Experiments in Vocational Education in a Developing Country[1]

by

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As the author of the following article points out, developing countries cannot uncritically adopt the systems and principles of vocational education that have evolved in highly industrialised States ; because of inexperience and uncertainty as regards the future, they must be prepared to experiment and innovate, to suffer disappointments and learn from their mistakes. After outlining the general system of education, vocational training and apprenticeship in Israel, Mr. Harburger describes a number of schemes tried out in his country to meet the needs of national circumstances or special groups of the population, and frankly analyses the reasons for their success or failure.

GENERAL BACKGROUND

THE nature of the experiments undertaken by the young State of Israel in the field of vocational education, and the need for them, cannot be fully appreciated without some knowledge, however sketchy, of the demographic structure of the country and the national system of education.

Population

The total population of Israel in February 1963 was estimated by the Central Bureau of Statistics at 2,293,000. Among the characteristic features of this population, the most important for our purposes are the high rate of immigration, especially from underdeveloped countries ; the age structure of the population, in which young people predominate ; and the unbalanced distribution of the inhabitants throughout the country.

[1] This is a slightly revised version of a paper presented by the Government of Israel to the United Nations Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas, held in Geneva in February 1963.

Immigration and Immigrants.

Between 1882 and 1948, when the State of Israel was born, more than half a million immigrants arrived, about 90 per cent. of them from Europe and only 10 per cent. from Africa and Asia. Subsequent waves of immigration brought nearly one million citizens to the new State, more than half of them from African and Asian countries. Immigrants of European origin and the few from the United States came from countries with high educational standards, and many of them had worked in their home countries as professionals, university professors and teachers, merchants, bankers, craftsmen and so forth. Until Hitler's rise in Europe there had been a natural selection of immigrants : most of these were young people, often young couples, who decided to go pioneering in Palestine. During and especially after the Second World War, on the other hand, Israel absorbed the survivors of the Nazi holocaust whatever their age and background. Immigrants from oriental countries were again of a very different sort : they ranged from cave-dwellers from Morocco to pedlars, middle-class merchants and low civil servants from Iraq ; most of them had an incomplete elementary education and practically no vocational training or technological experience at all. The families of these new immigrants were on the average considerably larger than families arriving from Europe and included often eight, ten and more children under the age of 18.

Age Structure of the Population.

Up to 1935 most immigrants were in the age group 18 to 25 years. Since 1948 the increasing proportion of oriental families with many children, and the well-developed health services in Israel, which have made the infant mortality rate one of the lowest in the world, have made the Israeli population one of the youngest on earth, as the following figures for May 1961 show :

Age group	Percentage of population
0 - 14 years	36.1 per cent.
15 - 29 „	21.7 „ „
30 - 44 „	18.1 „ „
45 - 64 „	18.9 „ „
65 years and over . . .	5.2 „ „

Geographical and Occupational Distribution of the Population.

The figures for over-all density of the population in Israel —106.2 per sq. km.—is very misleading, as nearly 80 per cent. of the inhabitants live in the northern half of the country. Density in the southern half reaches only 11.8 per sq. km. and, of the 167,000 people living there, some 70,000 live in the towns of Beersheba and

Ashkelon. Thus, large areas of the country are uninhabited and represent a challenge, especially for industrial development, because of the great scarcity of water there. As the pressure of immigration continues and the country is in great need of economic (especially industrial) development in order to improve its trade balance and become more self-sufficient, settlement in these "development areas" and their productive exploitation are encouraged by the Government in all kinds of ways—by remission of taxes, special subsidies, cheap housing schemes, inexpensive loans for industrial enterprise, etc.

About 64 per cent. of the total population live in towns, but an analysis of the occupational structure shows that in 1961 only 17.1 per cent. of all employed persons worked in agriculture, forestry and fishing, whereas 82.9 per cent. found their livelihood in manufacturing, crafts, construction, services, etc.

About 11 per cent. of the total population belong to minority groups (Moslem and Christian Arabs, Druze, etc.).

Education

In many respects the high percentage of children and young persons in the Israeli population can only be regarded as an asset as long as it is also recognised to be an obligation—as long as society is fully conscious of the vital importance of preparing all these youngsters for a productive life as members of the community, according both to its future needs and to their potential abilities.

But an accurate assessment of these needs and abilities is hard to obtain in Israel, notwithstanding the existing development plans, for lack of information on the rate of mechanisation and automation, for lack of quantitative assessments of skilled workers by trades and because of the relative unreliability of many European and American testing methods when applied to youth of Afro-Asian origin.

Much has indeed been done to overcome these difficulties, but for the time being we cannot rightly claim a high degree of certainty in respect of our educational system. In our educational planning we are therefore obliged to provide considerable flexibility, to be prepared to improvise and encourage well-founded experimentation, and to be willing to admit our mistakes, to learn from them and to start anew.

Elementary Education.

In 1949 free compulsory education, covering the ages 5 to 14 and divided into one year of kindergarten and eight years of elementary school, was established by law. Youngsters who have not com-

pleted their elementary education at the age of 14 have to attend evening classes for working youth. School attendance among the Jewish youth reaches 98 per cent., and among Arab boys 90 per cent.

Secondary Education.

Only about 20 per cent. of the graduates of elementary schools apply to the employment service for work. Most of these look for vacancies as craft apprentices whose training is protected by an Apprenticeship Law ; this binds them to attend apprentice schools held one day a week and to pass governmental examinations in order to obtain their trade certificates.

There are three main trends of secondary school :

(1) general high schools with a four-year curriculum leading at the age of 18 to academic maturity (matriculation) ;

(2) vocational schools, giving two-, three- and four-year courses depending on the trade, the level of attainment or type of specialisation achieved ; and

(3) agricultural schools, mostly boarding schools, with three- and four-year courses.

Nearly 80 per cent. of all Israeli youth continue their education in one or other of these types of secondary schools, but in the age group of 17 to 18 only about 30 per cent. are still in full-time educational institutions.

Higher Education.

Higher education in Israel is provided by the Hebrew University in Jerusalem, and the Haifa Technion trains engineers and architects on an academic level. Younger and smaller institutions are the Tel-Aviv University and the Bar-Ilan University. Altogether there were in 1962-63 about 13,000 students in higher education in universities and in the Haifa Technion.

Vocational Guidance.

A broad foundation for vocational guidance is provided by arts and crafts lessons held in elementary schools, and vocational guidance is carried out by employment counsellors in all offices of the employment service. No boy or girl is registered for work or apprenticeship in the labour exchange without having one or more interviews with a counsellor ; more difficult cases are sent to one of the vocational guidance centres for testing. Some elementary schools make use of these centres for carrying out group-tests for

their pupils in higher classes. Handicapped persons are sent to special guidance committees, and these, too, make use of the vocational guidance centres.

Vocational Education.

Vocational education in Israel is provided in four main ways :

(1) Full-time vocational schools. Fifty-two schools are dispersed all over the country and in 1962-63 had a total enrolment of about 13,000 pupils, in 38 different trades. Almost all these schools were established and are maintained by public bodies (e.g. the trade unions) or municipalities. The Government supervises them, holds final examinations, subsidises them and grants scholarships to needy and worthy pupils. In most schools half the day is devoted to workshop practice and the other half to related subjects and general education, including citizenship. The annual cost per pupil varies between 600 and 1,000 Israeli pounds, of which about one-third is covered by school fees.

(2) Apprenticeship. In-service training of youngsters between 14 and 18 years of age, usually supplemented by school attendance one day a week, is mainly based on the Apprenticeship Law, 1953. There are about 13,000 apprentices in workshops and factories, in offices and stores—10,000 of them working in trades covered by the law. Apprentices receive daily wages, starting at a rate of 30 per cent. of the wages of an unskilled adult labourer and rising to about 75 per cent. of the wages of a low-grade skilled worker. The annual cost per head of apprentice schools is around 135 Israeli pounds—35 being paid by the apprentice as school fees. The length of apprenticeship varies, according to the needs of different crafts, between one-and-a-half years and four years.

(3) Vocational training of adults. Accelerated training courses for adults have been provided for about 100 different crafts, and industrial and service occupations, in 23 special training centres, factories and schools. In the last 12 years some 100,000 workers have been trained in this way. As all these trainees are new immigrants or ex-soldiers without means, training expenses are borne entirely by the State, and the trainees also receive a daily allowance varying, according to their family status, between 4.20 and 9 Israeli pounds. The duration of these full-time courses is between three and 18 months. The average cost of training (including the daily allowance) is about 1,000 Israeli pounds.

(4) Supplementary training for upgrading. As the standard reached in accelerated training courses naturally cannot be very high, and as industry has continually suffered from a great shortage

of highly skilled workers, the Ministry of Labour runs evening schools in which 2,500 to 4,000 craftsmen receive supplementary practical and theoretical training each year. About 50 to 60 per cent. of the expenses are borne by the pupils. The curriculum includes 100 to 200 hours of instruction.

Experiments in Vocational Education

The Need for Experimentation and Its Aims

Before describing some of the new ventures in education and training in Israel, a few additional remarks must be made about the need for experimentation and its aims.

First, as many of the young, as well as the adult, citizens of Israel—and especially candidates for vocational training—are inexperienced in technology and its meaning for the individual, ways must be found to familiarise them at the earliest possible age with materials, tools and processes and thus to facilitate a choice of career based on knowledge and not on chance.

Secondly, there is a tendency among the Israeli population towards unproductive education, which does not lead to the occupations that are most urgently needed, such as skilled work in crafts and industry, etc. Hence, in familiarising people with technology, every effort should be made to render it as attractive as possible.

Thirdly, since many pupils are new immigrants whose economic, social and cultural adjustments have not been completed by the time when they should start learning a trade, any system of vocational education has to include quite a large share of general education, training for citizenship and language instruction.

Fourthly, a new country cannot afford not to learn whatever can be learned from other countries. On the other hand, this entails the danger of merely transferring other nations' experiences instead of adapting them to local circumstances, economies, technology and mentality.

Fifthly, in Israel special stress has been laid upon new ways of training that would combine the advantages of different classical patterns of vocational education, and would answer the needs of different groups of the population as well. More importance is attached at the present stage to this goal of training than to the greater economic efficiency that might result if certain standard patterns of training, well known in other parts of the world, were adopted.

Young People

There have been three main experiments aimed at giving young people up to the age of 18 some general technological information and experience and influencing their final choice of a career.

Technical Youth Clubs.

All over the country technical youth clubs have been established by public, voluntary organisations and municipalities, with the help of the Government. Two or three times a week, in the afternoon, thousands of boys and girls aged 12 to 16, pupils in elementary and high schools, attend these clubs, where they receive instruction from arts and crafts teachers in working on wood, metal, leather, paper, plastics, electric appliances, etc., with simple tools and machines, building models and producing articles for their own use.

As no comparative follow-up has yet been made it is hard to assess the success of the scheme ; but there is little doubt that many of the elementary-school graduates who drop out of general high schools turn to craft training as a result of their first contact with technology in these youth clubs.

Pre-vocational Training in Elementary Schools.

For the last five years the Ministry of Education and Culture has been trying out a new system of pre-vocational training in elementary schools.

It was assumed that arts and crafts training, which starts in many schools as early as the third grade (age 8-9), is not attractive enough for seventh and eighth grade pupils (age 12-14). It was decided, therefore, to make this training more serious and nearer to life by directing each class towards a certain trade.

General education was cut down from 30 hours a week to 28 hours. The total number of hours in the seventh grade was raised to 40, including ten hours' workshop practice and two hours' technical drawing. In the eighth grade the pupils have 42 hours a week of instruction, including 11 hours' workshop practice and three hours' technical drawing.

A follow-up showed that a considerably higher percentage of these than of other pupils wanted to take up technical training after graduation from elementary school ; and, remembering that this was the main purpose, the scheme can be considered a success. But it should be kept in mind that cutting down general education in elementary schools is a serious step which might have a harmful effect even on further vocational education ; that the scheme is

rather expensive ; that one should not expect the pupils receiving this kind of pre-vocational training to enjoy a considerable advantage for their future technical education ; and that a timetable of 40 to 42 hours a week plus homework is rather heavy for 12 to 14-year-old youngsters.

Two-year High Schools—Technical Trend.

Five years ago the Ministry of Education and Culture introduced a two-year curriculum in high schools to encourage the parents of boys and girls who cannot afford the expense of complete high-school studies, or whose children do not show any particular inclination or aptitude for extended theoretical studies, to continue their schooling for another two years. In these schools there are three trends : general, agricultural, and vocational. In the vocational trend the pupils have classes 46 hours a week, including 28 hours of general education, 15 hours of workshop practice and three hours of related subjects. As graduates of these classes were found lacking in general education (compared with normal high-school graduates) and in vocational education as well (compared with regular apprentices or ordinary vocational-school pupils), it was decided to change the curriculum and to stress the vocational side in a way which will turn these classes into two-year vocational schools.

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Pre-employment Apprenticeship Courses.

These courses were introduced because it was found that not all graduates of elementary schools are able, at the age of 14, to stand the stress of the free labour market, and the tensions of being thrown into the society of adult workers at a regular working place. An additional reason was the fact that vacancies for apprentices were scarce in many trades and the Ministry of Labour was interested in encouraging employers to take in more youngsters, by preparing them in advance. It was impossible to rely in Israel on the solution adopted in other countries, where large firms have their own apprentice schools in which newcomers spend the first six to 12 months before entering the different production units, as Israeli factories are generally much too small and economically weak to bear the costs of such ambitious projects.

Pre-employment apprenticeship courses are held in training centres for adults and in vocational schools for a period of three to 11 months. The cost of a one-year course is about 500 Israeli pounds per pupil, and the original idea was that this should be borne in equal parts by the apprentice, the prospective employer and Govern-

ment. Pupils do, in fact, pay part of the school fees, but the employers' share has so far been almost completely borne by the Government. The week includes in most trades 46 hours of instruction : 32 hours of workshop practice and 14 hours of related subjects and general education.

This project has proved very successful, as many parents find the bridge that it provides between school and the hardships of life useful in a country where ordinary compulsory education ends around the age of 14 years. There was never any difficulty in finding vacancies for graduates of these courses ; and in spite of this influx of well-prepared youngsters the number of unprepared apprentices entering jobs rose from year to year. This success should not mislead the authorities into widening the range of these courses without fixing clear criteria. Otherwise they turn into subsidies to industry, which should train its own skilled manpower without considerable public support.

Sandwich Courses.

For a number of years the Ministry of Labour experimented in the Tel-Aviv area with a system of sandwich courses, which seemed to overcome many of the disadvantages of both apprenticeship and full-time institutional training.

Throughout their training period pupils worked alternately for three months in special classes in vocational schools and three months as apprentices in a factory workshop. Thus one apprentice place was allotted to two boys, one of them being in school while the other was in the workshop.

The trade unions agreed to the payment of lower wages than usual, so as to encourage employers to join the scheme and to compensate them for the inconvenience of changing apprentices every three months—a considerable source of annoyance even though the same two boys always succeeded one another. Even with these reduced wages, it was found that the apprentices earned enough to pay their school fees and have some pocket-money over, thus meeting the needs of parents who could not afford to pay school fees out of their own income but were not dependent on their children's wages.

The applicability of the scheme in Israel was limited from the very beginning, as its usefulness depends on the existence of enough apprentices and apprenticeship vacancies in the same trade and at the same stage of learning to make up homogeneous classes on an economic basis. This seems possible in larger, highly industrialised towns only.

The standards attained by the pupils were astonishingly high, generally higher than those of the average apprentice, and

their sense of orientation and readiness to adjust to new situations compared favourably with those of vocational school graduates. It is too early, however, to assess their prospect of progress as adult skilled workers.

Unfortunately, we had to abandon the experiment as it demanded more inspection and supervision than we could afford. We learned, indeed, that the success of this kind of sandwich training depends, no less than upon other factors, on permanent, almost daily contact of the liaison officer with the boy, the workshop and the school—a budgetary as well as a manpower problem.

Training for Adolescents.

Two groups of youngsters induced the Government to look for new solutions: elementary-school graduates who, at the age of 16 or 17, were still unsettled from an occupational point of view, and pupils of high schools who dropped out after the first two or three years.

Although it would have been possible to have special accelerated training courses for these boys and girls, such a project was rejected as a general solution, since at the age of 18—after one to two years' training—all of them would have to serve in the army for two-and-a-half years and most of their newly acquired skill and knowledge would be lost by such a long break. Instead the Ministry of Labour established, in consultation and in agreement with the army, adolescents' courses in civilian trades in which the army is also interested and in which it is willing to keep the young soldiers during their national service. In this way elementary-school graduates are trained in cooking, hairdressing, sewing and as tinsmiths. Pupils who drop out of high school are instructed in automotive mechanics, electricity and technical drawing. The trainees remain in the courses until called up by the army.

Both the army and the labour exchanges are well satisfied with this scheme, which has also provided a solution for at least some of the youngsters who have " lost their way " and represent a permanent potential danger to society.

Vocational Youth Centres in Development Areas.

A special employment problem exists in development areas where plans for industrialisation are in progress but are not advanced enough to absorb the total potential labour force. As heads of families are naturally the first to be sent to work, it is especially the young people who are left unoccupied. Moreover, in these areas educational facilities above elementary-school level are scarce.

To deal with this situation 14 youth centres were set up, in which boys and girls work half-days for pay, mostly on government

works. The other half-day they spend learning a trade or occupation, according to their ability and inclination, and supplementing their general education. As their final placement cannot be known with certainty and as industries in these areas will need machine operators and semi-skilled workers, many are prepared for their future occupational life by general technical education and courses designed to familiarise them with working habits. Some are trained as metalworkers, woodworkers, electricians, building workers, cobblers, dressmakers, etc. They can stay in the centres for up to two years, but as soon as they find employment they are free—and are encouraged—to leave.

As a transitional rather than a permanent solution these centres fulfil an important social and educational mission.

Adults

As has already been mentioned, accelerated training courses for adults sponsored by the Ministry of Labour exist all over the country. Since most of the trainees are new immigrants, the curriculum has to include general education subjects, especially language, mathematics and citizenship. In addition the following special schemes may be mentioned.

General Education Courses for Adult Candidates for Craft Training.

With the improvement in the employment situation, shortages of manpower have developed in certain cases and it has sometimes proved difficult to find candidates with the necessary basis of general education required for modern vocational training. To remedy this state of affairs the Ministries of Education and Labour and the army have jointly set up a boarding school in which soldiers, during the last three months of their national service, can take refresher courses in Hebrew, arithmetic and some other subjects of general education. It is as yet too early to judge the results.

Training of Semi-skilled Workers.

The new industries in development areas (textiles, chemistry, diamond polishing, etc.) employ a large number of semi-skilled workers whose training can well be carried out on the job. The process is, however, often hampered by lack of experience on the part of foremen. Sometimes the productivity of new workers is for many months so low that a new factory, generally working under unfavourable conditions, is unable to pay minimum wages. In such cases the Ministry of Labour may decide to take the training programme under its auspices, sending its inspectors for consultations from time to time and paying for a limited period

part of the wages as a training subsidy to the employer. Thousands of new workers have found permanent employment in this way and new factories have been able to build up an efficient and reliable staff of semi-skilled workers.

Observation Centre for the Handicapped.

Whereas the system of rehabilitation of disabled persons in Israel is rather conservative, being based mainly on the experience of other countries with some adjustment to local conditions, it was found that in the existing chain of vocational guidance facilities one link was lacking : a centre where physically and mentally handicapped persons could test their own strength, abilities and inclinations, and where they could be observed and finally advised by an experienced team of instructors, physicians, psychologists, social workers, physiotherapists and employment counsellors. Such a centre was therefore established and equipped with tools, machines and material not on a trade basis but on the assumption that it should be adapted to basic manipulations which occur in various crafts and industries. Disabled persons are generally accepted after the completion of their medical rehabilitation, or when their condition is more or less stabilised. They remain in the centre for between two and six weeks. All 85 persons who have so far passed through the centre had been unemployed for many months (some for years), living on public assistance. Sixty-seven found employment, following the advice of the team. It should be stressed that almost all of them had already gone through the regular stages of vocational guidance without success.

This scheme has been found so successful that it has been decided to open similar centres in other places.

Training of Foremen, Technicians and Instructors.

There would not be much justification for calling the Israeli training programmes for foremen, technicians and instructors original or experimental. The experimental aspect consists solely in the concentration of these three training fields in one national institute, an arrangement especially suitable for poor, newly developing countries, lacking highly skilled manpower.

The personal and educational qualifications of candidates are similar, and many of them study subjects that are common to all three types of curiculum ; therefore, many teachers can be used by any of the three trends of the institute. Even workshop and laboratory equipment is similar enough to be used by all three student bodies. Another advantage is the ease with which students can move from trend to trend, if their former choice should prove wrong. From the financial point of view, this kind of organi-

sation seems to be most efficient. In Israel such an institute was established with the help of the United Nations Special Fund and with the assistance of the International Labour Organisation; about 800 adult students are studying for one or other of these careers. It is, however, too early to draw conclusions, as only a few pupils have completed the course.

Further Projects in the Planning Stage

The Ministry of Education and Culture, in co-operation with the Ministry of Labour, has worked out a detailed plan for the experimental establishment in one of the new development towns of a comprehensive school at the secondary level, comprising a general high school and a vocational school. The general high school will be run on two different levels, one leading to matriculation and the other to a leaving certificate only. In the vocational school, too, there will be two trends—the first stressing workshop practice and the second putting more weight on related subjects and general education. This type of institute is probably most suitable for small, new, immigrants' towns, where the number of children makes the maintenance of two or three different secondary schools impossible, where uncertainty in the choice of an educational course makes flexibility imperative and where the ambitions and prejudice of parents demand high-school education—notwithstanding the manpower needs of the country or the abilities of their children.

As already pointed out above, industrialisation of the development areas is not advanced enough to guarantee full employment in all cases. On the other hand, in many districts there is full seasonal employment (industrial crops) alternating with times of heavy unemployment. The Ministry of Labour plans to establish in these areas pre-employment and vocational courses for adults during seasonal unemployment.

Finally, to meet the shortage of qualified counsellors for vocational guidance in the upper grades of elementary schools, it has been decided that a certain number of teachers in all elementary schools will receive training in elementary vocational guidance. The first 100 of these teachers, who will work under the supervision of fully qualified psychologists, are already under training.

Conclusion

(1) Planning of vocational education is a function of manpower policy and general economic planning, and must take into account demographic, social, psychological and general educational facts

and conditions. These plans, facts and conditions have to be well known and analysed before experiments in vocational education are undertaken, and hence no conclusive decisions should be made without consultation between the different planning, economic, labour, statistical and educational authorities.

(2) In developing countries, in which the economic and technical future and the speed and direction of development are much more uncertain that in old-established, highly industrialised States, any blind sticking to principles taken over from other countries or recommended in books or by outsiders may be harmful. Other people's experience may be excellent raw material for independent thinking : it never should take the place of it.

(3) Since other nations' experience should not be taken over without critical screening, and since developing countries are poor in tradition and experience in the field of vocational guidance and education, there should be much readiness to innovate and much courage to carry out experiments, to suffer disappointments and to correct mistakes and draw conclusions. Governments should provide the necessary funds for experiments in vocational guidance and education, fully conscious of the much heavier financial losses which might be incurred by unsuitable guidance and educational methods, leading in mild cases to exaggerated training periods and waste of manpower, and in more serious ones to inefficiency in production and damage of expensive equipment.

(4) In developing countries, where industry is not well established and is not yet able to train all the skilled workers who will be needed tomorrow, but where the financial reserves of the nation are generally too limited for training all skilled manpower in special schools, attention should be paid to training methods intermediate between exclusive on-the-job training by employers and complete institutional vocational education paid mainly by the State. These methods have been found very useful in the State of Israel and might under similar economic, social and technological conditions prove suitable for other countries.

(5) As vocational education, like any education, can flourish only in a favourable public climate, the need cannot be overstressed for co-operation and co-ordination between different authorities in charge of it. The main question is not who is responsible for vocational education or whether certain aspects of it are under this Ministry or that—the cardinal problem is how to activate everybody concerned to participate in a constructive way. And who could be more concerned with this than the parents, the teachers, the children, the trade unions, the employers and, in a word, the public? Without their lively interest the best scheme must fail.