PRODUCING AN EDUCATED COMMUNITY

F. Emery Nov 1977

I will simply assume that we would be happy if we had evidence that, as a community, we are better educated than we were in yesteryear and that we hope that in future years we will be a better educated community then we are today.

I question, however, whether we know how to bring this about. We have assumed that the best strategy is to give more and better education to the young people of the community before they enter the work force. More education was assumed to mean more years in schooling and better education was assumed to mean such things as higher qualified teachers, smaller classes, better texts, richer libraries, better equipped science laboratories and gymnasia.

During the nineteen fifties and sixties there appeared to be evidence that this strategy was working. Increase in national levels of education appeared to be related increase in the GNP. Increase in individual level of education certainly seemed, in general to lead to higher levels of income over the individual's work career. Therefore, it seemed that by pumping more of the nation's resources into 'more and better education' would be amply justified by the increase in GNP and the growing proportion of the people who were happy with their standard of living.

In the seventies there has been growing unsureness about the evidence: uncertainly about whether a greater output of degreed people necessarily converts itself into greater productivity and uncertainly about whether the individual can readily convert his increase education into a higher standard of living. The study of the Australian urban work-force, by Chris Phillips and myself, certainly showed that education beyond the secondary level had precious little effect on people's feeling about their lot in life.

I do not think that these doubts can be resolved by more detailed and expert studies of the educational inputs and the economic pay-offs. I think that we can better re-appraise our educational strategies, quickly, by going back to studying the findings of the truly massive study that James, S. Coleman directed at the behest of the U.S. Government, 1964-6.

In terms of resources and competencies no other nation then, or now, could now, could have done such a study; and few would have been so motivated.

For us the relevance lies in the fact that these efforts were directed to the tighter question of what social investments translate into an increase in individual education. And, a much broader definition of 'social investments' and educational outcomes was considered than is usual in economic studies of the value of education. They did not confine themselves to the sort of data generated by the administration of monies granted for educational purposes or data generated from attempting to measure the performance of the economy. It is tighter question because it starts from the educational facilities that are actually in

being, not those the legislators had in mind when they voted funds; and it ends with that education has been gained, not with the nebulous process whereby reputed educational gains are sold on the labour market or in some strange way co-relate with time trends in economic productivity. Coleman's measurement process allowed that education might arise from sources other than those legally defined as schooling and that education of value might appear in ways that are not reflected in measures of GNP or personal income levels.

At the very beginning of this paper I spelt out an assumption, a point of view that I was going to take for granted in the rest of the paper. Now that I have spelt out where I want to take the argument I will make another assumption. This second assumption is that the way young people get to be educated in Australia today is not different to how young white people in Northern USA were getting an education in 1964-6.

As far as I can ascertain, the study was conceived and designed as if the 'more and better for the young' strategy was unquestionable. The question that led to the government proposal for the study was whether it was just the young *white* people who were getting more and better education.

The results of the study were more radical than, I think, any of the key actors even dreamt of. In the years immediately following the release of the report these results were muted by the form of 'regression analysis' that Coleman's group adopted to inter-relate the facts that they had collected, and distorted by the continuing national pre-occupation with the facts that evidenced a gross disproportion between the educational facilities available to young white people and those available to young black people.

The Evidence of the Coleman Study

The Coleman Study shows, quite unequivocally, that we have been wrong in our post-war educational strategy. Education does not work the way we thought it did.

It is apparent from the Coleman data that, by far and away, the most important influence on whether a young person gets an education, from whatever is available, is whether their parents really care. (I suspect it is really whether it is any 'significant other' other in an older generation who really cares. In our society these are so few compared with parents that they would not show up in Coleman's surveys.).

In the appendices to this paper I will spell out the evidence for these statements. Assuming the evidence is valid and convincing let me proceed to the implications.

It seems to me that what we have accepted as necessary and sufficient conditions for learning are proven by the Coleman Report to be only necessary conditions. That is, if a person is motivated to learn then it is necessary that that person have access to good teachers, libraries, laboratories etc. The mere provision of these conditions does not mean that people will be motivated to use them as means for educating themselves.

The sufficient conditions for learning are clearly spelt out in the Coleman data. If one's parents really want one to learn then self-learning will occur, however impoverished the learning environment.

I do not think that I have ever seen a more richly endowed High School than Gunn Hight School at Stanford, California. I do not think that I have ever seen, in those years of 1967-8, less relation between financial input and educational outcome. The sufficient conditions were in the dreamtime whilst the parents were pre-occupied with their individual advancement.

If we really want to raise the educational level of our community, and not just provide more ways of rationalizing existing hierarchies, through certificates, then social investment in education must be directed to strengthening those conditions that are sufficient conditions: investment of resources on strengthening necessary conditions should be strictly reserved to those conditions that can be proven to be necessary in present conditions, definitely not those that have been traditionally necessary.

A conservative interpretation of the Coleman findings might point to the significant role of parental educational level on student's interest and learning. Thus it could be argued with some reason that as we raise the educational level of each generation we will get a pay-back in that their children will automatically be more interested and motivated to learn. This, however, is only part of the story the data gives us. The effect of parental education is greatly enhanced if it has been translated into having reading materials in the home. This assumed that the parents' interest in learning has survived their schooling and persisted into adulthood. Parental interest in their children's schooling is an additional important determinant and it is by no means tied to parental education.

The educational strategy that follows from this is that of getting adults involved in their own learning, and hence bringing reading materials into the house, as well as involving them more in the on-going schooling of their children. If our concern is with producing an educated community this Continuing Education higher priority than pumping further funds into more school libraries, labs, teachers etc.

A massive contribution to this continuing education would be made if the design of jobs in the work-place moved away from the traditional pattern of specialized, one-man-one-job to multi-skilled, semi-autonomous work teams. It has been amply demonstrated that the latter create much greater demand and opportunities for continued learning on the job. There is evidence that this carries over into the worker's family life. There is also evidence (Emery and Phillips, p74) that the traditional, 'bureaucratised' jobs kill the desire to do anything creative with one's leisure time. In the Australian urban population we found only 11% of men and 16% of women whose main leisure pursuit was mental activity (as distinct from social or physical activity, or simply resting). Amongst those with tertiary education the proportion rises to 27% but amongst blue-collar workers, skilled and unskilled, it is only 7%.

In this same sample only 37% reported that they had good opportunities for learning in their job.

These findings suggest that we are confronted with a daunting national task. However, as Coleman's evidence proves, there is no way around it and it must be directly confronted. A society that kills in its adults the desire to learn and to cultivate in their children a love of learning is only deceiving itself by pumping money into formal education. We must base our educational strategies on what are proven facts, namely, that:-

a) "…much of the failure in the education of under-privileged populations rests on the failure to provide them with convincing evidence of the worth and relevance of school learning and/or the nonverbal (and often verbal) communication by teachers of their conviction that their wards are ineducable". (Chein, p158).
b) " That schools bring little influence to bear on a child's achievement…" (Coleman, p325).

REFERENCES

Chein, I The science of behavior and the image of man
New York, Basic Books, 1972
Coleman, James.S. et als Equality of educational opportunity
Office of Education/U.S. Department of Health, Education and Welfare. 1966
" Supplemental Appendix.
Emery,F.E. & Chris Phillips Living at work
Canberra, Australia Government Publishing Service, 1976.

APPENDIX

Re-analysis of the Coleman data.

The key data emerging from the Coleman Report for those who are interested in how education works (as apart from documentation of who got what) is to be found in the Supplemental Appendix to the Survey on Equality of Educational Opportunity. This provides the correlation matrices for all the variables measured for the six major racial groups in the USA at grade levels 1,3,6,9 & 12: 548 pages in all.

Re-analysis was confined to grades 6, 9 and 12 of Northern white students. These appeared to be closest to the conditions of life generally experienced in Australia and covering the age range of 12 to 18 where the debate about more and better schooling or leaving to work is likely to become more heated.

Sixty variables were measured for each grade level. These were identified in the Report as 15 Dependent Variables, 14 Student Variables, 13 School Environment Variables, 10 Teacher Variables, 18 Principal + Superintendent Variables.

Coleman's main tool of analysis was regression analysis. It brought out the main features that have been discussed in this paper. However, this form of analysis blurred the picture and, because of its assumptions, led to some stringent criticism. Regression analysis can seriously distort some patterns of interdependence between variables and some who did not like Coleman's findings were quick to point this out. My proposal was to use the method of causal path analysis outlined in the appendix of Emery and Phillips (1976). This method is primarily based on the ordinal properties of a correlation matrix and avoids the assumptions inherent in regression analysis. Although this vastly simplifies computational problems it is still a very time-consuming problem when more than 20 variables are involved. The step was taken, therefore, to select from each sub-set of variables the ones that made the greatest contribution to inter-variable correlation. This gave a sub-sample of 20 variables; 1 dependent, 8 student, 3 school environment, 4 teacher and 4 principal and superintendent. The one dependent variable, G.I. Total, summed the results of five general information tests and was more closely correlated with results on the verbal and non-verbal 'IQ' tests, and maths and reading achievement, than anything else.

More than that, some of the so-called student items, e.g. doing homework, interest in school and reading, and self-concept, would, in my book, be called 'dependent variables', educational outcomes.

Precisely the same variables were measured at grade levels 12 and 9. At level six the teacher's perception of student quality was substituted for the general information tests and 'proportion of mothers expect excellence' substituted for teachers expectations. The remaining 18 variables were identical.

The results of the three separate re-analyses are presented below. The results indicate what cluster of variables are most significantly related to each other and, for each cluster, indicate the way in which the variables in the cluster, directly or indirectly influence each other. To convert these graphs into a diagram of causal paths it is necessary for the reader to put arrow-heads on the lines to represent what he thinks best sums up the knowledge he or she can bring to bear on which is the most likely direction of influence: there is nothing in a matrix of correlations that can do this. I have put arrows on the graphs for grade XII to indicate one person's best interpretation.

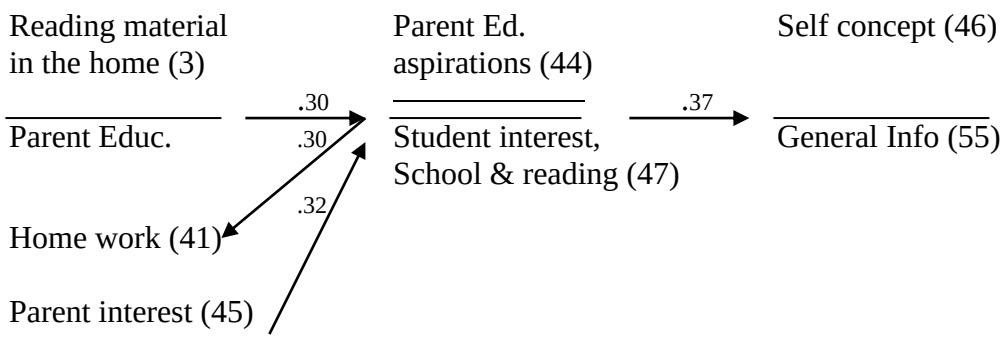
Accompanying each set of graphs is a table giving the average of the inter-variable correlations within and between the clusters. These figures should serve to prove that the differences we are discussing are not trivial.

I realize that there are initial difficulties with reading this sort of diagram. Those who readily read topographical maps and flow diagrams should have least difficulty. If one starts from the central features of any such diagram and, consulting the variable list, moves outwards with the questions of what is it and what is likely to be causing what then a picture emerges that closely approximates the evidence present in the original correlations.

Because of computer limitations Coleman based his correlational studies on subsamples of 4,000.

GRADE XII
(sample size = 4,000)

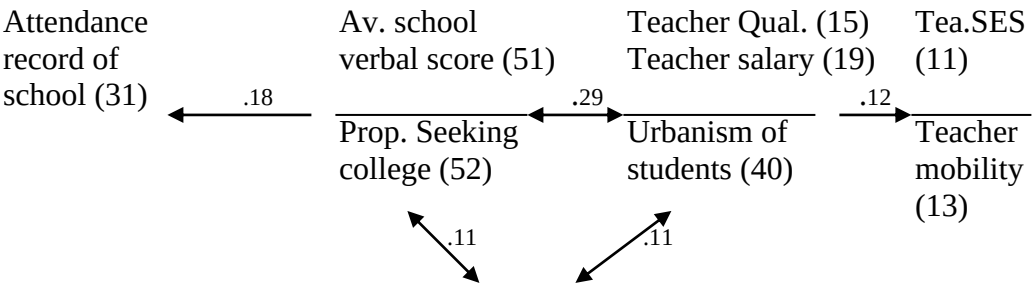
Cluster 1.



It will be noted that the critical educational outcomes are in this cluster but none of the variables representing current expenditure on formal education. The effect of parent education appears to be in part dependent on whether parents are sufficiently concerned about continuing their education to have reading materials in the home.

Cluster 2.

a.



b.

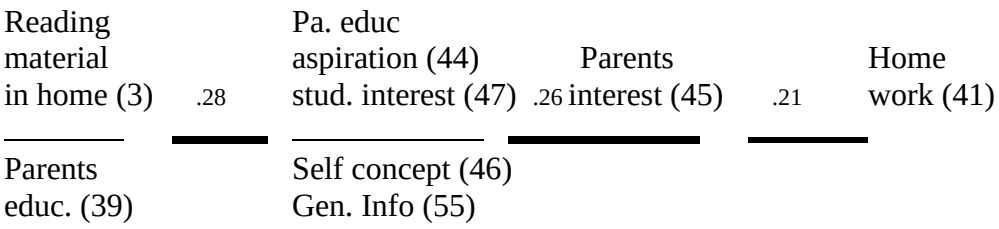
This cluster tells us that the more highly qualified teachers gravitate to the best paid teaching jobs, which are to be found in schools catering for the urban, literate middle class. These are also the schools best able to provide lavish facilities and extra-curricular activities.

Surprisingly, the only educational outcome these variables significantly influence is attendance at school. In all other respects it looks like a self-contained and self-determining system.

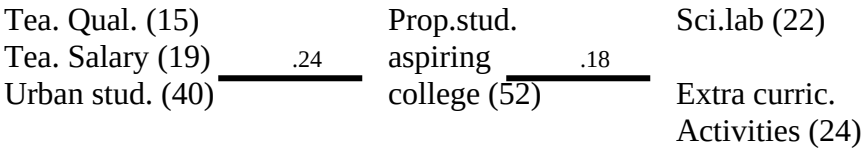
Average correlations within and between clusters.

Cluster	Cluster			
		1	2a	2b
	1	.27	-	-
	2a	.08	.20	-
	2b	.03	.09	.34

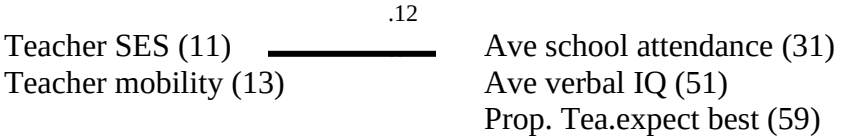
Grade IX
Cluster 1.



Cluster 2.



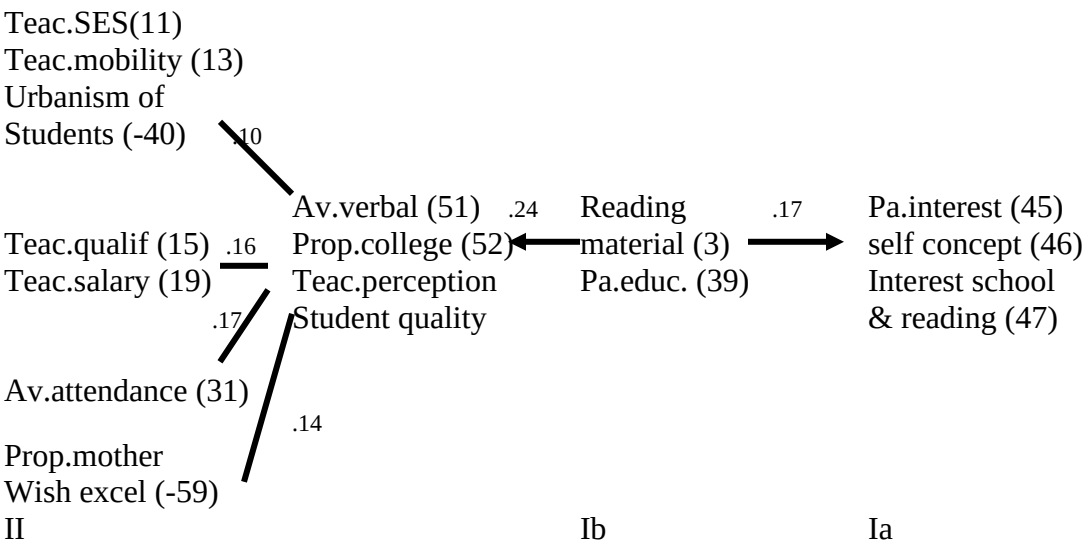
Cluster 3.



Average correlations within and between clusters

Cluster	Cluster			
		1	2	3
	1	.26	-	-
	2	.04	.21	-
	3	.05	-.02	.24

Grade VI
(sample size= 4,000)



	1a	1b	II
Ia	.22	-	-
Ib	.17	.31	-
II	.04	.15	.16

Note: the two clusters that were widely separated at grades 9 and 12 are here linked by variables 3 and 39 (cluster 1b) but are otherwise little related to each other (e.g. correlation of .04 in table).

At this level parental concern appears to be at least as much expressed in choosing a good school as in motivating their children.

List of variables

The twenty variables that emerged from the first stage of analysis are described by Coleman as follows:

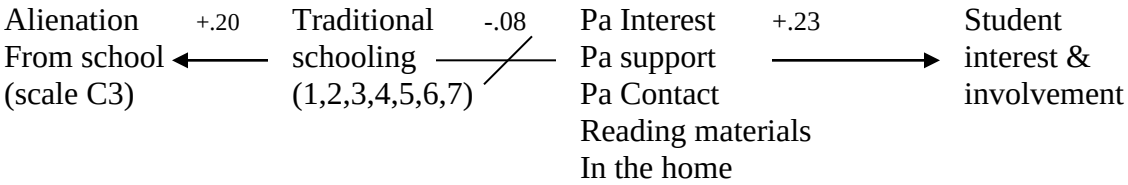
List no	category	label	No. items incl.		
			XII	IX	VI
3	student	Reading material in home	5	5	3
11	teacher	Socio-economic level	1	1	1
13	teacher	Geographic mobility	5	5	5
15	teacher	Level of qualifications	1	1	1
19	teacher	Salary	1	1	1

21	Principle and supervisor	Pupil/teacher ratio	"special measure"		
22	Principle and supervisor	Science lab facilities	x	x	-
			Special measure		
24	Principle and supervisor	Extra-curricular activities	x	x	-
			Special measure		
31	Principle and supervisor	Attendance record of the grade	1	1	1
39	student	Parents education	2	2	2
40	student	Urbanism of background	3	3	2
41	student	Homework	1	1	1
44	student	Parents educational desires	5	5	2
45	student	Parents interest	2	2	2
46	student	Self concept (as scholar)	3	3	2
47	student	Student interest in school and reading	4	4	3
51	school environment	Grade average on verbal IQ test	x	x	x
52	school environment	Proportion doing college prep curricular	x	x	-
55	dependent	Total score on General Information tests 1,2,3,4&5	x	x	-
59	school environment	Prop. Teachers expect to be amongst best students	x	x	-

Comparable Australian Data.

Similar issues to those studied by Coleman have been recently studied, on a more modest scale, by W.N.Bardsley. His sample of 374 was built up from approximately 30 students, chosen at random from those who were born in May or June 1960, from each of four large metropolitan co-educational schools in each of the three states of Victoria, S.A. and Tasmania. In each set of four one was classed, by Educational Department officers, as traditional, one as conventional, one as innovative and one as open.

When we re-analyse the intercorrelations between the measures he took (table 7.6) we find a pattern of causal paths which is presented in the next figure.



Here we find the same 'Coleman phenomena' – it is the home atmosphere, not the school, which is the primary determinant of whether the student is interested and involved in learning.

Bardsley did not have anything like the numbers of subjects, nor the multi-million dollar grant, of Coleman. However, his sample is statistically reliable for the order of

differences that show up in the above figure. The measures used by Bardsley are of the same order of quality and depth as Coleman's is excellent. Thus, for instance, the set of measures that came together in the re-analysis as "student interest and involvment" is a set of six scales, each based on a number of items closely correlated with each other:

Scale N	Description	No. Items
C1	Adjustment to school	5
C2	Liking for school	5
C4	Extra-curricula involvement	5
C5	Interest in subject matter	5
C6	'Fitting in' at school	4
C7	Confidence as scholar	4

Bardsley did not have the equivalent to Coleman's measures of economic investment in the schools but within his sample of twelve metropolitan schools there was unlikely, in 1976, to be any difference large enough to produce a negation of Coleman's findings. In other words none would have been so lavishly funded that students could not but develop an interest in learning. Bardsley has gone beyond Coleman by designing his study to identify the effect of differences in the level of student self-determination in the learning process.

Whilst Coleman has demonstrated that economic investments in the school yield very little returns Bardsley shows that a very significant return can be achieved, at least in reducing student alienation, by a change from traditional to open schooling. The most important single determinant of this effect is the extent to which rate of teaching (and expected learning) is adjusted to individual differences.

Bardsley has also clearly shown that when parental socio-economic status is not translated into parental interest, concern and reading materials in the home it has very little effect on their children's orientation to learning.

Footnote

Bardsley, W.N. Student alienation and commitment to school: a multivariate analysis of home and school environments (Ph.D. thesis, ANU, Canberra, 1976)

.

Personal reflections.

I first re-analysed some of the Coleman data whilst at the Centre for Advanced Studies in the Behavioral Sciences, 1967-8. Amongst the educationalists present that year there was no interest.

I was brought back to the matter by a question raised by a mature post-graduate at our Centre, "How does one justify a transfer of funds from schooling to continuing education?" I remembered the Coleman study and went back to the task of re-analysis.

Having at the time read the debates in the New York Review of Books and the American Sociological Review I checked for similar reviews in other journals. Instead of

the expected symposia I found the report treated as if it were just another study of 30 to 100 undergraduate students on a $10,000 budget. This puzzled me.

In trying to understand my incomplete record of what followed the release of the report I am led to believe that the findings were too hard to stomach and it was too easy to poke holes in the regression analyses. That is not the end of the story. The study was financed by the U.S. Government and the results available for re-analysis by others. There are celebrated cases where groups of scholars have contributed to a re-analysis of studies that appeared to have particular significance, e.g. the re-analysis of Authoritarian Personality and of The American Soldier. On any criteria that one would adopt the Coleman study is the most important social survey since Booth's survey of poverty in London. In the eleven years since its appearance it has not been done the honour of a re-analysis. Why? My guess is that no-one in the social sciences felt that they could over-all do a better job of collecting the evidence, none could ever hope in their life-time to be able to get such a sample and, the cruellist cut of all, even if they got Coleman's computer tapes what would they do by way of analysis other than regression analysis. They would have no reason to believe that factor analysis, principal components analysis or the like would work any better than Coleman's 2,000 regression analyses: they share the same assumptions.

A gold-mine is only a gold-mine if one can extract the extract the gold at a price worth paying. I think I have demonstrated how this can be done with the Coleman Lode.