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New forms of teaching-learning for in-company training

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InWEnt

InWEnt – Internationale Weiterbildung und Entwicklung gGmbH (Capacity Building International, Germany) - is an organisation for international human resource development, advanced training and dialogue. Established through the merger of the Carl-Duisberg-Gesellschaft (CDG) e.V. and the German Foundation for International Development (DSE), it can draw on decades of experience accumulated by the two organisations in the field of international co-operation. Its practice-oriented programmes are directed at specialist staff and managers, as well as decision-makers from business and industry, politics, public administration and civil society from all parts of the globe. Its Development Policy Forum arranges high-calibre international policy dialogues on subjects of current concerns in the field of development policy.

Division 4.01 of InWEnt has its seat in Mannheim and conducts on behalf of the Federal Ministry for Economic Cooperation and Development (BMZ) advanced training programmes. Under the banner of "sustainable development", its work focuses on questions of technology cooperation, system development and management in the field of technical and vocational education and training. Its dialogue and training programmes are targeted at decision-makers from the public and private sectors, junior managers and multipliers from vocational training systems.

Introduction

From 2003 onwards, InWEnt´s Division Technological Cooperation, System Development and Management in Vocational Training is to present a series on everyday practice in vocational training.

The intention of this series is described in the title itself ("Beiträge aus der Praxis der beruflichen Bildung" = series on everyday practice in vocational training). The division aims to support its programs of international personnel development in the above-mentioned areas with technical documentation in both printed and electronic form.

These reports

- originate in the partner countries, taking into account specific situational demand
- will be tested with and for experts in vocational training in the partner countries in conjunction with respective practice-oriented training programs on offer, and
- with a view to global learning, will be improved and adapted prior to publication according to the recommendations of the partners or the results of the pilot events.

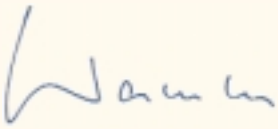
Thus, the Division Technological Cooperation, System Development and Management in Vocational Training is applying the requirements of InWEnt´s training program to its own products in the above faculties: i.e. these can only be as good as their practical relevance for the experts of vocational training systems in the partner countries.

To this effect, we look forward to critical and constructive feedback from all readers and users of these special series.

This manual is one of an entire series of InWEnt publications that have been produced as a result of training seminars and courses carried out in cooperation with the vocational training institute SENATI in Peru.

Our special thanks go to Prof. Tippelt of Munich University and Mr. Amorós from the "International Cooperation Office", who both made invaluable contributions to these activities.

Division Technological Cooperation, System Development and Management in Vocational Training, InWEnt, Mannheim, Germany



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1 Introduction to the topic

occupational content and organisational structure

Companies train apprentices to ensure that their future employees have the required skills and qualifications. Within this context, a company's training methods can be defined from two perspectives: Firstly, the training methods should be seen as tools that enable occupation-related knowledge and skills to be passed on as efficiently as possible and secondly, they should ensure that apprentices learn about the way that a company's work is structured.

collective skills development

Companies should demand that that their workers have not only technical but also methodological and social skills. An innovative company should not limit its training programmes to individual skills development. The continuing hunt for quality products and innovative strategies also calls for collective skills development through the implementation of various training methods.

practical skills acquirement methods

In order for companies to fulfil these vocational training objectives, various methods have been developed – aimed entirely towards practical skills acquirement, permitting apprentices to; "benefit from an integrated learning process, putting into practice in the workplace the acquired technical, methodological, social and individual skills."

learning how to learn

These new in-company learning approaches are based on apprentices' own experiences and interests. It could be said that the main common objective is the creation of the bases necessary for apprentices to "learn how to learn". Consequently, the trainer's role should not be limited to the simple transfer of knowledge but include strategies able to ensure that apprentices look further than the basic concepts.

workplace training as a complement

Obviously, not all professional-didactic goals can be achieved in the workplace. The acquirement of certain basic knowledge and theories still requires input from learning centres outside company premises. There is no suggestion here that workplace-based training should in any way replace these, or other methods, serving rather as a complement to them. This manual is intended to offer a general view of some of these forms of learning, which may be of great use to trainers or monitors, especially in the case of those wishing to combine theory with practice.

2 The role of the training-workshop in in-company vocational training programmes

(Prof. Dr. Wolfgang Wittwer, University of Bielefeld)

2.1 The banking concept / How vocational training should not be

Paulo Freire

The Brazilian pedagogue, Paulo Freire, who developed and put into practice the concepts of literacy teaching, defined the student-teacher relationship as follows:

the student-teacher relationship

- The teacher gives the class and the students are taught. The teacher knows all and the students nothing. The teacher thinks and the students are thought about. The teacher speaks and the students listen attentively. The teacher trains, the students are trained.
- The teacher chooses and imposes his choice while the students express their conformity.
- The teacher performs and the students have the illusion of performing through observing the teacher's performance.
- The teacher chooses the study plan and the students (who are not consulted) adapt themselves to it.
- The figure of the teacher combines the authority conferred by knowledge with professional authority, which prevails over the freedom of the students.
- The teacher is the subject of the learning process, while the students are mere objects.

the traditional teaching process

In a rational teaching-learning process, students become "containers", that is, recipients that have to be "filled" by the teacher. The fuller the recipient, the better the teacher. The more predisposed to be filled, the better the student.

the banking concept

Freire named this form of teaching "the banking concept", as in this way education becomes a "savings account", the students being the object of investment and the teacher the "investor". Instead of communicating, the teacher simply presents communications, contributing capital that is patiently received by his students, who learn through memorizing and repeating.

learning by memory

This form of teaching-learning is applied where it is required that students simply learn something by memory without any need to analyse or reflect on subject matter or the conditions of the teaching-learning process.

the interactive process

If, on the other hand, teaching-learning is seen as an interactive process, one in which students should be taught to act independently and to assume responsibility, it becomes necessary to establish adequate teaching-learning methods to enable these goals to be reached.

2.2 The concept of the training-workshop

in-company further vocational training courses

This idea was originally developed for in-company further vocational training courses. It was later modified, being adapted for in-company initial vocational training. The concept of the training-workshop offers the opportunity to pass-on the key skills, needed for the carrying out of occupation-related activities.

2.3 The objectives of the training-workshop

practical focused learning

The term "training-workshop" is in itself a definition of the concept. The combination of the words "workshop" and "training" tells us that the learning process is directly related with practical work. From this we deduce where, when and how the training takes place. To summarize, the "training-workshop" concept is a special form of training directly linked to the realization of practical work activities

2.4 Didactic principles

The effects of the training-workshop can be defined as follows:

- Apprentices learn specific content (themes).
- Apprentices learn where and how to obtain information.
- Apprentices learn how to learn.
- Apprentices learn ways to interact and communicate professionally with personnel of different levels of responsibility (trainers, employees for different technical departments, heads of training, etcetera).

learning independently

Apprentices need to be taught to work independently in their occupations after completing their initial vocational training. Taking account of the fact that the best way to achieve this is by using acquired skills in a practical working environment, vocational training needs to be designed on an organizational and methodological level in such a way as to enable apprentices to develop and apply these skills. In other words, apprentices should learn to act independently as a part of their vocational training.

a clear difference

There is a clear difference between the training-workshop learning model and traditional school-based methods. In the training-workshop, apprentices learn:

- through carrying out practical tasks in the working environment
- in groups
- through interaction

Trainers and apprentices assume new roles. The trainer becomes a moderator rather than simply a "teacher" and the apprentice takes an active role in the designing of the learning process.

2.4.1 An example

the traditional teaching concept

A class considers the theme "Machine tool fabrication and operation". In a traditional teaching environment, the trainer would conduct the class with the aid of images or by using the machine itself.

the training-workshop concept (maybe approach for all concepts)

In a training-workshop environment, however, the procedure is very different. Here, for example, a group of apprentices presents a task about obtaining information on the fabrication and operation of a machine tool to the rest of the group. Apprentices are exposed to a variety of different ways of acquiring the relevant knowledge, such as by using an information bank (technical books and manuals) or through conversations with trainers or other apprentices with machine tools experience. The apprentices themselves decide the best way to obtain the necessary information.

This small example illustrates how the ideas presented here can be interpreted.

2.5 Practical working environment based training

specific case applications

In this context, a practical focus means that apprentices can learn to apply and pass-on knowledge relative to specific situations under real working conditions.

2.6 Group learning

learning in groups

Workshop training is characterised by group learning. While all the members of a group may have the same degree of experience with respect to the object of learning, their individual aptitudes will naturally differ. One apprentice may show good manual skills, while another may more quickly grasp a theoretic concept. By the same token, one apprentice may find it easy to interact with his peers, while another may be more reserved.

structures within the group

In accordance with apprentices' strengths and weaknesses, as well as their individual abilities, a definite structure will develop within the group. Leaders will emerge and others will remain on the sidelines. Some apprentices will better identify with the task to be carried out and others will more freely integrate with the rest of the group. Eventually, a certain division of work will be established along the lines of "let whoever knows it best do it".

2.7 Interactive learning

communication

Group learning calls for a more intensely interactive process. Apprentices learn not only by means of dialogue with trainers but also through interacting and communicating with their fellow group members. During this process, apprentices come to realise that while they can certainly profit from the strengths of each group member, in order to achieve optimum results, they will also have to deal with the behaviour and opinions of others, negotiating the best way to proceed as a group. They will learn about the experiences, opinions and intentions of others, which will also help to promote group interaction and communication.

2.8 The trainer as moderator

the moderator's role

Unlike traditional teaching models, in which the trainer dominates the teaching-learning process and basically assumes the role of "knowledge transmitter", the training-workshop model considers the trainer's role more as that of a moderator, who initiates and stimulates the learning process, but has a limited direct participation.

two people as moderators

Moderating is often shared between two people (with the exception of very small groups), in which case the moderators can be presented to the apprentices as a separate small group.

advantages

This offers the following advantages:

- Having two moderators allows apprentices to draw from a wider range of behaviour patterns as a point of reference than would be the case with only one. Also, if for any reason an apprentice isn't keen on one moderator he may well more readily identify with the other.
- Moderating calls for both spontaneous reaction and improvisation. The two moderators can help each other out should difficult situations arise. One can also take the other's place if he or she runs out of ideas or should he or she at times fail to connect with the group.
- But having two moderators is also convenient for technical reasons. During the moderating process different tasks tend to come up at the same time,

such as directing discussions, observing the group or gauging the mood of the participants.

> Also, interchanging monitors (on a visual and existential level) can have a revitalising and stimulating effect on apprentices: "Seeing nothing but the same face, hearing nothing but the same voice, is eventually tiring".

> In small companies or groups, it is not always practical for there to be two monitors. This does not mean, however, that the training-workshop model should not be applied. Moderating "carried out by one person" will always be a better option than working without a monitor.

2.9 The apprentice as designer of the learning process

the apprentice's new role

The training-workshop model demands new roles from not only the trainer but also the apprentices themselves, who cannot adopt a passive attitude, rather taking an active or interactive part in the learning process.

This means that apprentices must know how to

> present and defend their interests,
> apply their own experience to the defined tasks,
> study subject matter independently,
> develop problem-solving proposals,
> take and back-up decisions,
> formulate questions.

3 The working structure of the training workshop

encouraging apprentices to work independently

The intention of the training workshop model (see Figure 1, The training workshop model) is to encourage apprentices to work independently, moving away from pre-formulated learning tasks, establishing tasks themselves in the most independent way possible. By means of an example, at the beginning of a technical course, students can be asked the following:

Which technical area would you most like to deal with?

proposing subjects

Each apprentice writes a subject on a card, which is then displayed on the whiteboard. The cards are then arranged by common areas and technical similarities; that is, proposals with the same or similar subjects are grouped together

compiling proposals

If a minimum of three apprentices opts for the same subject then this can be put to the group. The maximum and minimum number of group members is decided by the scale of the task to be carried out, the time available and the considered objective.

group work

An example of a subject suggested by the apprentices themselves could be "The fabrication and operation of machine tools". Each group collects information on the subject and then visually presents the results of their work, thus passing on the knowledge acquired to the other apprentices.

The task should be completed within a pre-set time limit, for example, eight hours. Apprentices can compile data from an information bank.

the time limit

In the case of a group working on the above-mentioned subject, sources of information could include, for example, technical books and articles or machine tool manufacturing company brochures. Other possible information sources incorporate meetings with experts in the field and visits to machine tool manufacturing companies as well as meetings with operating personnel.

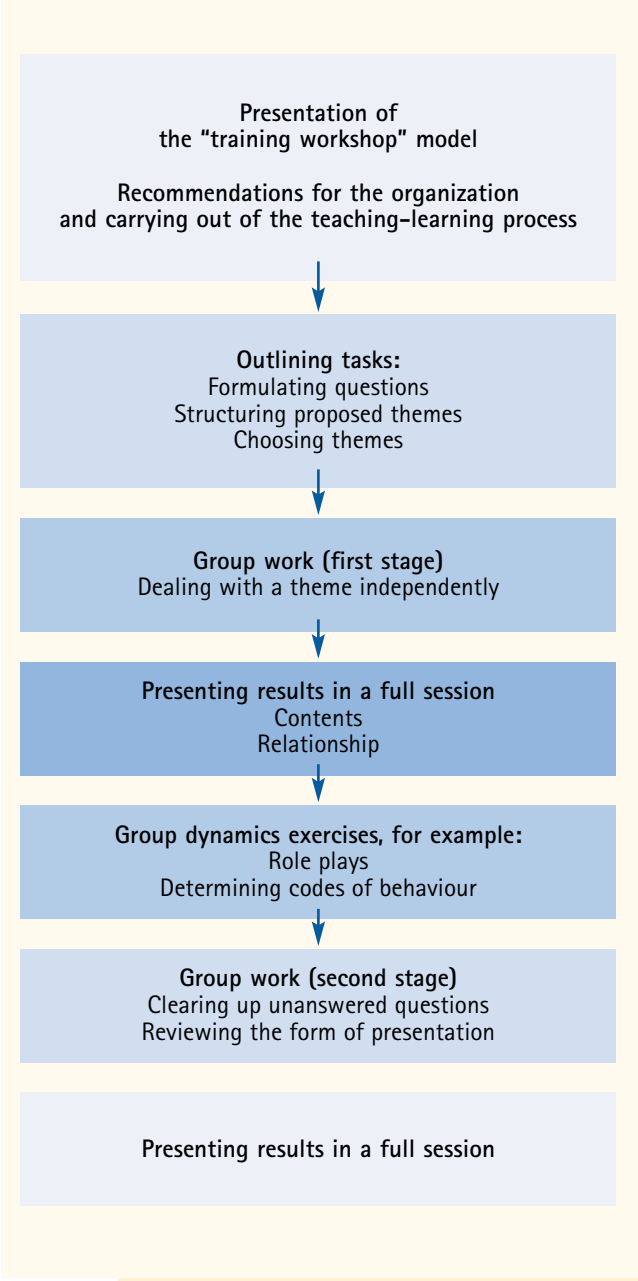
presenting results

Each group presents its results in a full session and those apprentices who have not taken part in the process itself can direct questions to the presenter(s). If the group in charge of the presentation does not know the answer to a given question, this should be written on a card and displayed on the board under the heading "question cards". Any subsequent unanswered questions should be placed under the same heading.

learning by one's own experience

During the first presentation of results, some groups will discover that they haven't structured their subject precisely enough or that they have perhaps proposed a too ambitious theme. The trainer could have commented on this during the preliminary phase but decided not to, thus permitting the apprentices to learn by their own experience.

Figure 1: The training workshop model



informing about group performance

During the full session, each group should inform not only about the results obtained but also on how the work was carried out within the group, what rules of conduct were adopted, whether any problems arose and if so, how these were resolved.

group dynamics

If, for example, relationship or cooperation problems arise, after the preliminary work phase, the trainer could carry out group dynamics exercises, such as role plays or, alternatively, could run through with the apprentices the rules governing group work.

second phase

During the second phase, of a pre-set length, each group attempts to answer the questions that remained unanswered in the previous phase. To facilitate this process, it is necessary that the subject be formulated in precise terms and structured in sub-points. The apprentices will now need to study the information bank materials in more depth and ask the experts more precise and to the point questions.

full session

At the end of the second phase, another presentation is carried out in full session. Once again, unanswered questions are displayed in the way explained above. It could be that members of the group in charge of the presentation now begin to realise that if the other apprentices do not understand them, this could have more to do with a precarious presentation than a lack of knowledge of the subject matter.

third phase

If necessary, a third phase can be implemented in order to improve the visualization and presentation of the results.

Nonetheless, the work phases should not be repeated over frequently, as if the apprentices are obliged to correct their work over and over again they could become demotivated and bored.

The frequency of the different phases should be governed by, among other factors, the trainer's opinion about the apprentices' performance, their level of knowledge and the degree of motivation shown. On a general level, the more apprentices become accustomed to the learning workshop method the less time they will require to complete the relevant tasks - and better results will be obtained. (See Figure 1, The training workshop model)

4 The guidance text (Leittext) method

self directed problem solving

The guidance text method is designed to lead apprentices towards active learning. This idea is based on structuring the learning process in such a way that the apprentices learn to work as independently as possible. Problem solving is "self directed", with the aid of guidance questions, working plans and control questions. The guidance texts consist of materials prepared specifically to aid and encourage self-learning.

finding your own rhythm

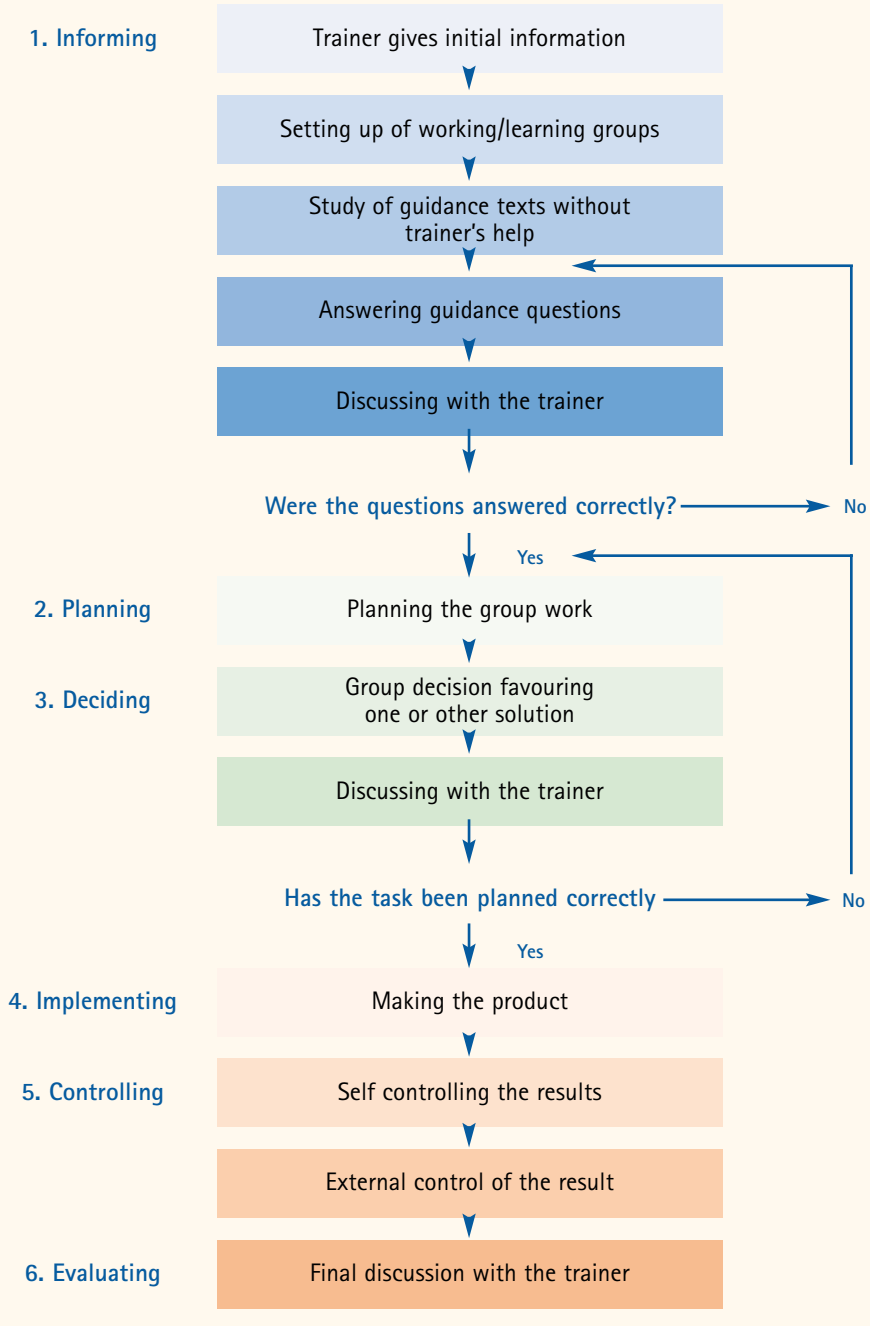
Self directed learning means that apprentices determine their own learning pace, looking for information and planning work themselves, as well as controlling their own results and evaluating their performance (See Figures 2 and 3, Development, objectives and characteristics of guidance text based learning; Schematic outline of a learning unit using the guidance text method)

Figure 2: Development, objectives and characteristics of a guidance text (Leittext) based training process

Independent **planning**	Encouraged, for example, **through self-informing**	By means of **guidance questions**
Independent **realization**	Encouraged, for example, **through taking one's own decisions**	By means of **guiding principles**
Independent **evaluation**	Encouraged, for example, **through self control**	By means of **success control sheets**

Source: BIBB

Figure 3: Schematic outline of a learning unit using the guidance text method based training process



The guidance texts help the apprentices to identify and implement their learning approach as well as correct it if necessary. It should be pointed out however, that the guidance text method is not really suitable for the learning of facts or data.

written material used throughout the learning process

Written material is systematically used throughout the learning process from the outset until the follow up stage. Apprentices use this written material:

- 1. to obtain information,
- 2. to plan and carry out their work,
- 3. to decide, after consultation with their trainer(s), what resources should be used in the implementation of their work-plan,
- 4. to carry out their work as independently as possible,
- 5. in product control,
- 6. to collectively evaluate, with their trainer(s), both the process and the resulting product.

guidance questions

The texts are comprised of guidance questions such as, "How should we proceed? (work-plan), Has the work been done correctly? (control sheets), and guiding definitions, which summarise the knowledge related to the corresponding task.

more limited powers of decision

The guidance texts are based on "complete actions" and indicate each step to be taken from the beginning to the end of a given process. In contrast to the projects method, here development and structure are determined previously. As a result of this, apprentices have more limited powers of decision, planning and carrying out their work in accordance with the pre-established contents of guidance texts. This requires trainers to assume "more intense" roles, due to both the inclusion of previously determined texts and the need for a considerably more intense control during and after the learning process.

modification or variant of the projects method

Notwithstanding the aforementioned, there are many similarities or common characteristics between both methods. For this reason, the guidance text method is considered within vocational training circles to be a modification or a variant of the project method.

common characteristics

Characteristics common to both the project and guidance text methods include the following:

- links between theory and practice
- real project implementation focused learning processes
- self learning applied to the training process
- group and team work
- a complete action model focus

5 Learning islands

integrated training within the working process

In the Federal Republic of Germany, the concepts of the company as a training location and integrated training within the working process have been the focus of increasing interest over recent years. Since the beginning of the nineties, different forms of workplace training schemes have been developed, through the implementation of various pilot projects.

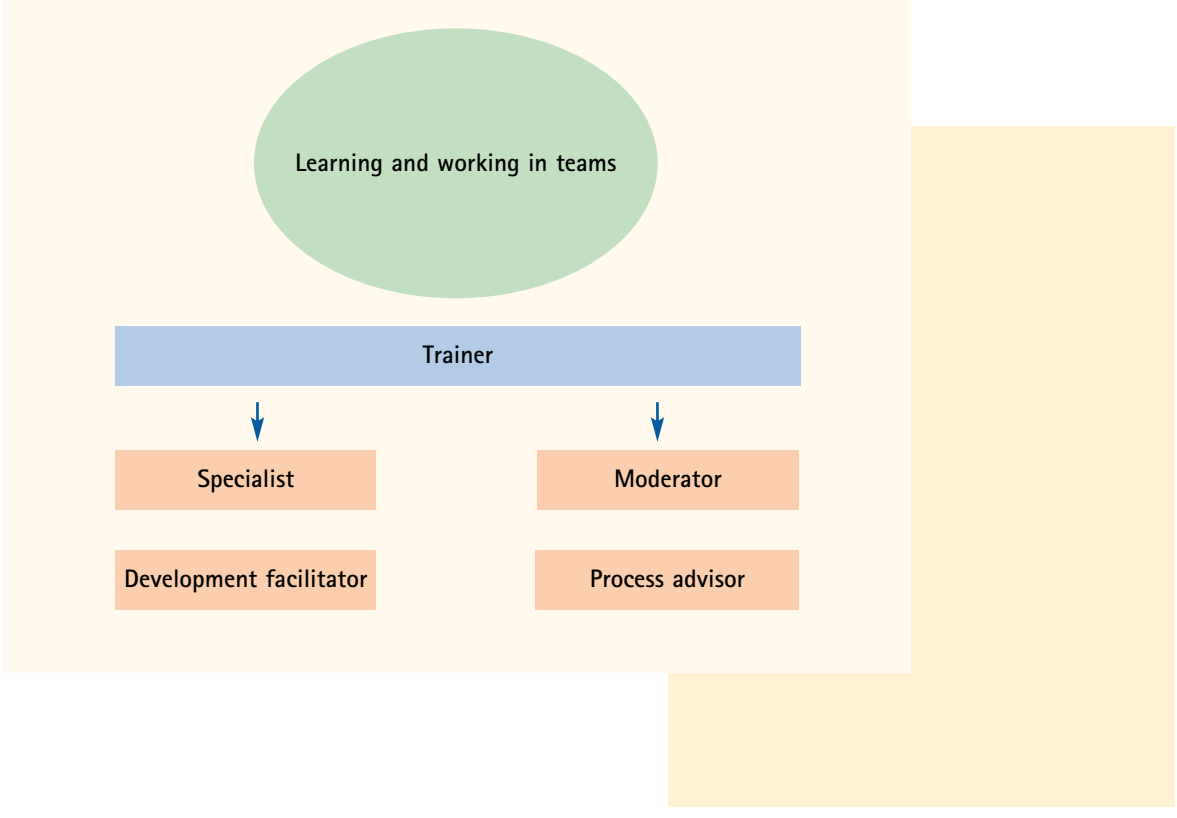
both educational and economic objectives

In general terms, the objective of these forms of work-place training models has been both educational and economic. It is intended that apprentices quickly learn the skills required for them to meet the increasingly challenging demands of the position for which they are being trained. An example of this can be found in the so-called learning island method.

qualifications and skills required in the near future

Traditional workplace learning is generally limited to specific skills and knowledge acquirement in accordance with the company's requirements in a given moment. It is, however, preferable that apprentices learn not only what they currently need but also acquire the qualifications and skills that they will need in the near future. Because of this, work positions in the learning island method are based on more up-to-date and innovative objectives and organizational systems.

Figure 4: The trainer's role in learning islands



integration with a real working environment

Learning islands form part of a real working environment, but are still very new and atypical concepts. They are often included in new working processes that are still at the experimental stage. Learning islands can be used to test new work organization schemes and to apply these to real situations. Within an learning islands framework, work and training are carried out in teams made up of apprentices from different fields and occupations.

definition of learning islands

The former German company Mercedes Benz (since the merger in 1998: DaimlerChrysler) has defined "learning islands" as follows: "Learning islands, in accordance with the new concepts of work and or personnel development, are task focused, with representation from different occupations (interdisciplinary). They are also characterised by the carrying out of real work, which is structured according to the principals of training. They can become, and this is a real option, an innovative factor when applied to processes by means of the deliberate and motivated linking of training, work tasks, areas of research and development and the quality development".

advantages

Learning islands combine the advantages of workplace training (productive activity, motivation through the carrying out of real work) with those offered by learning workshop training – training by means of qualified personnel, focused towards qualifications that will be relevant in the future and the elimination of unrelated activities or tasks.

5.1 Main features of the "learning island" method

According to W. Greinert, the main features of the learning islands can be summarised as follows:

> Apprentices from different occupational fields can participate in the fabrication of a product or a range of products or collectively carry out machine tools maintenance.
> Semi-independent work-groups can be formed simultaneously and these can be directly and indirectly linked one to another (planning functions, production control, etcetera)
> Apprentices' activities do not need to be limited to one single function.
> Apprentices can carry out tasks independently and organise their own work.
> The trainer or instructor's main role is that of a moderator, training process advisor and, to a much lesser degree, "problem solver". (See Figure 4, The trainer's role in learning islands)
> Learning islands constitute not only a faithful reflection of the infrastructure of the productive environment but also offer a complete complementary infrastructure which can be applied to the learning processes. This can be used to reflect on the task to be carried out and to stimulate social processes among the apprentices.
> Learning islands are based on a form of work-process development, which demands a parallel thinking and operation, unlike the taylorist model, characterised by a sequential and lineal organization of tasks.

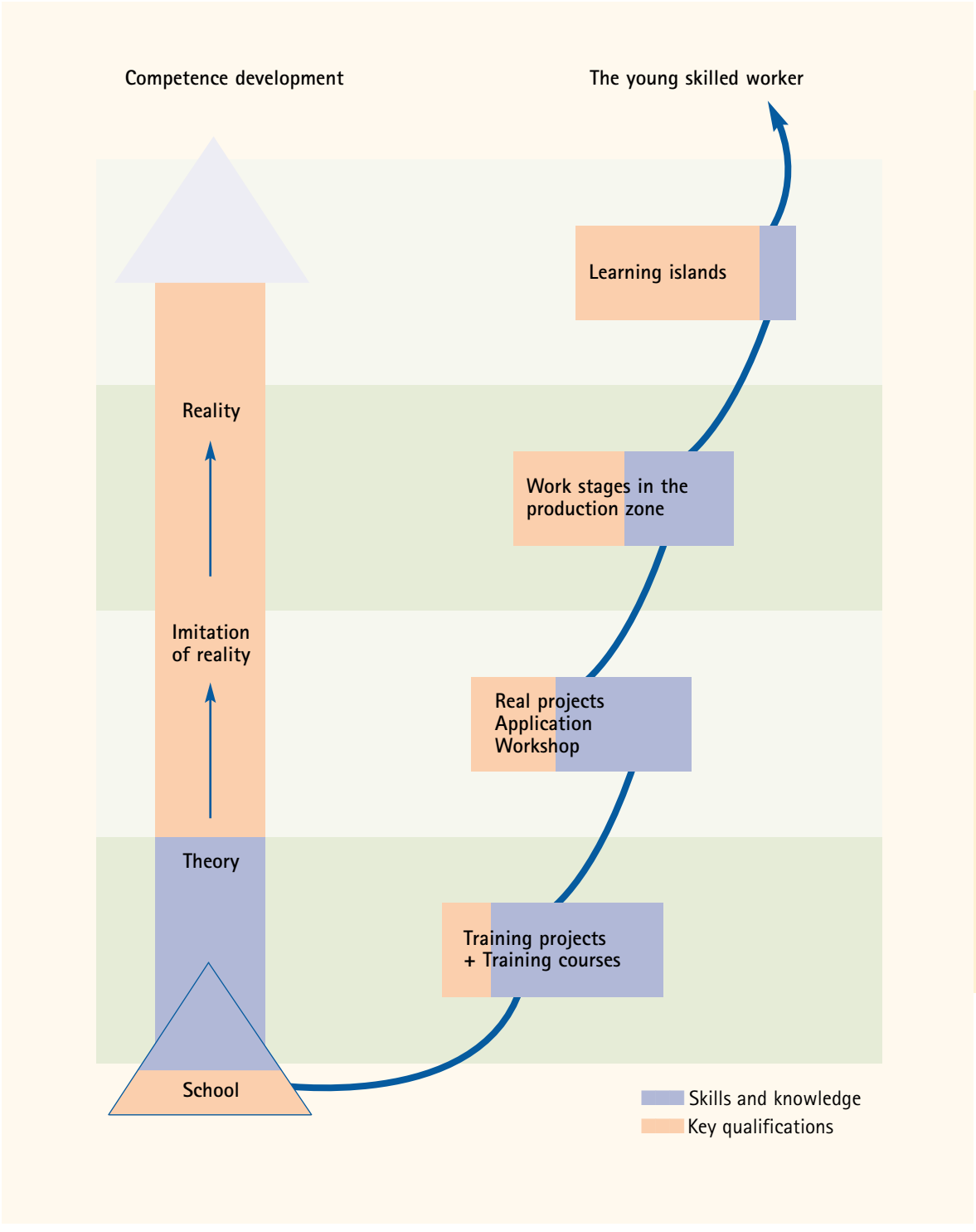
As can be seen, learning islands "qualify" for group work, involving all parties in the training process.

Learning islands signify a decentralization of the training process, with the formation of independent units with decision making capacities.

Learning islands imply a clear rejection of learning models based on mere simulation. Learning islands contemplate solely the carrying out of "real" tasks, relevant to the company's operations.
Learning islands signify a permanent sharing of knowledge between group members (apprentices)

As can be seen in Figure 5, Competence development; learning islands should not be seen as an isolated didactic strategy, rather as totally the opposite

Figure 5: Compentence development



Source: Learning Island, Mercedes Benz Pilot Project

– an integrated element forming part of a training concept capable of leading students steadily from theory towards practical reality. Learning islands as a methodology can also be used for adult training schemes.

Above all, the new requirements of the labour market make it increasingly necessary to change the mechanistic and lineal conception of work organization – or in other words, to move away from the taylorist work structures towards group work (team work, project based management, etcetera). In these areas, learning islands have become a very useful tool to be used in the implementation of technological an organisational changes

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