary. A divergent thinker who is very successful will be able to come up with many other good ones. This does not necessarily mean fluency. A verbally fluent person can produce many good responses, but they may not be original or unusual, and thus they will still be convergent.

Hudson (1966) discusses the relation of education to the two different kinds of thought. He says that the school climate helps determine whether convergent or divergent thinking will be more important. More regimented schools will promote the convergent, and this leaves the

divergent in an anonymous position. A school that emphasizes imaginativeness, originality, invention, analogies, and unusual, although creative, inspiration, brings the divergent into the foreground. Sadly enough, children who are both highly intelligent and divergent may be rejected and punished in a more regimented situation, and may develop feelings of self-rejection and low self-esteem. They may even be told: "That's crazy" when they have put forward a particularly innovative response! (Shades of Edison and Einstein).

Especially in the so-called 'developing countries', changes in social systems and the simultaneous breakdown of traditional security structures, coupled with population growth and changing technology appear to insert a large element of unpredictability. In fact, The Economic and Social Commission for Asia and the Pacific (ESCAP), a subsidiary of the United Nations, has recently been attempting to develop an approach based on beliefs about the fundamental unpredictability of needs in developing social systems (*Social Development Newsletter*, 1981). I quote:

Early development planning efforts were based on a kind of Cartesian-Newtonian model of reality which embodied two basic assumptions and which were taken from the physical sciences. The first assumption was that a sufficient quantity of all relevant information was potentially available to planners and administrators. The second was that the proper use of this information would make possible the design of policies, programmes and projects which would result in the achievement of predetermined changes in distribution and/or levels of income, wealth, power, prestige and influence within national populations.

A major problem relating to the assumption of the availability of information, even assuming the predictability of change in social systems is the belief first, that all relevant information can be made explicit in order to permit its rational consideration, and, secondly that those who can produce explicit information will do so.

And from the same source:

One systems theorist characterizes the problem as follows: 'The management scientists, when he becomes very serious about his own models, in which 'all' of the objectives are represented and a 'proper' compromise is represented, (and a 'proper' compromise is created), also is deceived. In the straight-faced seriousness of his approach, he forgets many things: basic human values and his own inability really to understand all aspects of the

system, and especially its politics.'

The gist of the ESCAP's social development studies is that we need creative people who can develop and adapt to the new, rather than attempt to superimpose a predetermined system derived from assumptions based upon so called statistical/analytical probabilities. One of the capabilities of the divergent thinker is the ability to deal with new emergent situations in creative and sensible ways. It would seem that a major asset of any country, but especially a developing one, is a continuous supply of creative thinkers who can develop systems that are inclusive of change rather than dependent upon predetermined models that more than likely will fail.

The question to be asked, given the foregoing, is whether or not we have such divergent thinkers developing in Fiji schools. The school, being a captive audience in which various variables can be controlled, is a ready-made source of information about young people. Thus it was decided to answer this question through the use of the school situation. It was thought that fifth form would provide an adequate sample. The students would have already developed their thinking capacities to approximately adult level, and would be a more representative sample than sixth form, where students are preparing mainly for University Entrance. All schools selected also had sixth forms, however. Both urban and rural schools were selected, and where schools were segregated by sexes, an equal number of schools with opposite sexes were selected. In all, 23 Fiji schools were sampled.

Christensen and Guilford (1960) developed a test for identification of the divergent thinker that is entitled the "Alternate Uses Test". This device measures the number of acceptable free responses to a stimulus word, and in addition, there is provision for rarity as well. This test reflects divergent thinking in which there is emphasis upon variety of output in the generation of new information from given information, spontaneous flexibility, and a tendency to seek a variety of answers with freedom from preservation and inertia. This test is convenient and versatile, and is administered without a time limit, although other materials are given (described later) to which the student can turn when finished. This prevents the less fluent from being upset over finishing long before others. The Alternate Uses Test is presented in the following form:

USES OF OBJECTS

Below are the names of three everyday objects. Think of as many *different* uses for each one as you can, and write them in the space provided.

How many uses can you think of for a **BLANKET**?

How many uses can you think of for a **BRICK**?

How many uses can you think of for a **PAPER CLIP**?

A space of about 3 inches is left between the questions so that the student can write in responses. They are told to use extra paper (provided) if the spaces are not large enough. The advantage of somewhat limited space is that thinking blocks are not promoted by presentation of an overly large blank sheet of paper.

This test was administered to all the students present at a particular school on a particular day who were enrolled in fifth form. The total number of students who were sampled was 2,564, of whom 1,247 were boys and 1,317 were girls. The average age of the boys was 16.36 and the average age of the girls was 16.21 years. The total average age was 16.29 years.

Fiji is a heterogeneous society. The two major groups of peoples are the indigenous people of Melanesian and Polynesian descent, and those of Indian (from India) descent in about equal proportions. There are some students in Fiji schools who are of 'European' and Oriental descent. The number is very small, and in the present study these were classified as 'Other'.

Scoring presents few difficulties. The average number of responses for the Alternate Uses Test is nine uses or three each, for the three common objects. In the present study, papers with ten or fewer responses were set aside in the group classified as 'Neither'. All responses that were clearly not uses for an article were not counted as contributing to the total number of responses.

For those students who produced eleven or more responses, the papers were sorted into two piles, one being those of *Convergent* thinkers and one being those of *Divergent* thinkers. The convergent thinkers produced responses in quantity, but not in rarity. In other words, their responses were correct, but were not divergent. For the divergent classification, a student must have had more than average production in quantity, and

must have had at least three rare responses. The rare responses were selected on the basis that they did not appear more than five times in every 100 responses. Proportions of frequent responses that were correct are given in Table 1.

Table 1
Percentages of Frequent Responses to the Alternate Uses Test

Usages	Percentages in sample
Blanket	
cover (anybody)	61
warmth (anybody)	50
bedspread	27
make clothes (any kind)	25
put out fire	20
exclude light	17
protect from insects, wind	16
screen, curtain, drape	12
ironing pad	10
wrapping things, bundles, carry bags	8
carpets, door mats	8
pillows, cushions	7
Brick	
buildings (any kind)	66
paving (roads, footpaths etc.)	32
fences, walls, divisions	25
fireplaces, stoves	23
posts (lamp, gate etc.)	17
wharfs, jettys, bridges	11
ladders and steps	10
playthings, toys	10
chocks	8
seats, benches, supports for seats	7
Paper Clip	
keeping any kind of papers together	72
science laboratory experiments	20
keeping clothes, shoes, belts in place	15
clipping on labels to dress or shirt	9
jewelry (earrings, necklaces)	8
straighten out to make wire	6

Any response that was correct in usage, but appeared five times or less in every one hundred responses was considered a rare response, and

therefore divergent. Any student who developed three or more such responses was classified as a divergent thinker.

When the results were tabulated, it became apparent that there are a number of divergent thinkers, as defined by the above classifications, in Fiji schools, although the number in each school varied a great deal from school to school.

The three major groups, divergent, convergent and neither were subdivided into males and females, and further subdivided into the three ethnic groups, providing 18 sub-groups. A summary of these classifications is given in Table 2 with absolute numbers of students in each group.

Table 2
18 Groups of Subjects who are Divergent, Convergent or
Neither Thinkers

Group	Classification	Ethnic Group	Sex	Number	Totals
1	Divergent	Fiji Indian	males	215	
2	Divergent	Fiji Indian	females	224	
3	Divergent	Indigenous	males	203	
4	Divergent	Indigenous	females	98	
5	Divergent	Others	males	10	
6	Divergent	Others	females	43	793
7	Convergent	Fiji Indian	males	207	
8	Convergent	Fiji Indian	females	200	
9	Convergent	Indigenous	males	61	
10	Convergent	Indigenous	females	77	
*11	Convergent	Others	males	4	
*12	Convergent	Others	females	8	557
13	Neither	Fiji Indian	males	364	
14	Neither	Fiji Indian	females	427	
15	Neither	Indigenous	males	179	
	Neither	Indigenous	females	220	
*17	Neither	Others	males	8	
18	Neither	Others	females	16	1,214
Total number of subjects					2,564

* any significant differences for these groups was not reported due to the small size.

The two largest ethnic groups were compared within and between by sex. 27% of the 786 Fiji Indian males were divergent thinkers. 26% of the 851

Fiji Indian females were also, 46% of the 443 Indigenous males were so judged, and 25% of the Indigenous females selected from a total of 395. Two by two tables with 1 *df* each were constructed to compare Indigenous and Indo-Fijian males with each other, and also females with females, and females with males. These comparisons using the Chi square test, resulted in one highly significant difference. Indigenous males produced the greatest number of divergent responses, and were different from all the other groups of divergent thinkers at the .01 level of significance. At this point in time, no comparison has yet been made between schools. In the list of schools, some are urban, some are rural, some have a higher socio-economic status than others.

The students were given a list of background factor questions.* These were questions that have proved to correlate with divergent thinking in studies in other countries (Hudson, 1966). The questions are listed in Table 3.

Table 3
Background Variables Compared between Eighteen Groups

1. education of father in years	11. brothers and sisters older
2. education of mother in years	12. brothers and sisters younger
3. father's occupation	13. has a close relative died?
4. mother's occupation	14. parents divorced?
5. self-employment — father	15. serious accidents or illnesses
6. self-employment — mother	* that required more than a
7. leadership in the family	week in bed.
— father?	16. spending a long time alone
8. leadership in the family	17. frequency of reading in
— mother?	close relatives
9. number of brothers	18. reading for pleasure (self)
10. number of sisters	19. encouragement to succeed

The responses to the background questionnaire from the 2,564 subjects described in Table 2 were compared by groups. A one-way non-orthogonal analysis of variance was carried out, yielding between and within groups sums of squares, means squares, and F ratios. Tests for homogeneity of variance were carried out to indicate whether the differences among variances arose from differing populations. Following this, multiple range tests were carried out. The test for least significant

* The statistics were performed with the Statistical Package for Social Sciences at the Prentice Computer Center, University of Queensland, St. Lucia, Australia.

differences (LSD) is the most powerful test for between group means. It is exact for unequal group sizes. This test was done for all 18 groups providing a mean for each of the 19 background variables.

Significant differences at the .01 level were found between divergent and some other groups in both parents' education and parents' occupation. These are summarized in Tables 4-7.

Table 4
Groups Significantly Different at the .01 level on Father's Occupation
(farmer = 1.00 manual = 2.00 merchant = 3.00 office = 4.00
professional = 5.00)

Low			High		
Group	Mean		Group	Mean	
13	1.94	neither	5	3.70	divergent
15	1.95	neither	6	3.02	divergent
14	2.03	neither	4	2.90	divergent
7	2.05	convergent	3	2.58	divergent
16	2.07	neither	2	2.57	divergent

Table 5
Groups Significantly Different at the .01 Level on Mother's Occupation
(housekeeping = 1.00 farming/manual = 2.00 merchant = 3.00
office = 4.00 professional = 5.00)

Low			High		
Group	Mean		Group	Mean	
7	1.13	convergent	5	2.90	divergent
14	1.14	neither	6	2.09	divergent
13	1.15	neither	4	1.96	divergent
8	1.18	convergent	3	1.83	divergent
15	1.44	neither	2	1.60	divergent
16	1.51	neither			

In addition, some significant differences at the .01 level were found for two other variables, the reading habits of parents and close relatives, and the reading by self for pleasure. These results are summarized in Tables 8 and 9.

In discussing the findings of this study, it is interesting to note that there

Table 6
Groups Significantly Different at the .01 Level on Father's Education
 (years 1-6 = 1.00; years 7-10 = 2.00; years 11-12 = 3.00; years 13-15 = 4.00;
 years 16+ = 5.00)

Low			High		
Group	Mean		Group	Mean	
18	1.56	neither	5	3.30	divergent
13	1.60	neither	4	2.28	divergent
7	1.69	convergent	2	2.15	divergent
14	1.69	neither	6	2.12	divergent
1	1.69	divergent	3	2.02	divergent
15	1.78	neither			
16	1.93	neither			

Table 7
Groups Significantly Different at the .01 Level on Mother's Education
 (Years 1-6 = 1.00; years 7-10 = 2.00; years 11-12 = 3.00; years 13-15 = 4.00;
 years 16+ = 5.00)

Low			High		
Group	Mean		Group	Mean	
13	1.35	neither	5	2.50	divergent
14	1.36	neither	4	2.02	divergent
1	1.39	divergent	9	1.89	convergent
7	1.39	convergent	3	1.81	divergent
			6	1.77	divergent
			2	1.73	divergent

Table 8
Groups Differing Significantly at the .01 Level — Parents and Close
Relatives Reading Habits: frequently = 1.00 sometimes = 2.00 never =
3.00

Group	Mean	Level	Group	Mean	Level
6	1.26	divergent	15	1.80	neither
8	1.43	convergent	13	1.77	neither
2	1.48	divergent	7	1.74	convergent
			9	1.73	convergent

appears to be a larger percentage (31%) of divergent thinkers in the sampled Fiji schools than convergent thinkers (22%), and a still larger percentage of students who fall into the 'neither' category (47%). This

Table 9

Groups Differing Significantly at the .01 Level — Self Read for Pleasure:
frequently = 1.00 sometimes = 2.00 never = 3.00

Group	Mean	Level	Group	Mean	Level
6	1.30	divergent	18	1.75	neither
2	1.32	divergent	15	1.61	neither
8	1.32	convergent	13	1.55	neither

differs from Hudson's (1966) findings in a population of English school-boys. His study differentiated divergents 30%, convergents 30%, and neither 40%.

After analysing the data, it was noted that a significantly higher proportion of divergent thinkers seems to be located in 2 schools, both boys boarding schools, and both catering to indigenous students. The 172 students make up 39% of all indigenous males in the entire 23 school sample. These two schools are 'popular' in the sense that they are considered as catering to a student who does better than average in achievement. Since we do know that there is some correlation between high achievement level and high intelligence, and since there is some correlation between higher intellectual performance (I.Q. 120, Butcher, 1968), we probably have a situational artifact in this case. If these two schools were to be dropped from the sampling of schools (reducing the total number of subjects, of course), the percentage of divergent thinkers would drop from 31% to 28%. This would still indicate a larger proportion of divergent thinkers than convergent.

Fiji schools are usually thought to be a quite conventional, and highly examination oriented, and one might expect a large proportion of convergers in relationship to divergers. It is surprising then that the present findings locate a larger proportion of divergers. One should keep in mind, however, that Fiji does not have compulsory education. Students may have passed through three hurdles in order to be accepted into Form Five — Intermediate Entrance at the end of class 6; Secondary Entrance at the end of class 8 (Form 2), and Fiji Junior at the end of Form 4. This 'weeding' process results in only the young people with a higher academic success rate and, presumably, a higher intellectual ability, being able to arrive in Form 5.

The majority of Fiji schools are multicultural, and multiculturalism is

emphasized in the schools as an asset in today's world. We know that bilingualism helps people think more flexibly and fluently (Lambert, 1979; Holmes, 1982), and it is a fact that most Fiji Fifth Form students speak at least two and many times three languages — English as the official language, and the home vernacular, e.g. Hindi, Bauan, etc., and many speak both of those plus the vernacular of another ethnic group. In addition, students come from widely divergent cultural backgrounds, both socio-economically and on the urban and rural background. The combination of a group of young people with high achievement level, high intelligence, and a multi-lingual, multi-cultural background may account for the high percentage of divergent thinkers.

In Fiji, as elsewhere, the higher the educational and occupational level of the parents, the more the offspring will be exposed to varied experiences, and thus able to develop more background material to enable them to think in a divergent manner. Frequency of reading in relatives and for pleasure by oneself also contribute, and this seems to be a worldwide phenomenon. Occupational levels of both father and mother are significantly higher than some 'neither' and some convergent groups. There is one exception to the rule. Five of the divergent groups differ significantly from five of the 'neither' category on the father's education variable. One divergent group, Fiji Indian Divergent males differs from the other divergent groups. With this group, the educational level of the fathers is significantly lower, and the same is true for the convergent Fiji Indian males. The same is true for mother's education. One possible explanation for this is that uneducated, and probably lower-socio-economic level parents may choose the most intellectually able son to become the highly educated one. Secondary school fees are high (as well as boarding and book fees), and a poor family would have a harder time to educate all children at the higher levels.

It appears that many other variables that have been studied elsewhere do not seem to contribute to the development of divergent thinking — e.g. encouragement to succeed (in fact all parents who have offspring in Fifth Form in Fiji seem to encourage them to succeed); spending time alone, relatives who have died and other background factors listed in Table 3 are not unique to Divergent thinkers in Fiji.

In summary, the results of this study answer the initial question, whether or not we have divergent thinkers developing in Fiji schools, in a very positive manner. Whether one takes the overall figure of 31% or the

amended one of 28%, we can say that development of such thinking ability correlates favourably with that found by Hudson (1966) in England.

In a comparison of four ethnic groups, the percentage of divergent thinkers is similar in three (25-27%) and one group of indigenous males differs in that 46% were found. This is probably an artifact of selection procedures for two boys boarding schools.

The divergent groups and the 'neither' groups differed significantly from each other on the variable 'father's education', with the fathers of the divergents having a higher educational level. One exception was divergent Fiji Indian males whose father's (and mother's) education was significantly lower. Of the other background factors, reading habits of relatives and reading for pleasure are a factor in two divergent thinking groups, both girls.

Multi-culturalism and bi or tri-lingualism is known to be a contributing factor to the development of divergent thinking, and these variables are present to a large measure in Fiji.

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