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ABSTRACT

This document reports on a pilot study undertaken to solve the problems faced by technical colleges in accepting, and judging the abilities of, applicants recommended by industry. First-year college students, 685 boys total, were given a series of tests in verbal and non-verbal intelligence. Test results show a striking similarity between the craft and technician groups in these colleges. The main conclusion reached is that the present relationships between industry and further education do not permit making hard and fast distinctions between potential craft and technician students, at least in their first year of college. A bibliography of related reading materials is included. (CK)

The Association of Colleges for Further and Higher Education

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Senior Research Fellow, Further Education Group, Brunel University

Summer Meeting
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Because of the close relationship between industry and technical education, exemplified by the day-release system, technical colleges are annually faced with the problem of deciding whether students selected by firms for courses are either capable of benefitting from such courses, or conversely, whether they are able to pursue courses of more theoretical complexity. An anonymous article in the Technical Journal (Anon. 'Who is Out of Step?', Technical Journal, Vol. 8, No. 9, December 1970, p. 15) puts the dilemma well: "Do the colleges exist to provide students with courses in keeping with their intellectual abilities and assist them to achieve the highest qualifications available to them or do they provide purely vocational education in the narrowest sense?" Both Martin (1969) and Buzzard (1969) have pointed out that the existing system does not pay enough attention to the abilities, aspirations and needs of the individual student. Martin (op. cit.) quotes a point made by Marvin Adelson (1966) in discussing educational needs and innovational means. "The education industry, institutionalised, legally sanctioned and in production, was here before we were. With the schools as its main physical plant, it has for a long time been processing people in large numbers; but very slowly, with low-paid labour and antiquated methods, nondescript quality control and a certain refractoriness to changes in its environment. A rapidly evolving society that is imposing increasing demands on its services seems to be confronting its managers and practitioners with problems they are not fully able to handle."

Further Education, however, contains an added complexity in that we are here faced with two systems — the educational and industrial — in which the constraints of one system are passed on to the other. Industry selects its workers, and industry sends them, if they are on apprenticeships or trainee agreements, to college. Even within one industry, the process of selection and of giving apprenticeships or traineeships, is haphazard. Kate Liepmann in her study of apprenticeships (1960), commented that within engineering, "the method of selection is not standardised. Some employers use more or less elaborate tests;

some go by instinct; in some firms the engagement of apprentices is left to the shop foreman". (P.70). Lady Williams, in her pioneering study in 1957, drew attention to the haphazard methods of selection within industry. "A number of firms, including some of the largest, recruit their apprentices through the Youth Employment Service, and it may be supposed that the offices have at least attempted some rough and ready selection on the basis of aptitudes; but as far as the firms in this enquiry are concerned (some 550 firms) as many do not make use of the Youth Service, or do so only to get additional boys if those making direct application prove insufficient."

To exhort employers to select their personnel with greater care, however, simply begs the question. Broad (1970), in discussing a survey made of 31 schools in the West of England, showed that one-fifth of school-leavers had no idea of what they wanted to do, and that another 34 per cent had only "some idea"; that 65 per cent of the leavers had not had a counselling interview and that 87 per cent of the schools careers staff spent one day or less per week on work/Further Education counselling. Consequently, large numbers of school-leavers emerge from the education system with only the vaguest ideas about their subsequent vocational career, and for this and other reasons, Newman (1969) has suggested that the task of the training officer is not so much to look for real talent but to weed out those who may discover they don't like the work, or who have been forced into the job through parental pressures or simply do not have any aptitude for the task.

Vickery (1969), working within the specialised Darlington textile industry with a largely female work force, has given a clear picture of the problems that face the employer in trying to select manpower. "Selection is based on the interview, the medical check, and the general remarks of the school report. Up to now we have not found any dexterity test that give a sufficiently accurate correlation to justify them". The evidence from other sectors of industry is equally pessimistic. Pendlebury and Hardman (1967), working with engineering craft apprentices at Rolls Royce, found that interview ratings had no predictive value either for success on the factory floor or at the local college of technology, that a battery of intelligence, spatial and numerical ability tests failed to predict success during works training, and suggested that headmasters' ratings might prove more successful than either of these two as predictors. In case anyone feels optimistic about this latter suggestion, perhaps I can refer him to another, so far unpublished report (Grimes, 1969) carried out recently within British European Airways, and a similar exercise within B.O.A.C. (Barry, Mary, 1969) which both

gave low or negligible correlations between headmasters' reports, interviews and works assessments. Ross (1962) has similarly reported a lack of any significant relationship between boys' hobbies and their practical assessment on the factory floor. McMahon and Montgomery (1962) showed that among apprentices at Ferranti's there were high correlations between technical theory qualifications and supervisors ratings, but non-significant correlations between these theoretical qualifications and factory ratings. These findings are corroborated by Susan Chappel, (1967) who found that previous academic attainment at school was the most valuable general guide to selecting apprentices for trade school, but that this prediction could be improved slightly by adding to it the combined scores of two tests, in mathematics and mechanical reasoning. She also stressed the major difficulty of this type of work — finding a reliable criterion of work performance.

Given the complexity of these inter-relationships between school, technical college and work, colleges of further education are faced with what appears an insoluble problem. They receive, from industry, large numbers of apprentices selected on a variety of different procedures, ranging from the casual (a phone call to the Youth Employment Office) to the rec[illegible]us (B[illegible]as a combination of nine tests, [illegible]iews and background assessments). The current evidence suggests that where predictors have been used for college success, they will correlate insignificantly with subsequent performance on the shop floor. In the event, what should colleges do about what Lady Venables (1960, 1961) has described as "placement", and in particular, how should colleges treat the division between craft and techician students?

The pilot study — pilot in the sense that it was not designed to test a specific hypothesis, but was carried out to suggest lines of investigation, and to test means of investigating them — that I want to report on here was intended to throw some light on these problems. In discussing it, I must explain that the work is far from complete, and that the results are not conclusive. This, then, is a preliminary report of work in progress, and many of the more intriguing questions associated with it still await analysis. It was carried out by the Further Education Group at Brunel University, a unit set up with a five-year grant from the Department of Education and Science with the specific brief to carry out research within the field of Further Education.

The situation that we were studying was of two local technical colleges, within a dozen miles of one another and serving broadly the same industrial and social area, both of them offering

craft, technician and national certificate courses. The colleges differed, however, in a number of ways; most specifically, one of these two colleges also acted as an area college for the aero industry, and therefore had a sizeable intake of boys, highly selected on a national basis, for a group of courses not offered by the other college. Another way in which these two colleges differed was in their approach to "placement". One college took boys — and as we came across only one girl in the entire sample of some 570 students I will (though she was by far the prettiest) ignore her — on the recommendation of their firm, and, after the first term, re-assessed their potential, moving them either up or down. At the end of the year, there was further re-assessment, and, again, a certain movement between craft and technician levels. The second college developed an induction course to introduce newcomers to the institution, and as part of this course, included three tests — in English, mathematics and science — together with an interview which, together with the boy's school record and his firm's recommendations, contributed to the initial decision to enter him for either a craft or technician course.

All colleges, whatever procedures they adopt for "placement", have the problem that boys arrive on their doorsteps from firms which either do not employ certain categories of workers, and so cannot afford to be flexible about these matters, or have a selection system of their own which convinces them of the rightness of their own decisions. Consequently, colleges are faced every year in negotiations with supporting firms to change the categories in which they have placed their own employees, and the success with which this is done varies from firm to firm. In our particular case, there was the further complication of the aero industry, with its own highly-developed selection system and explicit manpower needs. The aero industry is prepared to be persuaded against its own judgement in a number of marginal cases, but broadly speaking, it has developed a very elaborate system of recruitment from which it is understandably reluctant to deviate, unless it can be shown conclusively to be mistaken.

When we came to these two colleges in May, 1967, we were interested to obtain some independent measures of the potential ability of the first-year students, to see how this ability was distributed within the colleges. We rather expected, for example, that College B's procedure of giving an induction test would create more homogenous sub-groupings in that college than in College A. We also expected — we had been informed of the fact — that the aero students would prove to have rather higher measured ability than the non-aero students, but we wanted to know a little more specifically what the differences might be.

What we therefore did was to give the entire first-year intake in these colleges, so far as we could, a series of tests, in verbal

and non-verbal intelligence (AH4), English (NFER English), mathematics, (Vernan Graded Arithmetic — Mathematics) and the Eysenk Personality Inventory, which measures degrees of neuroticism and extroversion. We also administered a little-known Level of Aspiration test, which I will not discuss here in any further detail because of its complexities.

In all, we tested 685 boys in these two colleges. Because the testing had to be completed in a very short period, because the end of term was approaching and because we were dealing with some 43 classes in two institutions several miles apart, with boys who come to college on only one day a week, we were never in a position to test the entire first-year intake. We did, however, manage to test most of them, and Table 1 gives the initial results for English boys in our sample.

The table gives the average mark achieved by each group in our sample, against a possible total score given for each test at the top of the relevant column. It also gives the standard deviation for each group's scores, a measure which gives some idea of the spread of marks for each of the groups.

What is immediately noticeable about these figures is that, despite the fact that the colleges operate somewhat different "placement" procedures, there is a striking similarity about the composition of their craft and technician groups. The very slight differences in scores are the kind of variations you might expect to obtain purely by chance in drawing two different samples from the same population, and are of no significance. That is to say, that, on these tests (and one must always stress that we are referring only to these particular tests) the craft students in college A and those in college B performed in remarkably similar ways, and as you will see from the standard deviations the range of ability was also very similar. The same applies to the two groups of technician students.

What is also noticeable, however, is the remarkable difference in the scores for the aero students. You will notice, not merely that they consistently score better, as groups, than their counterparts, but that the mean scores for aero crafsmen approach the mean scores for engineering technicians and, in some cases, for technicians *plus*.

These scores are only a pale reflexion of the great differences that attach to the terms "craftsman" and "technician" within industry generally. A craftsman in the aero industry can expect two years off-the-job training in a specially equipped training school, with its own hostel, team of trainers and supervisors, constant personal attention, relatively high pay, and prospects geared to academic as well as shop-floor success. At the other end of the scale, a craftsman can mean merely a youth in a

Table 1

Mean Scores and Standard Deviations for English Day-release College Students

Category	*N for all tests*		*65 AH4*	*65 AH4*	*45 Eng*	*20 Mech*	*30 Prob*	*25 Alg*	*75 Maths*	*Mean Scores Neur*	*Extro*
College A craft	111	$\overline{M}$	27.8	37.7	29.4	18.2	17.4	2.0	37.2	9.9	15.0
		SD	8.6	10.8	7.2	1.7	6.2	2.7	9.6	4.4	3.7
College B craft	47	$\overline{M}$	27.5	39.6	27.0	18.1	16.9	1.7	36.7	10.6	14.5
		SD	9.3	12.9	7.1	2.0	6.7	2.5	9.7	3.4	3.7
College B aero craft	64	$\overline{M}$	34.1	46.5	30.8	19.1	23.4	5.7	48.2	9.3	15.2
		SD	6.0	8.5	8.2	0.8	3.8	3.0	6.0	6.7	8.2
College A tech	26	$\overline{M}$	33.5	43.8	31.8	19.3	23.3	5.9	48.6	9.2	15.8
		SD	6.5	6.8	5.5	0.8	3.8	4.4	7.7	4.0	3.0
College B tech	35	$\overline{M}$	35.7	45.4	33.4	19.0	24.7	8.8	52.6	9.8	13.8
		SD	7.7	8.8	5.6	1.1	3.8	3.9	7.9	3.9	3.7
College B aero tech	18	$\overline{M}$	43.5	56.5	36.6	19.2	23.3	13.9	56.4	9.5	12.9
		SD	7.6	7.3	2.5	1.2	10.4	3.0	12.2	3.8	7.6
College B tech plus	26	$\overline{M}$	37.7	47.5	38.4	19.3	26.9	14.5	60.7	9.5	12.5
		SD	4[illegible]	7.4	4.4	1.1	1.9	4.5	5.3	3.8	4.2
College B aero tech plus	22	$\overline{M}$	45.7	58.2	38.0	19.4	27.6	16.0	62.9	9.9	12.4
		SD	5.1	6.5	3.6	0.8	1.5	2.3	3.4	3.6	3.0

two or three-man light engineering outfit, acting largely as an operative and general factotum, in which day-release is seen as a necessary evil irrelevant to the needs of the firm and to be discarded as soon as possible.

Given these vast discrepancies, it is important now to consider how these students performed within their colleges, using as criteria their end-of-year examinations. The relevant data is given in Table 2, but the various categories of success and failure shown in that display need a little explaining. Our reference point is column 2, where we find all those who achieved a straight-forward pass. The first column, by comparison, includes all those who gained some kind of distinction and might, as a result, be moved to another category (from, say, technician to ONC). The third column contains those students who, though they might ultimately be passed, have some query concerning their academic performance, either through having failed one or more subjects, or more simply by doing less well than the course demands. The fourth column refers to straight-forward failed students, but the fifth column deals with those students who, in the eyes of staff, are clearly misplaced, and for whom the college can either not offer a course or who, from say G courses, are re-routed to craft courses. The column headed "missing" refers to all those students who, though they began a college course and were still present a month before the end of the year, when we tested them, eluded the examination system.

What is clear from these assessments is that, despite the discrepancies discussed earlier, the first year examinations act as only a very low hurdle. From the table, you will also see that there are two particular groups which appear to have caused problems within our two colleges; College A's technicians, of which eight out of 26 were referred, and College B's technicians *plus*, of which eight out of 37 were referred. College A's explanation of this particular problem is one that often greets a research enquiry — "this was a notoriously bad year, and quite untypical". The explanation for the technician plus group in College B is quite different. The course comprises both mechanical and electrical components, the electrical parts of which are taught by the electrical engineering department to those with a background to the subject and those, coming from the mechanical side, who do not have this background. In this particular year, staff problems caused the teaching to ignore the fact that these were mixed classes, with the result that all eight referral cases were mechanical students, failing — sometimes disastrously — in electrical engineering!

Here we come to a question — what are the objectives of the first-year exam? Many teachers have told us that they feel, above

Table 2

College Assessments on English First Year Students by Group

Grade of pass/fail

	1	2	3	4	5	MISSING	TOTAL N
College A craft	21	68	8	2	4	8	111
College B craft	—	30	1	1	1	14	47
College B aero craft	—	75	1	—	—	9	85
College A tech	—	12	8	—	5	1	26
College B tech	4	41	4	1	2	8	60
College B aero tech	1	50	—	1	8	1	61
College B tech plus	—	16	8	—	7	6	37
College B aero tech plus	14	1	—	—	—	7	22
Total	40	293	30	5	27	54	449

Grade of assessment: 1 Superior pass
2 Pass
3 Referred (subsequently passed)
4 Fail and repeat
5 Fail, down-graded

all, that their craft and technician students need "an experience of success" and that, consequently, they feel that this relatively simple hurdle increases motivation, inspires confidence and in some cases notably changes attitudes towards both the course and the college. Other teachers have equally made the point that the examination should "ring some warning signals" for the major obstacle to come — the external assessment the following year. The difficulty is to reconcile these conflicting aims, and here again, the problem of "placement" is crucial to the issue.

For the question, given the generally high degree of "success" in the first year, is to consider the second-year external assessments for the groups. Regretably, at the time of writing this paper, these follow-up results are only available for one college. The problems of tracing students from year to year

Table 3

Progress of Day-release Students in College 'A' over 2 Years

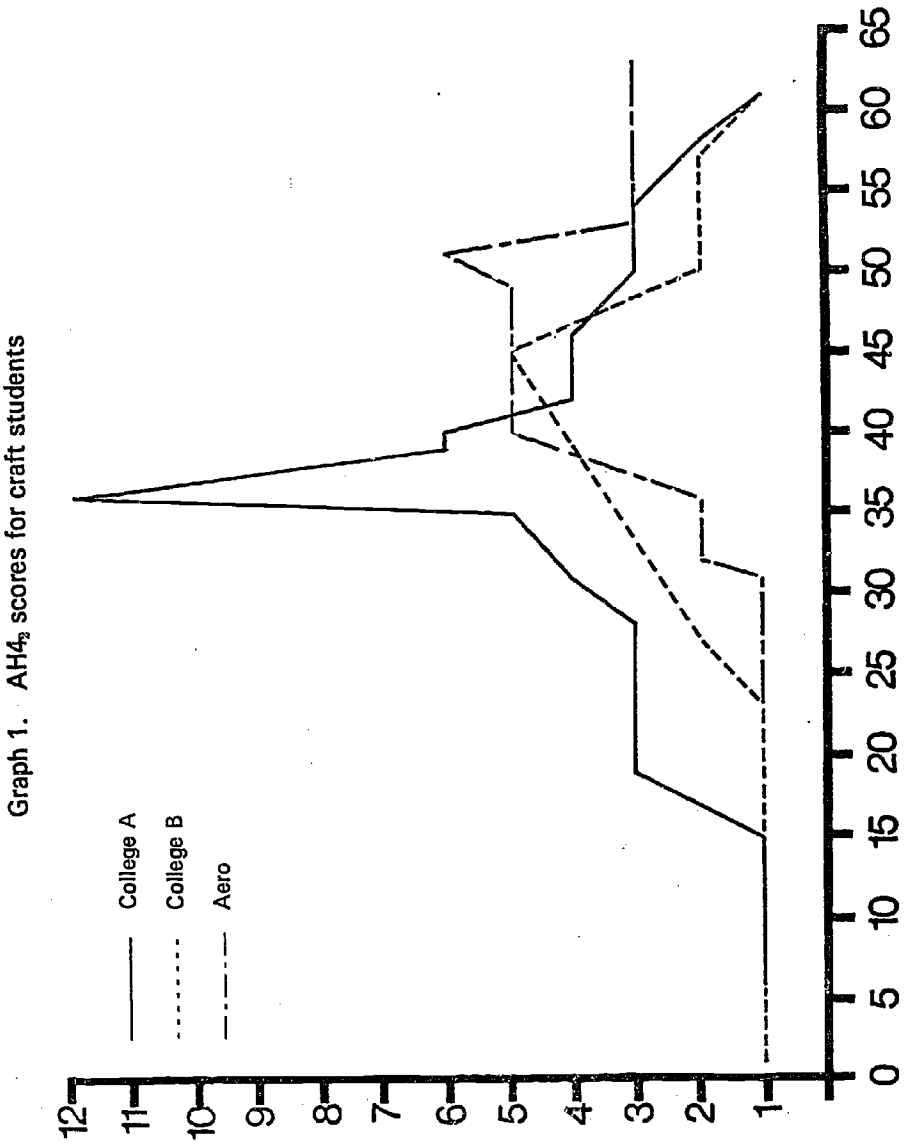
	CRAFT		TECHNICIAN	
Initial intake	111		26	
No. passing internal exam at the end of 1st year	97	% pass =87.4	20	% pass =77
No. enrolled and completing 2nd year of course	60		18	
No. passing Pt. 1 external examination at end of 2nd year	36	% pass =60	15	% pass =83.3

within the record-keeping systems developed by individual colleges are considerable and time-consuming, and demand infinite care and patience, and not a little ingenuity.

Table 3 gives the results for College A, and you will see that, again, both groups have done reasonably well, the craft students achieving a 60 per cent success rate and the technicians — marked as a particularly weak group by their teachers — have done even better. At the same time, we have a very large decrease in the numbers of craft students, which we might generally describe as "wastage". This is due to a number of causes. The major one is non-enrolment for the second year. A second is absenteeism during the examination period. A third is that some craft students in our sample did not sit for an external examination in this period. The question on "placement" is simply this: if students had been in different categories from those in which they were enrolled, would they have done better?

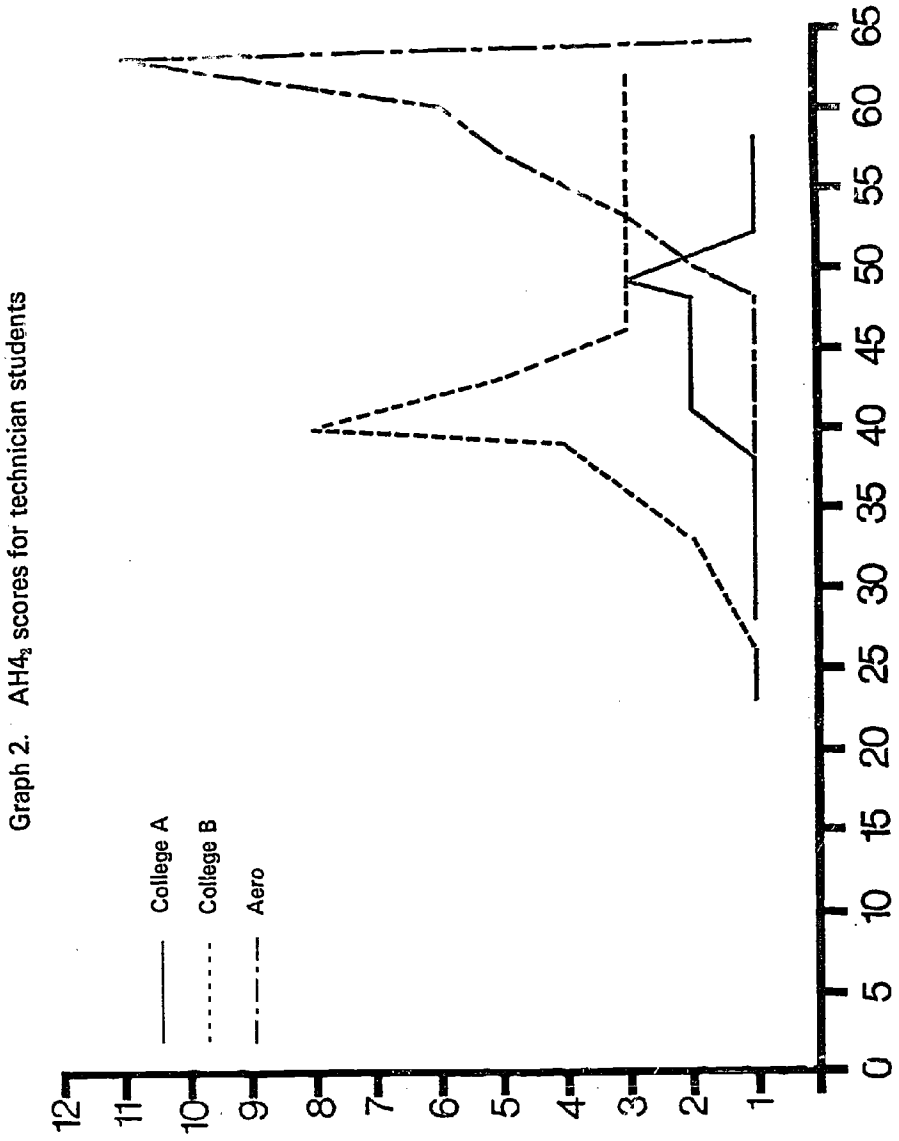
We cannot answer this directly, because educational experiences are unique to the individual and cannot summarily be repeated. What we can do, however, is go back to our original tests, and ask, first of all, whether these tests are reasonable predictors of "success". To ask this kind of question is to query the nature of the test battery itself, and so we first carried out a factor analysis to see how many factors were involved in our battery. The outcome of this work was an unusually clear picture, which allowed us to say that all four of our cognitive tests (AH4 verbal, AH4 non-verbal, English and mathematics) were all loading on the same factor, and moreover, were completely contained within that factor. Practically speaking, it allows us to take only one of these tests, instead of dealing with all four, and draw conclusions which will broadly apply to all four of them.

The next exercise we needed to do was to now take these tests, and see what kind of relationships we could find between scores on them and scores obtained on the college examinations. Here we faced a major difficulty, because the variety of subjects taken by our sample in the two colleges made it almost impossible to find a sizeable homogenous group who had all been through the same syllabus. We were, however, lucky in having two sub-samples large enough in which to work. These were 61 aero technicians and 78 aero craft students, both in College B. Correlation matrices for these two groups showed that, of all our tests, the non-verbal AH4 test as acting as a moderate predictor of "success" both in internal assessment on first-year craft studies for the aero group, ($r = +0.46$ $p < 01$) and on the theoretical assessment of the external City and Guilds exam for the first-year aero technicians ($r = +0.38$ $p < .01$).



Graph 1. $AH4_2$ scores for craft students

It is a major assumption, though not an unreasonable one, that the non-verbal AH4 test scores are, therefore, about as good a predictor for the theoretical content of college courses as we have in our battery. I hasten to add that they are not good predictors for all subjects, especially the more practical subjects and that, both in this study and in the studies already discussed earlier, the batteries have been too biassed towards heavily g-loading tests.

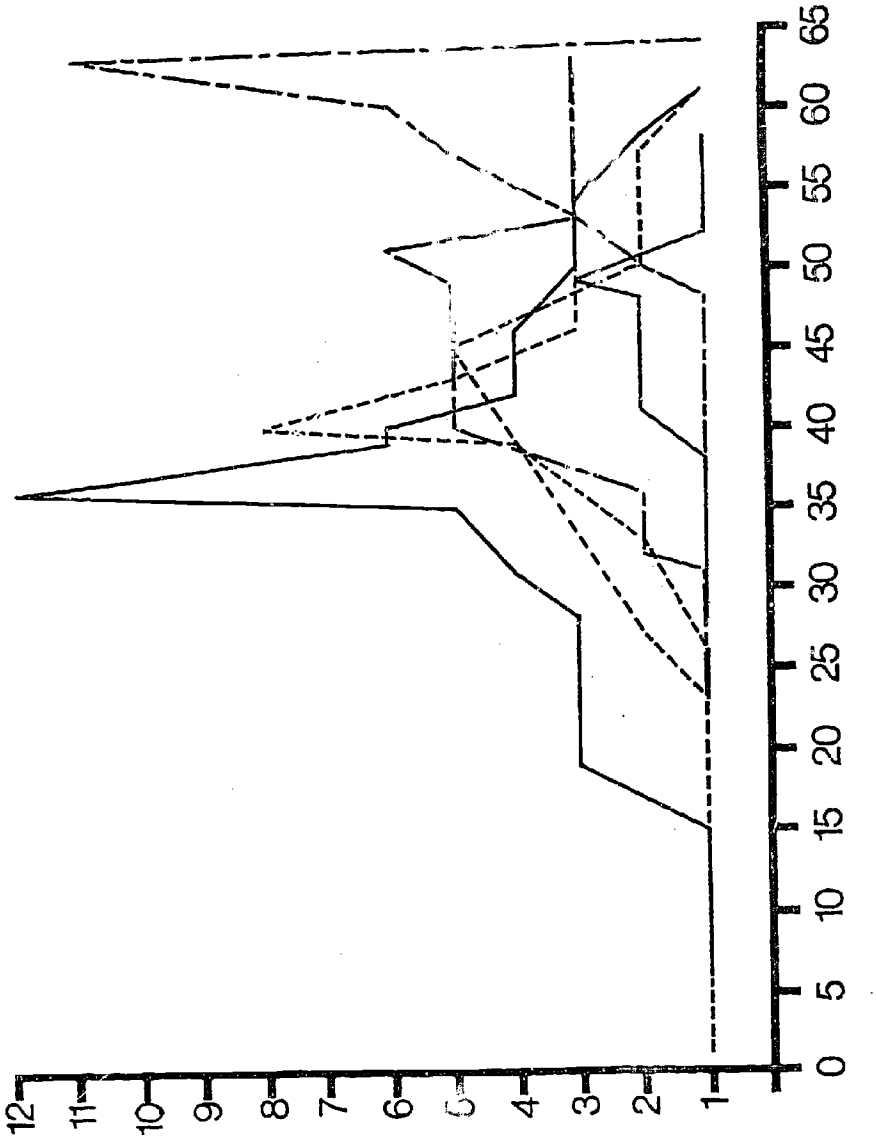


Graph 2. $AH4_2$ scores for technician students

If we now look at the distribution of AH4 (2) scores among our population for both craft and technician students (Graphs 1 and 2) among the whole sample from the two colleges, we get the following graphic distributions:

You will see that even though the aero craft group has been specially selected, there is a considerable over-lap between the two other craft groups and the aero students. This is also the

Graph 3. $AH4_2$ scores for craft and technician students



case for the three technician groups, and if we put these two graphs together, as we have done in Graph 3, then you can see that if we were to use this particular test as a measure of college "success', there are quite a few people in each group who could, on this criterion, be in another group.

To find out the extent of this over-lap, and to see which individuals might fall into this area of over-lap, we took all four of our cognitive tests (AH4 1; AH42, English and mathematics) and, using a multivariate discriminant analysis, tried to see how many individuals in one group could, on the basis of these tests, have been included in another group, and to identify the individuals so that we might have some check of their own progress. Discriminant analysis, although a highly sophisticated technique, is clearly open to error. Another point constantly to bear in mind is that our four cognitive tests are not complete predictors of "success" — they are only partially predictive. Nevertheless, discriminant analysis does give us an indication of the extent of over-lap, and the opportunity to look more deeply into individual cases. The outcome of this exercise is shown in Table 4:

As you can see, and bearing in mind all the qualifications I have given earlier, there is considerable over-lap between craft students and technician students. Plainly a great deal more work needs to be done here, and I re-emphasise that this is to a large extent a report of work in progress rather than any kind of final statement, even on this single project. But given that you are practitioners in the field, faced each September with the undesirable situation of having to make decisions that can effect the lives of very many young people, what conclusions can you draw, in a practical way, from this kind of evidence?

To me, the answer seems plain. It is that, in our present knowledge of the art, the present relationships between industry and Further Education do not permit us to make any hard and fast distinctions between potential craft and technician students at least in their first year in college. I do not want to pre-judge subsequent findings, but I am prepared to parade a prejudice — in favour of a first year, diagnostic common course in technology, with a far heavier loading on what we describe as "liberal studies", but which I prefer to describe as "communications" than we have at present. Further Education is, in any case, faced with finding a new role as off-the-job training becomes, at least in theory, a more commonly accepted facet of industrial life. It seems to me that common courses of the kind I have described and with a larger "educational" content might be at least one strategy which would have a pay-off in increased motivation and hence "successful" output, though it leaves unanswered the very difficult question, which I have tried to deal with elsewhere (see van der Eyken, Willem. The Lottery of Adolescence. Trends in Education. July, 1971. In press) about what to do with the boy who has technician potential but whose firm can only employ craftsman. What is immediately of concern,

Table 4

Number in Sample	Number Misplaced	Percentage Misplaced				Number in Sample	Number Misplaced	Percentage Misplaced
111	30	27	A Craft A Craft	⟶ ⟵	A Tech. A Tech.	26	6	23
43	13	30	B Craft B Craft	⟶ ⟵	Aero Craft Aero Craft	61	7	11.5
43	7	16	B Craft B Craft	⟶ ⟵	B Tech. B Tech.	33	4	12
43	6	14	B Craft B Craft	⟶ ⟵	Aero Tech. Aero Tech.	18	1	5.5
43	2	4.7	B Craft B Craft	⟶ ⟵	B Tech. Plus B Tech. Plus	25	0	0
61	22	36	Aero Craft Aero Craft	⟶ ⟵	B Tech. B Tech.	33	11	33.3
61	5	8.2	Aero Craft Aero Craft	⟶ ⟵	Aero Tech. Aero Tech.	18	1	5.5
61	8	13	Aero Craft Aero Craft	⟶ ⟵	B Tech. Plus B Tech. Plus	25	3	12
33	8	24	B Tech. B Tech.	⟶ ⟵	Aero Tech. Aero Tech.	18	2	11
33	6	19	B Tech. B Tech.	⟶ ⟵	B Tech. Plus B Tech. Plus	25	6	24
18	2	11	Aero Tech. Aero Tech.	⟶ ⟵	B Tech. Plus B Tech. Plus	25	4	16
18	7	39	Aero Tech. Aero Tech.	⟶ ⟵	Aero Tech. Plus Aero Tech. Plus	22	5	16
25	5	20	B Tech. Plus B Tech. Plus	⟶ ⟵	Aero Tech. Plus Aero Tech. Plus	22	4	18

however, is that official policy, as represented by the Hazlegrave Committee, seems to be veering away from such a strategy. My personal concern is that we do not, at this point, commit ourselves to administrative decisions which will have serious effects on the life-chances of young people when, in fact, the evidence is, to say the least, not conclusive.

Bibliography

1. Martin, A. (1969) Towards a social Psychology of Education and Training. *Bulletin of the British Psychological Society*. Vol. No. 22, Pt. 74. Pps 21-26.
2. Buzzard, R. B. (1969) Development in Selection Techniques. *The Training Officer*. Vol. 5, No. 3 Pps 69-78.
3. Adelson, Marvin. Educational Ends and Innovational Means System Development Corporation, 2500 Colorado Avenue, Santa Monica, Cal.
4. Liepmann, K. (1958) Apprenticeship Routledge, London.
5. Williams, Gertrude (1957) Recruitment to skilled Trades Routledge, London (1970).
6. Broad, B. J. (1970) The World's Their Oyster — Or is It? *Personnel Managerment*, July, 1970. Pps 14-18.
7. Newman, G. (1969) Apprentice Intakes: Selection or Elimination? *The Supervisor*. April, 1969. Vol. 20, Part 4. Pps 84-5.
8. Vickery, R. (1969) Cast on 500. *Industrial Society*, January, 1969. Pps 4-6.
9. Pendlebury, A. C. and Hardman, K. (1967) Rolls Royce: the selection of craft apprentices. *Technical Education and Industrial Training*, August, 1967. Vol. 9, No. 8. Pps 356-7.
10. Grimes, A. (1969) A Follow-up study of selection tests for aircraft engineering apprentices. Unpublished project report. Birkbeck College, London.
11. Barry, Mary. (1969) Cross-Validation of Selection Criteria against success in Aircraft apprenticeships. Personnel Research Report No. 26. Manpower Branch, B.O.A.C.
12. Montgomery, G. W. G. (1962) Predicting success in Engineering. *Occupational Psychology*. Vol. No. 36, Pps 59-68.
13. McMahon, D. (1962) Selection and Follow-up of Engineering Apprentices. *Occupational Psychology*. Vol. No. 36. Pps 53-58.
14. Chappel, S. (1967) *Personnel Practice Bulletin* (Melbourne). Vol. 23 No. 3, September, 1967. Pps 204-213.
15. Ross, J. (1962) Predicting Practical Skill in Engineering Apprentices. *Occupational Psychology*. Vol. 36, Pps 69-74.
16. Venables, Ethel C. (1960) Placement Problems among Engineering Apprentices in Part-time Technical College Courses — Part 1. *Br. Jnl. Educ. Psychol.* Vol. 30, No. 3. Pps 237-243.
17. Venables, Ethel C. (1961) Placement Problems among Engineering Apprentices in Part-time Technical College Courses — Part II. *Br. Jnl. Educ. Psychol.* Vol. 31, No. 1. Pps 56-68.

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