Science-teaching in Jewish and Arab Schools in Israel on the West Bank secondary-school graduates A three - way cross-cultural comparision

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A three - way comparison of teacher college entrants' and graduating students' views in Israel (both Jews and Arab) and their counterparts on the West Bank was undertaken in order to diagnose subjects' normative views as well as the application of these views in actual classroom science-lesson planning. It was found that college entrants' views of the Jewish subjects differed sharply from those of both Arab samples in all areas tested. While there was no difference between Israel Arabs and their countterparts on the West Bank on matters concerning in school and in classroom affairs, the Israeli Arab subjects' views about science and science-teaching were midway between those of the Jewish subjects and the West Bank subjects. As to the graduating subjects' normative opinions, no significant defference was found between Jewish and Israel subjekts, with both these samples differing significantly from their West Bank counterparts. As identical sitution for both the entrants and the graduating students pertained to actual lesson-planning. The findings were interpreted to mean that:

(a) Arab science education in Israeli schools is at present in a transition period, tending to move away frome traditional and towards "Western" approaches.

(b) Three years of college education had been instrumental in eliminating the previously existing discrepancies between prospective science teachers in the Jewish and Arab sectors of Israel, and to widen the gulf between Israeli Arabs' and West Bankers' normative stances as to "what science teaching is supposed to be".

Introduction:

This is not a study of what people actually do, but of what they feel they are expected to say when asked what should be done; in other words: What - to the best of their knowledge - are the socially acceptable responses which will satisfy 'the establishment'. The people concerned in this study were teacher - college entarnts (science stream) and their graduating counter - parts, which makes this a cross-sectional, though not Iongitudinal study. The "establishment" was the teacher - college science faculty. Entarnts to post-secondary institutions are the products of secondary schools and their expressed views can thus be regarded to mirror the process at the secandary level. Graduating students' expressed views, on other hand, will reflect on processes on the tertiary level. A comparison between the entrants and the grauates schould therefore mirror the changes, if any, between what subjects, before and after a three-year training period, think that science teaching, at the

upper elementary and middle school levels for which they have been trained, "is supposed to be like".

To *know* what science-teaching is 'supposed to be like', although a necessary condition for appropiate action, cannot be regarded as a sufficient condition as well. This study in and by itself cannot answer the question of whether college graduates who 'know how' can be relied upon to perform accordingly.

The present situation in Israel (since 1967) lends itself to three-way comparative studies. Three groups, viz., students in Jewish and in Arab teacher colleges, respectively, in Israel and Arab students on the West Bank, can be compared in relation to what is regarded by them to be 'proper science teaching'. The attainment of the objectives of modern science curricula in attuning the future citizen to a science-based industralized environment is, *inter alia,* a function of ethno-cultural variables, in particular traditionalism and authoritarianism. The Jewish majority-group in Israel (85% of the population of the State) can be regarded as representing Western society (and science education) and a predominantly urban, industrialized environment. The Arab minority in Israel is a predominantly Moslem, rural and traditional society, but has had close contacts and interactions with the Jewish majority, including identical, for the last 35 years. The Arab population on the West Bank, although at present administered by Israel, has maintained a cultural continuity, as contrasted with the cultural discontinuity (Mar'i 1978, p. 140) pertaining to the Israeli Arab population, and continues

to follow the Jordanian school curricula in accordance with Jordanian laws of education.

The three-way comparsion:

A two-part questionnaire was constructed containing in Part I 16 multiplechoice items to collect information on subjects' personal attitudes to science and science teaching, their retrospective impressions of science teaching in the schools they had themselves attended, and their normative views about a desiable class-room atmosphere and tescher-pupil relationships. In Part II, subjects were requested to plan two (middle-school) science-lessons describing in detail the teacher's and pupils' activities in every stange.

This questionnaire was administered to the following groups. The first consisted of applicants for admission to the science-stream of two Jewish (N=62) and two Arab (N=51) teacher-colleges in Israel and one major college on the West Bank (N=43), represnting graduates of 13, 15, and 11 secondary schools, respectively. Scince the test was seen by the subjects as part of their entrance examination, it can be assumed that their responses portrayed what-to them-were the socially desiable responses, i. e., they could be assumed to try to 'put their best food forward'. The second group comprised the graduating classes at the same teacher colleges (50 Jewish and 45 Arab Israeli, and 35 West Bank students). Here the questionnaire was administred towards the end of the students' third (final) year. The tests were prepared in Hebrew for the Jewish samples, and in Arabic for both the Arab samples.

They were administered by the second author in all locations. A three-way (across samples at both stanges) and 'pre-post' (entrants versus graduates within each of the groups) design was adopted.

Findings:

The findings will be presented in two sections. Sction A presents results on selected items; sections B gives findings in the form of cumulative data. Some of the questions and options have been shortened for presentation.

A. Selected item data:

1. *Subjects' views of science:* Does play a part in the progress of mankind? (see table 1 for results.) It is seen from the data in table 1 that college entrants in Israel (both Jewish and Arabs) differed materially from those on the West Bank. Graduating students in Israel were essentailly indistinguishable in this matter, but expressed themselves significantly more positively then those on the West Bank entrants.

2. *School experience in retrospect*: Did you enjoy science lessons when you were a junior-high school pupil? (see table 2 for results.) The results indicate that most of the Jewish entrans and graduating students recalled very enjoyable experiences, compared with the majority of both Arab samples (entrants and graduating students) whose recollections were muth more negative. This 'consistency in retrospect' can be taken as indicative of the similarity of the samples (entrants versus graduating students) involved in this study, as well as the

similarity of their school backgrounds.

Table 1.

Does science play a part in the progress of mankind? (percentages).

	Israel				West Bank	
	Jews		Arabs			
	E	*G*	*E*	*G*	*E*	*G*
Very much	88	78	53	85	16	43
Yes	12	22	37	07	12	14
A little	—	—	06	08	36	14
No	—	—	04	—	36	28

[+]*E*=college entrants, *G*=graduuating students

Table 2.

Did you enjoy science lessons when you were in junior highschool? (percentages).

	Israel				West Bank	
	Jews		Arabs			
	E	*G*	*E*	*G*	*E*	*G*
Very much	60	70	25	20	16	—
Yes	20	12	19	18	13	14
A little	15	03	47	16	36	28
No	05	10	09	48	35	57

[+]*E*=college entrants, *G*=graduuating students

Table 3.

What should teacher-pupil relationships be like?

(percentages).

	Israel				West Bank	
	Jews		Arabs			
	E	*G*	*E*	*G*	*E*	*G*
Friendly	22	40	21	15	16	23
Understanding	76	60	23	85	09	20
Formal	02	—	07	—	09	23
Distant	—	—	50	—	63	34

[+]*E*=college entrants, *G*=graduuating students

Table 4.

Are you going to teach science just as you were taught?

(percentages).

	Israel				West Bank	
	Jews		Arabs			
	E	*G*	*E*	*G*	*E*	*G*
Definitely yes	23	30	64	—	77	52
Sometimes	35	40	19	20	10	11
Hard to say	11	20	10	—	05	09
Definitely no	31	10	06	80	07	28

[+]*E*=college entrants, *G*=graduuating students

3. *Teacher-pupil relationships*: What shuold teacher-pupil relationships be like? (see table 3.) It is seen from table 3 that both Arab entrant-samples stressed the desirability of formal/distant relationships, while the Jewish subjects recommended more friendly ties. Graduating Israelis, *both* Jews and Arabs eschewed formal relationships, while more than 50% of those on the West Bank maintained their desirability.

4. *Conservatism/traditionalism*: Are you giong to teach science just as *you* were taught in school? (see table 4.) The results in table 4 indicate that in both Arab entrant-samples the majority would definitely 'follow' in the footsteps of their elders', but less than one quarter of their Jewish counterparts felt obliged to do so.

There was an almost complete breakaway from traditional teaching in the Israeli *Arab* graduating samples, with West Bankers schowing a similar, but much weaker trend, and the Jewish subjects, like the entrants, a large measure of flexibility.

5. *Objectives of science teaching*: On what should a science teacher concentrate *most*? (see table 5, for results.) Both Arab entrant-samples felt that the transmission of knowledge should be *the* main objective of science teaching, while most of the Jewish subjects thought that the development of thoughthabits was to be so.

Of the graduating students, *both* Israeli samples were unanimous as regards the development of thought-habits, with less than a quarter of the West Bank subjects feeling the same.

Table 5.

On what should a science teacher concentrate most? (percentages).

	Israel				West Bank	
	Jews		Arabs			
	E	*G*	*E*	*G*	*E*	*G*
Knowledge	16	—	70	—	08	57
Thougth-habits	78	80	19	83	05	23
Nature-love	06	20	05	11	07	11
Order-habits	—	—	07	07	08	09

[+]*E*=college entrants, *G*=graduuating students

Table 6.

What has the greatest influence on a pupil's grade? (percentages).

	Israel				West Bank	
	Jews		Arabs			
	E	*G*	*E*	*G*	*E*	*G*
Pupil's knowledge	20	10	51	07	08	52
Pupil's attitudes	13	40	22	46	08	11
Pupil's experience	08	06	04	09	09	20
The way in which a topic was tught	60	44	23	40	09	17

[+]*E*=college entrants, *G*=graduuating students

6. *Pupils' achievment as related to teaching*: What has the greatest influence on a pupil's grade? (see table 6.) It is seen that the majority of the Jewish entrants placed the onus on the teacher, whereas the majority of *both* Arab samples held the pupil responsible. In both Israeli graduating samples, there was a much stronger emphasis on pupils' attitudes as contributing to their grades, but *both* samples strongly deemphasized pupils' knowledge, in contrast to the West Bank sample. The percentage of both Israeli graduating samples holding that the main responsibility is the teachers' was now equal.

7. *The teaching of science - methods and approaches*: (a) Are field-trips desirable in nature-studies? (see table 7.) 100% of the Jewish entrants, compared with 61% of the Israeli Arabs and 38% of the West Bankers, felt that field-trips are essential or desirable. 100% of both Jewish and Arab graduates thought so, and so did close to 70% of the West Bankers.

8. *Methods and approaches, continued*: (b) How important are laboratory activities in junior high-school science teaching? (see table 8.) None of the Jewish entrants would dispense with laporatory activities, compared with 30%-40% of the Arab samples. Among graduating students the dufference between the Israeli samples had almost disappeared, but half of the West Bankers still felt that one could definitely teach junior high-school science without such activities.

Table 7.

Are field-trips desirable in nature-studies? (percentages).

	Israel				West Bank	
	Jews		Arabs			
	E	*G*	*E*	*G*	*E*	*G*
Essential	80	90	40	85	30	40
Desirable	20	10	21	15	08	28
Somewhat	—	—	14	—	12	28
Undersirable	—	—	24	—	50	03

[+]*E*=college entrants, *G*=graduuating students

Table 8.

How important are laboratory activities in junior high-school science teaching? (percentages).

	Israel				West Bank	
	Jews		Arabs			
	E	*G*	*E*	*G*	*E*	*G*
Essential	84	100	58	80	48	45
Desirable	16	80	11	11	12	09
Not Essential	—	—	06	08	08	11
No need	—	—	23	—	32	37

[+]*E*=college entrants, *G*=graduuating students

Table 9.
Should a science lesson be any different frome a non-science lesson?

	Israel				West Bank	
	Jews		Arabs			
	E	*G*	*E*	*G*	*E*	*G*
Very much	20	92	16	70	10	28
Yes	70	08	25	20	20	23
A little	08	—	13	11	16	17
No	02	—	40	—	54	31

[+]*E*=college entrants, *G*=graduuating students

9. *Methods and approaches, continued*: (c) Should a science lesson be any different from non-science lessons? (see table 9.) Almost none (2%) of the Jewish entrants repled in the negative, compared with 40% of the Israeli Arabs and more than 50% of the West Bank subjects. As for the graduating students, both Israeli groups would expect science lessons to be materially different, with close to 50% of the West Bankers expecting little difference or none at all.

10. *Methods and approaches, continued*: (d) How should a nature-study lesson be organized? (see table 10.) Almost 90% of the Jewish entrants advocated group-work, with about 80% of *both* Arab samples suggesting a lecture-type approach. Amongst graduating students the gap between the Israeli samples had disappeared, the vast majority advocating group-work, and the rest a quetion-and-answer type of lesson. On the West Bank, group-work advocates came to less than 30%, with 45% still suggesting a lecture-type approach.

Table 10.
How should a science lesson be organized? (percentages).

	Israel				West Bank	
	Jews		Arabs			
	E	*G*	*E*	*G*	*E*	*G*
Lecture	04	—	78	—	80	45
Group-work[a]	88	90	13	85	05	28
Questions & answers	08	10	05	15	07	20
Other	—	—	02	—	08	06

[+]*E*=college entrants, *G*=graduuating students
[a]Except for opening and summing-up phases

Table 11.
Actual lesson-planning-part II of questionnaire? (percentages).

	Israel				West Bank	
	Jews		Arabs			
	E	*G*	*E*	*G*	*E*	*G*
Lecture	12	—	82	22	88	57
Group-work[a]	88	90	18	58	—	20
Other	—	10	—	20	12	23
N (lesson plans)	100	100	94	90	69	70

[+]*E*=college entrants, *G*=graduuating students
[a]Except for opening and summing-up phases

11. *Actual lesson-planning* (part II of the questionnaire [see table 11 for results]). Jewish entrants were almost all in favour of group-work, with *both* their Arab counterparts heavily committed to frontal lectures. Among the graduaiting students in Israel, the Jewish subjects totally objected to lectures, which were now recommended by only 22% of

the Israeli Arabs, but by close to 60% of the West Bankers. These findings are in line with students' expressed views in Part I of the questionnaire.

B. Comulative data:

1. *Comparison between college-entrant groups.* (see table 12.) From table 12, it can be seen that the means for the Jewish subjects differed positively and highly significantly from the means for *both* the Arab samples in all four areas. There was a significant difference in favour of the Israeli Arab sample compared with the West Bank sample in tow of the areas: views about science and science teaching, and school experience in retrospect, but no significant differences in the other two: teacher and teacher-pupil relationships, and teaching approaches and methods.

Table 12.
Three-way comparison of college-entrants-Sample means[a] and significance of differences (chi-squared analyses).

Israel		West Bank	Significances (*p*)		
Jews	Arabs				
N=62	N=51	N=43	1:2	1:3	2:3
(*a*) Views about science and science teaching					
358	288	202	001	0001	002
(*b*) School experience in retrospect					
353	263	205	001	0001	001
(*c*) Teacher and teacher-pupil relationships					
290	200	179	001	0001	n.s.
(*d*) Teaching aims and methods					
338	231	197	0001	0001	n.s.

[a] On a 1 to 4 piont scale (1=most traditional to 4=most 'Western' approach or attitude; for section (*b*) - 1=least to 4=most enjoyable etc.)

Table 13.
Three-way comparison of graduating college-students-Sample means[a] and significance of differences (chi-squared analyses).

Israel		West Bank	Significances (*p*)		
Jews	Arabs				
N=50	N=45	N=35	1:2	1:3	2:3
(*a*) Views about science and science teaching					
3·79	3·50	2·92	n.s.	0·01	0·05
(*c*) Teacher and teacher-pupil relationships					
2·87	3·11	1·97	n.s.	0·001	0·001
(*d*) Teaching aims and methods					
3·68	3·49	2·48	n.s.	0·001	0·001

[a] On a 1 to 4 piont scale (1=most traditional to 4=most 'Western' approach or attitude)

2. *Comparison between graduating students groups* (see table 13 for results). From table 13 can be seen that:

(*a*) in contrast to the highly significant differnces between entrants, there were no significant differences between the Israeli Jewish and Arab graduates;

(*b*) instead of non-significant or reatively small differences between Israeli Arab and West Bank entrants, there were now highly significant differences.

Mar'i's (1978) diagnosis related to the situation in general and was based on studies executed in the early seventies. The present study relates specifically to science education and was executed almost ten

years later. Does Mar'i's statement hold true for science education in the middle eighties? The situation in secondary schools as portrayed by college-*entrants*' views and opinions, both retrospective and normative, is quit unequivocal and unmistakable. However, it must be stressed again that what is portrayed is the subjects' *image* of their teachers ans their teachers' objectives and priorities, which might be substantially different from the teachers' *self*-image, i. e., their personal priorities and expecations (see Jungwirth 1971, and Jungwirth and Tamir 1973, for discussions of this point). It is, however, the subjects' *perception* (i. e., the image) of what their teachers had intended, which formed their opinions of what science teaching (and, indeed, science itself) is and 'oughta be' (ought to be) Lauffer 1982). If one makes that assumption-as the present authors do-then it woudl appear that the 'modernisation effect' of the Israeli science cuccicula has resulted in Arab science education in Israel now occupying a position distinct from, but still more similsr to that on the West Bank, than to that of the Jewish sector in Israel. This would be particulary true in relation to those normative opinions (of the entrants) directly concerned with in-school and in-classroom processes, where no significant differences were found between the Israeli Arab and the West Bank situations.

What is the effectiveness of three years' studies at the teacher-college level? This can be estimated from *graduating* students' normative opinions of science teaching as it 'supposed to be'. Three main findings are relevant here: First, three years of perparation for science teaching

have resulted in significantly different expressed opinions (in all areas) of the Israeli Arab samples. The'no difference' of their Jewish counterparts seems to be due to a ceiling-effect. Second, both the Jewish and Arab Israeli subjects expressed different from their West Bank counter-parts. Third, there was no defference between West Bank entrants and West Bank graduating students as far as their views about the science-teacher's statud, and teacher-pupil relationships are concerned; i. e., there was no shift away from the highly authoritarian stance adopted by the college-entrants. It has been stated (Hurd *et al.* 1980) that 'biology teachers reflect the value-system of their coounities, and, in most instances, teachers closely fit the neighbourhood's image of what a teacher should be professionally'. This statement, written in and about the us is probably just as valid for the 'neighbourhoods' explored in the present study.

If the effect of three years college education on subjects' expressed normative opinions can be taken as indicative of future teacher behaviour, it might be expected that the present trend in Israeli Arab science teaching will be accelerated, moving Israeli Arab science education still futher away from its West Bank counterpart towards more modern, 'Western' approaches and methods which characterize the Jewish sector in Israel. An ongoing research project is attempting to ascertain whether the changes reported here indeed result in actual changes of teaching approaches and methods.

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