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D04433

ID

Distr.
RESTRICTED
ID/WG.7/1
20 October 1967
ENGLISH

United Nations Industrial Development Organization

AD HOC MEETING ON IN-PLANT TRAINING
Vienna, 13-18 November 1967.

THE PROBLEMS OF IN-PLANT TRAINING IN ITALY

By

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The views and opinions expressed in this paper are those of the consultants and do not necessarily reflect the views of the Secretariat of UNIDO.

id.67-021

1. FOREWORD

The observations and assessments contained in this paper originate from my experience as a Director of the in-plant training programs organised by IRI (Istituto per la Ricostruzione Industriale) over the last six years in which some 524 qualified technicians from 53 developing countries have taken part. This paper is not solely focussed on the experience of the two UNIDO courses we organised in 1967, in the fields of the iron and steel industry and of textile machinery manufacturing, but is rather broader in scope, since it also takes into account the overall experience acquired from the five courses for technicians conducted by IRI from 1962 onwards.

We regret that some of the pages in the microfiche copy of this report may not be up to the proper legibility standards, even though the best possible copy was used for preparing the master fiche.

2. The problems of education and specification of technicians from developing countries

Among the technicians needed by a backward economy, management and intermediate staff are those who carry out what may be defined as "strategic functions" in the context of development and modernisation. The importance of this limited but strategic part of the available active population has been effectively expressed by Paul G. Hoffman, Director of the UNDP (United Nations Development Program) :

"The underdeveloped countries need high level manpower just as urgently as they need capital. Indeed, unless these countries are able to develop the required strategic human resources they cannot effectively absorb capital. Of all the resources required for economic development, high talent manpower requires the longest "lead time" for its creation. Dams, power stations, textile factories and steel mills can be constructed in a few years, but it takes 10 to 15 years to develop managers, engineers and the administration to operate them. The existence of such manpower, however, is essential if the

countries are to achieve self-sustaining growth."⁽¹⁾

There exists, then, a very close correlation between underdevelopment and lack of means for training technicians at all levels. This lack is especially apparent in the fields of secondary and higher technical education, where the structural deficiencies of developing countries are such as to make it indispensable for them to have recourse to industrialised countries. Such recourse has been represented, above all in the last 15 years, by a swelling flow of nationals from developing countries towards industrialised countries for the sake of obtaining basic training in fields of higher instruction and often in those of secondary education too, or else to follow specialization courses in specialist post-graduate institutions attached to public agencies and productive units.

It can be said there is no country that has not prepared a more or less extensive program of bursaries for educational and specialization courses in favour of develop-

(1) F. Harbison, C. Myers : Education, Manpower and Economic Growth : Strategies of human resource Development, McGraw Hill, 1964, pag.16.

ing countries. In addition to bilateral agreements between governments, there are the programs operated by multi-lateral organisations and by private bodies, whose contribution is of considerable importance in this particular form of technical assistance.

At this point a clear distinction should be made between training and specialization or perfectioning.

Training, at both secondary and higher educational levels, obliges the student to be absent from his country of origin for a long period, rarely less than 3-4 years, and is open to the very young having no work experience. Specialization on the contrary is open to those who have already had training, have an occupation and are less young, and requires a far shorter stay abroad, generally for not more than one year. In spite of the considerable importance that specialization courses have acquired in recent years, they are much less numerous than those involving a long stay abroad in educational institutes (for instance: universities).

This is not the place to analyse in depth what are generally held to be the limits and dangers of education

abroad. It is enough to point out that such limits - uprooting and removal from original environment, difficulties in readaptation on return home, the failure of those trained in industrialised countries to return home (the brain drain), typical of educating abroad those who are too young and have no working experience - do not arise or are in any case less marked where specialization courses are concerned, given that these are generally of a practical character. Limiting our examination to the field of technical specialization "stages", it can be said that the fact that the bursary holders are not so young, that they are generally already established in their country's productive structure, that there is the opportunity for drawing up programs matching their specialization requirements and that the duration of the courses themselves is relatively limited to not more than one year, combine together to reduce or eliminate the difficulties and dangers associated with "basic training and education" abroad.

Indeed, it can be said that the possibilities given those already trained for up-dating their knowledge of the most advanced technology, for acquiring more profound know-

ledge of modern company management, for learning and assimilating, in that spirit of independent criticism which is the hallmark of maturity, are to be considered an essential contribution in the occupational advancement of the technical and business leaders of developing countries.

One more positive aspect inherent in programs for technical specialization training abroad that cannot be ignored derives from the growing importance, in the context of initiatives for international technical cooperation, of the sending of experts to developing countries and of consultancy activities. This has to be viewed in terms of the training of those who are commonly designated as the international technician's counterpart on the spot, with the role of natural link between their respective national communities with the experts from the industrialised countries.

It seems natural, then, that on the plane of programme and policy revision regarding the training and specialization of technicians from developing countries very special attention must be paid to up-dating courses. It

is the task of the industrialised countries to increase the possibilities for specialization by means of an adequate supply of "stages" to be conducted within their own productive sectors.

In this connection it may be observed that, in spite of the growing awareness of the efficiency and usefulness of this type of training, there do exist difficulties of various kinds so far as concerns obtaining a greater commitment on the part of European and American firms.

3. IRI's experience in the field of "in-plant training"⁽¹⁾

This short review of questions related to the training and specialization of technicians from developing countries is considered by us to be a necessary introduction to an examination of IRI's experience in the field, an experience which, in its limits and characteristics appears to us to

(1) IRI (Institute for Industrial Reconstruction) is a State holding company which controls some 130 industrial and service companies operating in a variety of fields: steel, engineering, shipyards, electronics, banking, Radio-TV, air and sea transport, etc. At the end of 1966 IRI had a pay-roll of 290,000 and the turnover of the Group as a whole in that year amounted to about \$3,500 million.

provide a useful basis for comparison for anyone interested in the problems arising from "in-plant training".

The IRI courses for technicians from developing countries are clearly characterised as a specialization operation and therefore tend to exclude basic training. These courses :

- have a duration of seven to eight months, during which the trainees follow a specialization program in their specific technical and occupational fields;
- are aimed at those who are to be classified as technicians at middle management level and therefore have working experience and are already fitted into the productive structures of their respective countries; furthermore, the bursaries are assigned only in those cases in which the candidate has obtained permission from his employer. These conditions guarantee the immediate return of the person to his occupation and possibly with a higher level of responsibility, when he returns to his own country;
- are articulated as a series of individual stage programs, which are drawn up on the basis of the

trainee's own proposals; thus the participants are not forced to follow a prefabricated program that might be valid for a whole group, but one drawn up case by case and aimed at qualifying the trainee in the conduct of a specific technical and occupational function within his particular line of specialization.

In giving the courses the characteristics indicated, the intention has been to eliminate, or at least reduce, the difficulties met in the basic training abroad of technicians from developing countries.

The courses are articulated in three phases :

- the orientation period (seminar) in Rome lasting five weeks, which has the fundamental purpose of making it easier for the trainees to find their feet in our country from the cultural and linguistic points of view;
- the stages in the firm, lasting five to six months, which are the most important part of the course and to which all the rest is geared;

- the appraisal seminar lasting two weeks in which a thorough assessment of the experience derived from the stages and from the course as a whole is made.

We shall restrict ourselves here to a survey of the stages phase (in-plant training) which are organised in the 15 further training sectors around which the program is prepared: Air Transport, Banking, Business Administration, Cement Manufacture, Commercial Exchanges with Foreign Countries, Industrial Plant and Machinery, Mechanical and Electrical Engineering, Publishing and Printing, Radio and Television, Roads, Sea Transport, Shipbuilding, Steel, Telephones, Vocational Training.

The essential problem of the stages lies in building up, for each individual trainee, a program that takes into account the many variables: the type of job for which the trainee requires further training, his ability and his occupational interests, the possibilities for further technical training offered by the firm, etc. The organisation of the stage is therefore an ever new problem just because it rarely

happens that two trainees have the same level of preparation, the same up-dating objectives, the same professional interests and carry out the same tasks in the firm from which they come.

This is why it is difficult in preparing up individual specialization programs to draw on past experience and why it is necessary for whoever has to prepare the program to know the resources available in such a large and varied industrial group as IRI. But this knowledge is not enough; imagination, inventive ability and sensitiveness to training problems are also necessary.

For these reasons it is very difficult to discuss experience of the stages as a coherent whole. We shall, therefore, consider the following aspects :

- the problems of teaching method;
- the results of our experience and the solutions proposed.

On the question of problems of teaching method, the primary need is for careful and intelligent planning of the stage. It is clear that this problem is much more complex for courses of the IRI type, in which it is a matter of organising con-

temporarily a considerable number of individual stages (more than 100), than for the UNIDO type courses for which a program has to be prepared which is valid for the whole group of participants. Our experience shows us, however, that even if the problem of preparing programs differs for the two cases, the problem of conducting the stages, of methods and teaching content, is substantially identical.

Whereas the necessity for careful planning of the stages has by now become an accepted fact for all those engaged in these programs both at company and IRI group level, it is still not accepted that the stages must be conceived not in the passive sense of mere observation, but as an instrument for training which requires active participation by the trainee. This instrument must be not only very elastic but open to a complex range of activities of a training type, not only instruction, but also study, research and practical work.

The stage should, therefore, consist of a series of complex but interwoven activities, aimed as a matter of principle at stimulating to the maximum the trainee's commitment

and sense of responsibility.

This conception of the stages confers very special importance on the guidance, orientation and assistance given by the staff of the companies to whom the control of this teaching instrument is effectively entrusted.

The difficulties that emerge in giving effect to this conception, which remains a constant underlying objective of our action, are various: the difficulties in fitting outsiders into an active job of work within the firm, the particular commitment required in the application of active training methods in this field, etc. It is, moreover, comforting to note how in some sectors (air transport, professional training, steel, etc.) very satisfactory results have been achieved and how there is growing awareness on the part of company staff that their role is not to be conceived merely in administrative terms, but as teaching, that is to say in those terms effectively expressed in the French phrase "maîtres de stage" or in the English expression, "tutoring".

So far as the conclusions we have reached on the problem of correct preparation and conduct of the stages are concerned, we consider it absolutely essential in the first place that the stage should be preceded by a period of orientation.

This requirement is particularly real for IRI courses, in which it is a question of providing the trainees, by means of an intensive course in Italian language, with a medium for communication with the company instructors.

The need must not be underrated for providing at the same time the information needed to give them a chance to settle down without too much difficulty in a new environment in such a way as to enable them to interpret and assimilate its values. In this sense the alternation of language instruction and training of a more general kind, as is ensured by the introductory course, seems to us one of the most valid of our experiences.

As regards the conduct of the stages the solutions, or rather the least challengeable proposals, seem to us to be as follows :

- to avoid placing the trainee in a privileged position within the firm. The possibilities for establishing normal relationships and genuine collaboration with colleagues are closely conditioned by the trainee's respect for "the rules of the game" within the company. In other words, from the point of view of duties and obligations, and hence also of rights, he must be put in the same position as his "counterparts" in the firm;

- to explain clearly to the trainees and to company staff all aspects of the training and administrative organization of the stages;

- to establish relations with the firm even before the stage begins, so as to have the collaboration of the appointed member of the firm's staff during the preparation of the stages. In other words, it is necessary to avoid the creation, during the various phases of the up-dating experience, of breaks and interruptions, especially between the general orientation phase and the stage proper;

- to keep in touch with the trainees and the company staff during the stage, collaborating in resolving the various difficulties that can arise during this period;

- to ensure that the stages are conducted under the supervision of company staff sensitive to training problems and endowed with sufficient authority and a thorough general knowledge of the firm concerned;

- to make a periodical check, by following up monthly reports and interviews with the trainee, on the result of the specialization training, and to take care that during the stage the specialization objective at which one is aiming is always perfectly clear;

- to make a thorough final assessment of the experience of the stage in all its aspects: technical training, cultural and human.

The observations made here can probably be appreciated by anyone concerned with this type of training and no-one concerned with stages can ignore the need to draw up a teaching methodology based on concrete experience.

Obviously, the "solutions" proposed here are only a series of fixed points around which an educational methodology could perhaps be developed.

This problem is so important as to justify the interest and attention of experts in teaching questions.

Today there is very little background material on which to work. We are all really working, and not only in Italy, on the strength of hypotheses and approximations, while the problem is of such importance as to make it worth-while conducting serious and thorough research in the field.

4. The experience of UNIDO training programs

It could be useful here to consider the experience of UNIDO courses in the light of the above observations.

It is quite clear that, considering the character of the UNIDO in-plant training programs, there are some additional difficulties in applying the training concepts which have been advanced in this paper.

These additional difficulties lie mainly in the necessity for communicating with the trainees in English, in the relatively brief duration of the course, in the creation of a common program for all the participants in the in-plant training courses.

It being very difficult, if not impossible, to organize programs entirely focussed on the active presence of the participants in the plants for the entire period of the training, we thought that to achieve the established objectives it was necessary to organize training periods which, through a continuous alternation of lectures and plant visits, would give the participants the chance to study and observe the various aspects of the most advanced technologies relating to their occupational interests.

Obviously the basic conditions for obtaining satisfactory results were and are :

- that there should be a good degree of homogeneity in terms of professional experience and interest among the participants;
- that besides having adequate educational standards, the participants should have at least a few years of good working experience in the specific fields covered by the program;
- that the participants should have an interest in obtaining an insight into a variety of related technological aspects rather than of specific technical questions.

Starting from these assumptions we organized in 1967, on behalf of UNIDO, two in-plant group training courses for engineers and technologists in the fields of metallurgical industry (iron and steel) and of textile machinery manufacturing.

Notice was sent by UNIDO to the Governments of 36 countries. On that basis UNIDO selected 20 candidates whose application forms were sent to the IRI-Technical Cooperation Unit which approved all of them.

The training programs were divided into three parts :

- a) orientation seminar in Rome (February 13-25, 1967);
 - b) in-plant training period in IRI firms in Genoa (February 27 - May 12, 1967);
 - c) terminal seminar in Rome (May 15-23, 1967).
- a) The orientation seminar was conceived as being mainly informative in character.

For two weeks, by means of a varied series of talks, chosen with the aim of supplying useful information, both on the Italian economic situation and on the specific sectors of metallurgical industry and textile

machinery manufacturing, the participants were given the chance of deriving the maximum advantage from the subsequent on-the-job experience in IRI plant.

The programme for the two weeks was as follows :

1st week : The Italian economy and the IRI group.

All the participants, whether belonging to the metallurgy or the textile machinery group, attended these lectures together.

2nd week : Introduction to the metallurgical industry (iron and steel) and textile machinery manufacturing sectors. A different program was arranged for each of the two groups which, therefore, attended the lectures separately.

During this period one visit to an industrial plant was arranged for each group.

The daily schedule of the orientation seminar was as follows :

9 - 11.00 a.m.	:	Lecture and discussion
11 - 12.30 a.m.	:	Group work
4 - 6.00 p.m.	:	Lecture and discussion
6 - 7.00 p.m.	:	Group work

A system of consecutive translation was provided.

- b) The programs of the in-plant training period were organized on a group training basis. In both cases the approach adopted was that of alternating talks by experts in the specific technological fields, on the technical topics included in the program, with extensive visits to particular sectors of an industrial plant, where it was possible to study, from an operational point of view, the technical subjects discussed in the talks.
- This approach, in our view, was particularly successful with the metallurgy group which was assisted by the competent and large staff of the Società Italiana Impianti. Moreover the facilities available in the Italsider plant at Genoa, which is very modern, greatly facilitated the in-plant training aspects of the program. It was however less successful for the textile machinery manufacturing group, both because of the wide range of experience and professional interests of the participants and because of the difficulty of matching this variety of interests with the resources available at the IRI Vocational Training Centre at Genoa (CIFAP) and at

plant level (Nuova S. Giorgio).

In any case, towards the end of this stage - in the last two weeks - a reasonably successful effort was made to give some participants the possibility of getting a specific insight into the subjects in which each of them was particularly interested. The same arrangement was made for two trainees of the metallurgy group.

Many visits, especially for the textile machinery group, were organized to plants located in various parts of Northern Italy. Both groups were assisted by interpreters; for the textile machinery group a simultaneous translation system was adopted for the technical talks, whereas in the case of the metallurgy group consecutive translation was provided. Apparently, the participants found the simultaneous translation more effective.

- c) The program of the terminal seminar was divided in three parts :
- group discussions for the evaluation of all aspects of the in-plant training projects;
 - talks given by experts on some important aspects of economic and technical cooperation between industrialized

and developing countries;

- participation in a large conference (lasting two days) organized by IRI on the theme "The role of Technical Cooperation in the Industrialization of Developing Countries".

From interviews with the people who followed the participants during the training period and with the trainees themselves, during and at the end of their experience, and from the appraisal contained in their final reports, some concluding remarks can be made about the two projects :

1. The experience has been, on the whole, positive, even though the level of achievement and the results obtained in the textile machinery manufacture course were inferior to those in the metallurgy course.
2. The scarce "efficiency" of the textile machinery manufacture project, about which there were a few doubts from the beginning, must be attributed to the following factors :
 - heterogeneity in the professional standards of the participants and remarkable discordance in their aims;
 - limited capacity of the firm involved (Nuova S. Giorgio)

to meet completely the wide range of professional expectations of the participants;

- although the company is quite advanced from the technological standpoint, the range of production in the field of textile machinery is relatively limited: this fact was a drawback in the implementation of the "in-plant training" aspects of the course; many visits had to be organized to companies not belonging to the IRI group, in order to compensate for this limitation;
- due to the differences in the level of technical experience of the participants, the talks delivered to the group were considered either too simple or too difficult; it was indeed almost impossible to strike a satisfactory balance in deciding on the content and the level of sophistication of the technical lectures included in the program.

3. In the metallurgy course these factors were almost non-existent. The relative homogeneity of the participants, their common expectations in terms of what they could obtain from this training experience, the possibility

of recourse to a large and very competent staff of experienced technicians at the SII, the good coordination established between the talks and the visits to the plants, greatly facilitated the successful completion of the program.

There could be criticism, perhaps, as to excessive emphasis on the theoretical side in the program; this was, however, a factor of minor consequence which can be easily corrected, if and when this type of course is repeated in the future.

As far as future developments of study programs are concerned, we would make the following suggestions :

- a more effective participation of the organizations responsible for the training should be arranged at the stage when participants are selected so as to obtain a more homogeneous group of trainees;
- the organization of in-plant training projects should be limited to the most advanced technological sectors; incidentally, these are the sectors in which it is generally easier to find the men and the facilities

necessary for the successful implementation of training programs aimed at engineers and technicians operating at the middle-management level. Taking the IRI group as an example, these prerequisites can be found in the steel manufacturing sector, although very advanced technologically, is not yet in a position, in terms of facilities available, to give the kind of continuous assistance required for these kind of training programs.

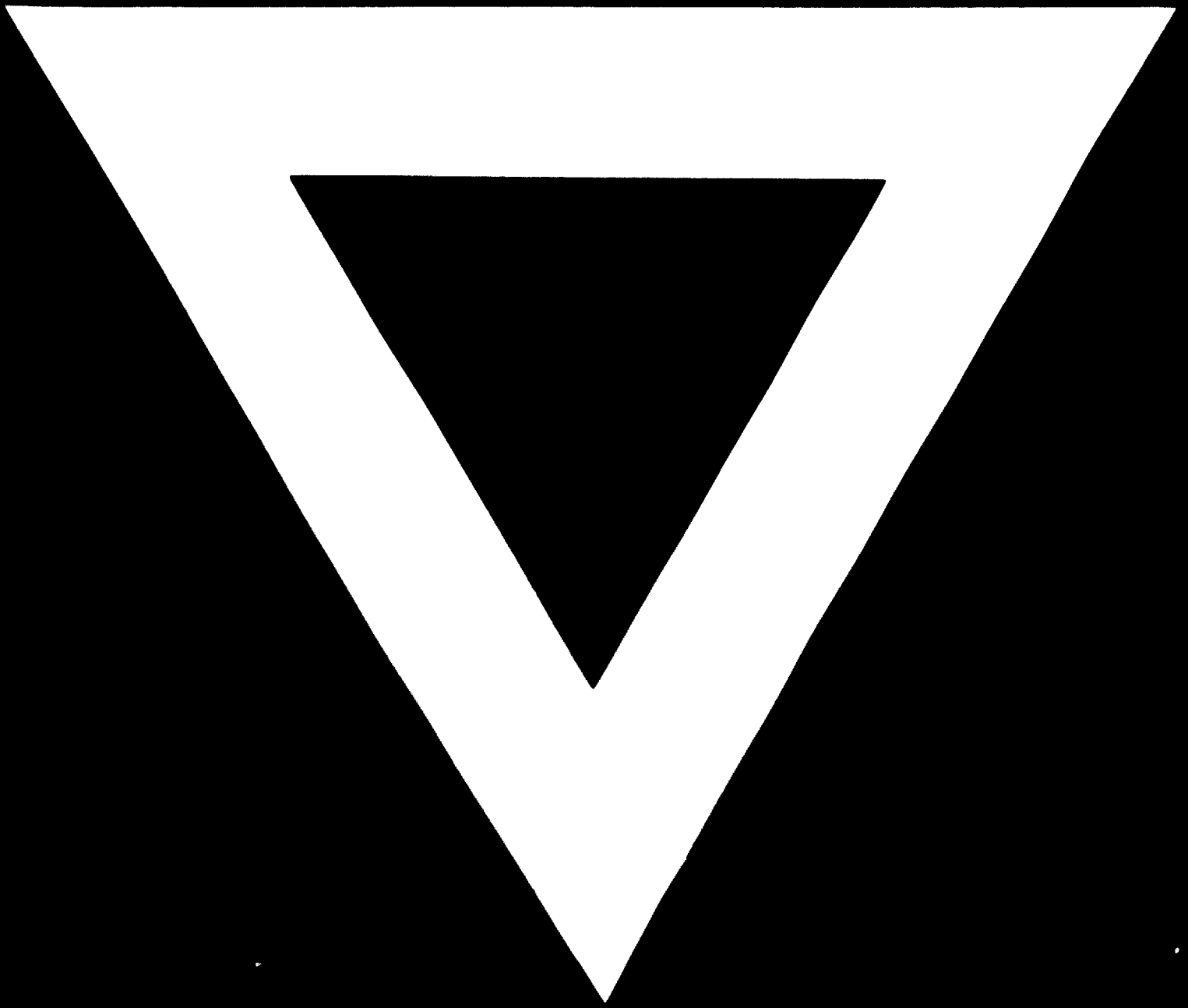
By way of conclusion we can state that, as far as we are concerned, the successful implementation of the UNIDO courses, and especially of the one organized in the field of metallurgical industries, was considerably facilitated by the previous experience of the IRI courses.

Although the two programs are quite different in duration, organization and content, both of them have a few important points in common, namely: the fact that they are directed at technicians of developing countries at middle-management level, the fact that they are more or less the same problems as far as the application of new and imaginative training methods are concerned, and the fact that the programs are

focussed on up-dating the knowledge and skills of personnel whose impact on the development of the industrial sector of developing countries is of strategic importance.

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