HUYS ADVIES

CURRICULUM DEVELOPMENT

Framework for Vocational Training Modules

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Title: CURRICULUM DEVELOPMENT, Framework for Vocational Training Modules

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Abstract: Definition of training objectives and training cycles for the training of entrepreneurs with examples in house improvement. Listing of topics and learning aims of each topic as performance, conditions and standards. Content of the training modules, logical framework and lesson plan. Different training methods develop knowledge, skills and attitudes in different ways.

Key Words: Curriculum development, vocational training objectives, learning aims, content, lesson plan, training methods.

Background: The author has worked for the past 40 years in many practical and product focussed development programmes in developing countries worldwide. Projects and programmes were with INGO's and DGIS (including some years with UNCHS, UNESCO and ILO) and were output oriented with well-defined educational objectives. Most of the projects were related to settlement upgrading, housing improvement and entrepreneur development. During the course of many years, information has been collected and used from various international sources to structure the training and to advise local training institutes. The reader will be able to find nowadays similar information on open Internet websites, but these are often presented in a less organised manner. The purpose of this paper is to have a simplified short guideline/format for local training institutes upon which structured lessen programmes can be developed.

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Training activity for institutional training staff on the development of training material for new wall insulation using reflective foils. The institute formerly did not have any training material on thermal insulation or general house improvements. The development of mini-models, entrepreneur exchange training and in-house on-the-job training are new elements in their curriculum.

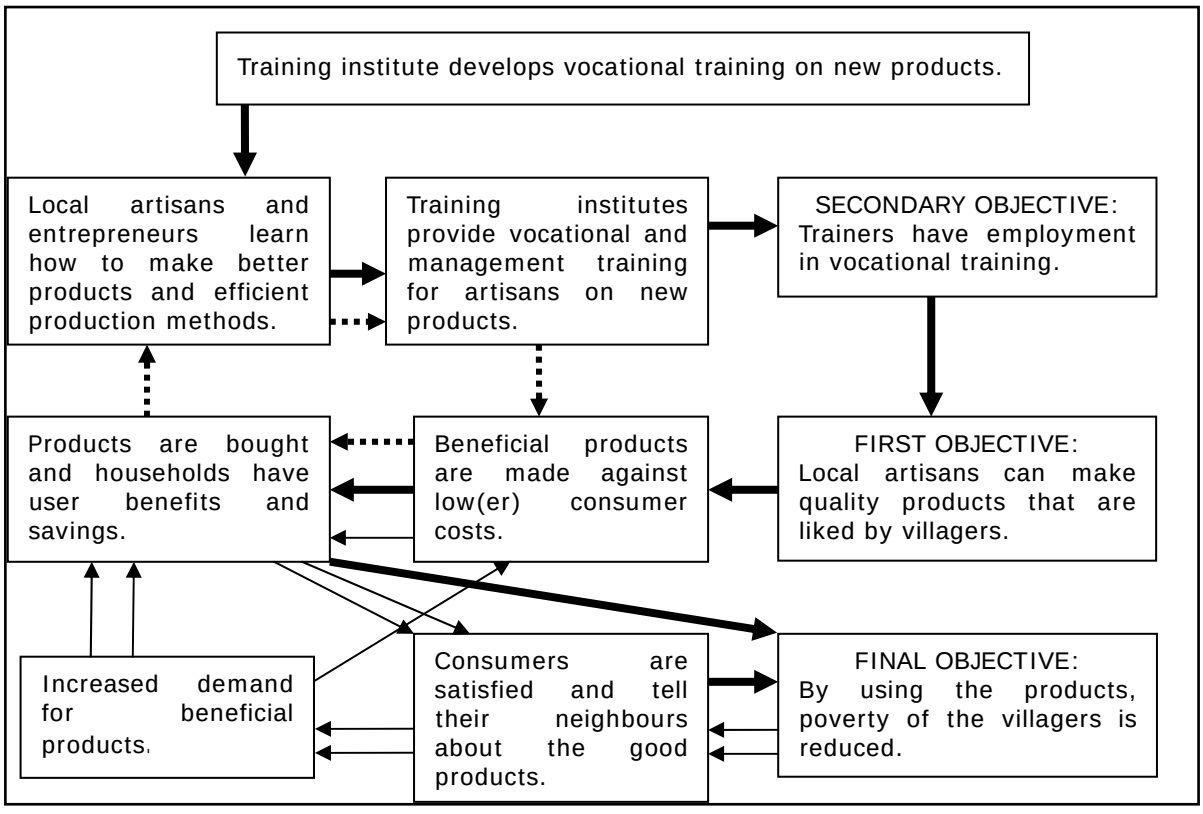
INTRODUCTION

Often in development programmes, knowledge is transferred from external sources (consultants) to local professionals and practitioners, who in turn impart that knowledge to local artisans and entrepreneurs.

The first objective is to ensure local artisans sell quality products to their clients (villagers). By using these quality products, the villagers can save money, improve their health, save time or a combination of the benefits, all leading to an improved quality of life. Improved quality of life and habitat, better health and more time available are elements in poverty reduction. Poverty reduction of the villagers, as well as local entrepreneurs, is the final objective.

Training of professionals in this process is not an objective by itself, but can be an objective of the training institute, to create employment positions for the institute by developing and providing employment-generating training programmes. This trainer's objective of self-employment is a secondary objective.

To achieve the first objective, the local artisans need to be trained on how to improve their performance in product manufacturing and client-focussed services, leading to increased production and income. The trainers need to tailor their training programmes to the specific needs of these local entrepreneurs. This includes technology development, tools use, marketing and financing mechanisms, and administrative skills to operate in a formal market.



The three cycles of training are indicated in the above flow diagram.

➔ The thick arrow is to arrive at a better product through training.
→ The thin arrows represent the following process of increased consumer demand for the products and subsequent increased business for the local artisans and entrepreneurs.
⋯> The interrupted line is the additional cycle of training for entrepreneurs. This last cycle can include more advanced production techniques, business administration and marketing.

DEVELOPING A TRAINING CURRICULUM

The curriculum defines the content of the training module. It is a package, including such information as:

- Definition of the training objective / purpose of the training module.
- Topics to be covered.
- Strategies – course activities designed to achieve the specified objectives; defined by using such action verbs as *organize*, *design, contract*, *implement*, *repair, build* and *finish.*
- Instructional materials needed to be prepared before the training session, such as materials, machines, homes for installation and agreements with house owners, entrepreneurs willing to accept a trainee for short practical lessons, etc.
- Time frame of the course.
- Feedback

When developing a training curriculum, it is important to:

- Consider the pre-training entrance level skills of the trainees. Their skill level will determine to a large extent the content of the curriculum.
- Allow adequate time for trainees to master the new material. Trainees with little practical experience need more time to master new machines, tools and resource materials.

The following steps will assist in developing a curriculum. An example component for training carpenters on how to make add-on windows is given. This example is for skilled carpenters, not for training school leavers having no knowledge or experience with tool use, woodworking and making windows.[1] The outline needs to be further developed for a complete curriculum.

1. Define the Training Objective

What needs to be achieved by the end of the training? The objective should be specific and quantifiable.

Training Objective: To teach carpenters how to make add-on window frames for better thermal insulation of existing windows.

↑ *Metal Outside, Fixed*

↑ *Aluminium Inside, Movable*

← *Timber*

[1] School leavers do not necessarily want to become carpenters. In many cases, they only want a diploma with the expectation of obtaining a job with a suitable income.

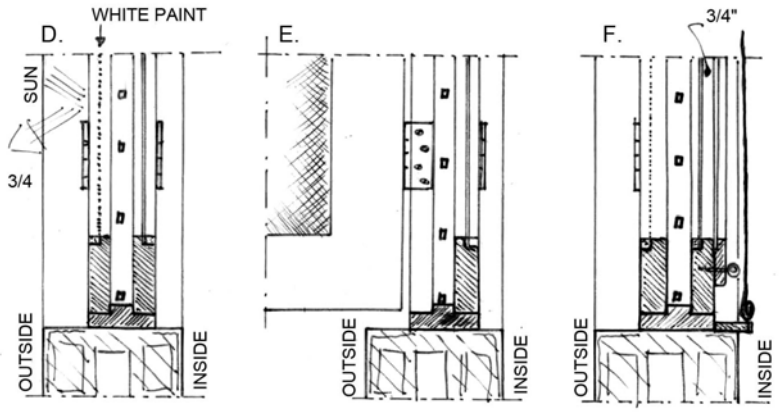
2. ***List the Topics to be Covered***

List the topics to be covered during the training and determine the chronological teaching order. Which topics must be learned first? Begin with the basic theory and gradually build up the required knowledge to achieve the training objective.

For the add-on window module, some of the topics to be covered can include:

A. Knowledge of the different types of add-on window constructions, material use, installation options, advantages and disadvantages.
B. How to read and understand drawings.
C. How to manufacture the add-on windows from timber.
D. Finishing options and painting techniques.
E. How to measure and determine the size for existing house windows, taking into consideration the different mounting options for fixed and movable add-on windows.
F. How to advise the client on the type of add-on window or for the replacement of main windows that are too old (client relation).
G. DIY option.
H. How to make cost estimates and provide precise quotations.
I. Proper handling of glass sheets and transport of the add-on windows.

Reading and understanding drawings is a necessary aspect that needs to be taught to village artisans so they can make new products from manuals.



3. ***List Learning Aims for Each Topic***

List the learning aims of each topic. What should the carpenter be able to do at the end of each particular training session?

The learning aims of training topic A can be:

A.1 Ability to describe the six different types of add-on windows.
A.2 Ability to describe material use and installation options.
A.3 Ability to explain the advantages and disadvantages of each type of add-on window variation.

The learning aim of training topic B can be:

B.1 Ability to read and understand a drawing.

The learning aims of training topic C can be:

C.1 Ability to list the materials and tools required for making the add-on windows.
C.2 Knowledge of the quality of wood to be used.
C.3 Ability to manufacture timber add-on windows in his workshop and have all the materials ready for in-house installation.
C.4 Ability to operate the machine for symmetric grooves and precise joints.
C.5 Knowledge of the types of fittings needed for each situation.
C.6 How to pack the components for safe transport and zero damage.

The learning aims of training topic D can be:

D.1 How to give the add-on window a primary finishing treatment.
D.2 Final finishing options after installation in the house.
D.3 How to do maintenance of existing windows.

Preparation of the Materials

Assembling the Components Inside or Outside

The learning aims of training topic E can be:

- E.1 Ability to measure the size of the windows for inside or outside placement.
- E.2 Ability to explain how the add-on window opens and closes.
- E.3 Ability to adjust the design according to the desires of the house owner.
- E.4 Ability to assess whether the framing of the day of the window needs adjustment and, if so, ability to explain the need of an improved day framing to the client.
- E.5 Ability to mark the position of the add-on windows to avoid errors in the installation.

The learning aims of training topic F can be:

- F.1 Ability to assess the existing window and advise if an add-on window is a suitable solution or the existing window needs replacement or maintenance first.
- F.2 Ability to advise the client on the type of finishing possible.
- F.3 Ability to advise the house owner on what type of maintenance will be required for the existing window frame and glass frame.
- F.4 Ability to plan activities in clusters to economise travel time and need for transport of materials.

The learning aims of training topic G can be:

- G.1 DIY option 1 – Demonstrating one add-on window installation and supplying the materials (pre-cut timber, primer, glass sheets, fittings and finishing paint) to the client for DIY installation.
- G.2 DIY option 2 – Supplying the finishing materials to the client for DIY finishing.

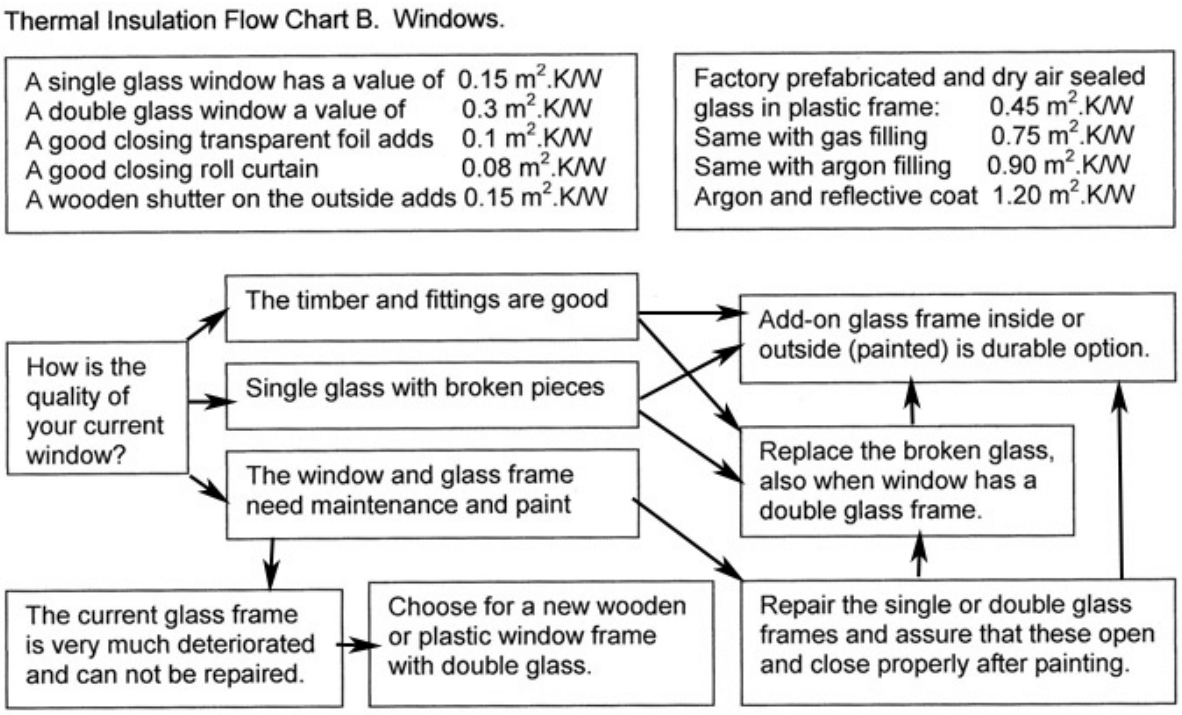
The learning aims of training topic H can be:

- H.1 Ability to provide precise cost estimates for the various options of add-on windows.
- H.2 Ability to provide DIY cost estimates.
- H.3 Ability to provide alternatives to lower immediate costs, implementation in phases (installation one year, painting the next).

The learning aims of training topic I can be:

- I.1 How to order glass sheets.
- I.2 Type of glass sheet required for each type of window.
- I.3 How to cut medium-size glass sheets to the required size with minimum loss.
- I.4 How to pack the glass sheets for safe transportation.

Transport of packs of glass by carriers in high altitudes.



A flow chart for windows is a good support tool for a carpenter when advising a house owner on the best choice of window improvement.

4. Content of the Training Module

Detail the training objectives of each training aim. A training objective is the specific knowledge and skills that the trainees are to gain as a result of the training activity. An objective is usually measurable. By defining objectives in a measurable way, you describe a desired behaviour and will later be able to offer better feedback. Bear in mind that attitudinal goals are often not measurable.

To equip trainees adequately for a certain task, they need the knowledge required to do the task. Knowledge alone, however, is insufficient. Trainees must also learn the appropriate skills (through practical work) and attitudes needed to perform the task well.

Examples of poorly written training objectives:

- The trainees will learn to be good craftsmen. (objective is hard to measure)
- The trainees will learn a lot about insulation of houses. (too general)

Examples of well-written training objectives:

- By the end of the training course, the trainees will do the following:
  - ◊ Identify six characteristics of add-on windows (*knowledge objective*).
  - ◊ Show in practice sessions (*behavioural objective*) that they can make a contract agreement with a client (*attitudinal objective*) by presenting various design options (*skills objective*).

The detailed training objectives are divided in three separate parts:

(a) **Performances**, giving more detailed statements of what the artisan will be able to do at the end of the training session. The following words are part of the definitions:
He can list…, he can identify…, he can explain…, he can repair…, he can make…, he can calculate…, he can select…, he can solve…, etc.

The performances are expressed in active terms. This means that the writer of the training objectives must think of what the trainee must be able to do at the end of the training.

For example, at the end of the training session A, the trainee must be able:

- To list six different design options for add-on windows.
- To identify an add-on window from six different samples.
- To describe the fitting method of the six design options.
- To list the advantages and disadvantages of each of the six design options.

By writing these performances, it needs to be avoided that the statements can be interpreted in a variety of ways, such as:

◊ The trainee will understand the objectives of …. Understanding is vague, he must be able to mention elements or write down what to do.

◊ The trainee will have a working knowledge of …. Also very vague, the entire training programme will improve working knowledge.

◊ The trainee will appreciate …. This is very personal as well.

(b) **Conditions** under which the performances will be executed during the training. The training is usually realised in the workshop of the training institute. Generally five types of conditions are to be considered:

- The range of problems the trainee must solve.
- The tools and equipments that can be used.
- The special manuals and other job aids provided.
- The workplace conditions, inside or outside.
- Special physical demands for the person (strength, sight, skill).

The conditions will vary for each type of performance. For add-on window production and installation, two work areas exist, one in the workshop of the institute in the preparation of the materials and one in a private house where the add-on windows need to be fitted.

The Range of Problems: This depends on the local working conditions of the artisan and the equipment he owns or the situation inside the houses. If the main problem is to produce large quantities of profiles, creating an association with another carpenter who has a machine may be a solution.

Tools and Equipment: It is not useful to educate the trainee only on the use of electric equipment when there is limited or no electricity. The trainee must be competent in hand-operated tools as well. On the other hand, it may be useful to provide information on workshop machines that can produce the required profiles faster or indicate where ready-made profiles can be bought.

Mitre box of hardwood, an essential working tool for making precise joints.

Manuals and Job Aids: For factory-supplied add-on frames, assembly and installation instructions should be available. The more complicated the equipment becomes, such as for plastic prefabricated windows, the more important these manuals are.

Workplace Conditions: The training institute should have a stock of dry, clean resource materials for the practical work. When working on the premises of a house owner, the artisan must work according to the time schedule of the house owner and be able to make a suitable work plan. He should be careful not to damage the existing curtains or other furnishings.

After this roll curtain was installed, it was insufficiently rolled up above the movable windows. As a result, the locking pin of the window damaged the roll curtain.

Special Physical Demands: For house construction type of jobs, the artisan must be physically able to lift building materials, work on heights and under cold climate conditions. For the add-on windows and roll curtains, however, most activities are light work and can easily be performed by women.

(c) **The Standards**: These are the quality standards of the performed work. Quality standards of construction work are strongly related to the strength and durability of the product. Only when a good quality standard is produced, will the client be satisfied and communicate so to his neighbours, through which the artisan may get more work. There are four types of standards:

- Accuracy, the precision in which the work is performed, tolerances.
- Speed, how soon or fast the work can be completed according to contract.
- Quality of source materials and finishing.
- Satisfaction by the client about the work performed.

The position of the fittings depends not only on the client's preference, but also on the technical situation.

Accuracy: When the windows are precisely measured and the information noted down in an organised manner, the chance of errors will be minimised. An add-on window that is not fixed straight will not get the satisfaction approval of the client. Add-on windows need to close properly against the existing window so no air circulation results (and energy loss).

Speed: The client does not always have the time to be around for long periods when the carpenter does the work. More important, taking a long time to do a simple job is not cost effective for the carpenter or the client because the cost per hour needs to be paid for. Good work planning and the right tools will improve speed, accuracy and quality.

The speed of work and the quality often depend on the materials and tools that can be found in the market.

Quality: When add-on windows are made of timber, no knots or other irregularities should be present in the thin timber; otherwise, the timber will bend or warp, possibly destroying the glass. Hinges used outside should be well galvanised; otherwise, these will rust.

Knot in wood – wrong placement of screws.

Open joint – knot and damage in profile.

Satisfaction: All elements come together in the satisfaction level of the client, also when the client is realising a DIY job with assistance from the artisan. In the case of the add-on window, the satisfaction will develop during the following winter period when less heating fuel is used and an increased comfort is obtained. The entrepreneur needs to address the client during this winter period and ask if everything is to the satisfaction of the house owner. Guarantee periods are part of the satisfaction process.

The satisfaction may only be realised after experiencing a winter and the client is more comfortable because of the window improvement or has used less firewood.

A satisfied customer will provide free advertisement for the product.

Good customer-client relation-ship will assure that the client knows what to expect and does not develop undue expectations that can lead to poor satisfaction.

5. Logical Framework

Writing down the performances, conditions and standards in as a logical framework will facilitate development:

Aim	Performances	Conditions	Standards
A	Knowledge of the six different designs of add-on windows, material use and installation options, advantages and disadvantages		
A 1.1	Name the 6 add-on window designs	From memory, no aids	All 6 correctly named within 3 minutes
A 1.1	Identify the 6 add-on window designs from samples or pictures	Samples or pictures of the 6 add-on windows designs available	All must be named
A 1.2	Describe the fitting method of the six design options	Trainee role-playing in front of group, using mini models	Client must be satisfied and be able to choose the best option for his house
A 1.3	List the advantages and disadvantages of each design option	Trainee role-playing in front of group, presenting factsheet	Minimum 5 or at least 80% advantages + disadvantages are named
Aim	**Performances**	**Conditions**	**Standards**
B	How to read and understand drawings		
B.1	Read and understand drawings	Straight projections, perspective, axonometric, sketches, photos	Score of 100% on specific questions
Aim	**Performances**	**Conditions**	**Standards**
C	How to manufacture the add-on windows from timber		
C.1	List equipment and tools required for making the add-on windows	Booklet with tools and equipment	100% of tools and less than 10% excessive tools
C.2	Determine quality of wood to be used	A stock of prepared timber (20 m)	Select 10 x 1 m + 10 x 0.5 m of good profiles
C.3	Manufacture timber add-on windows and have all the materials ready for in-house installation	All tools available: woodworking tools, mitre, circular saw, one- or two-sided planning machine	The timber is to be without knots or irregularities. The longest wood nerve of each piece should stay within the timber. Produce 100 m/hr.
C.4	Operate the machine for symmetric grooves and precise joints, including changing the saw blade, sharpening the blade, setting the saw and planing machines	Dry timber Saw and planing machines	The groove should be centric and 1 mm wider than the glass. Profile sides are chamfered. Different profile designs.
C.5	Types of fittings and finishing needed for each situation	Different sizes for different window sizes and opening directions	Galvanised and copper for outside. Opening without friction.
C.6	Packing component for safe transport and zero damage	Same as for DIY supply	Not forgetting anything
Aim	**Performances**	**Conditions**	**Standards**
D	Finishing options and painting techniques		

The above is indicative of the type of descriptions. For example, for aim C.3, more details are required regarding workshop tools and the most efficient way to cut the roughly sawn large size timbers to get the optimum number of shaved profiles. When village carpenters do not have the machines, they should purchase the profiles from larger entrepreneurs.

Along with the conditions, teaching aids and samples can be listed. The samples need to be prepared beforehand as part of the trainers preparative activities.

The standards should include time, numeric, percentages or other measurable elements.

6. ***Make Lesson Plans for Each Topic***

Making lesson plans for each topic has the following benefits:

- Helps the trainer to prepare in advance.
- Reminds the trainer of key points to make during the session.
- Provides the trainer with a written record of the lesson, which can be critiqued.
- Provides materials for future use by other trainers.

(a) Plan each training topic daily schedules. For simple training objectives, such as add-on windows, one or two days should be sufficient.

(b) Decide on a timeframe – how much time to be spent on each topic component. For example:

Training Topic A: Knowledge of the different types of add-on window constructions, material use, installation options, advantages and disadvantages

45 minutes: Describe the different add-on window designs
15 minutes: Describe the material use and installation options
30 minutes: Discuss the advantages and disadvantages
30 minutes: Testing

(c) Decide what training methods to use, for example:

- Demonstration by the trainer of the product in manufacturing and finishing.
- Theory lecture with samples and drawings.
- Practical exercises on machines and in houses.
- Role-playing – client-entrepreneur relationship. Since the artisan needs to deal with clients, practical role-playing exercises should be developed between artisan and client.
- Electronic media, such as CD video that show examples of the different designs.

(d) Trainer Preparation Work: List items that need to be prepared and ready for the training, such as training environment (classroom, workshop of the training institute, in a house), audio-visual equipment, notebooks and models. In some cases, such as the add-on window, part of the practical demonstrations can include making some mini and real-size samples, factsheets and manufacturing manuals. Part of the practical training can be organised in the workshop of an experienced carpenter who has the equipment.

The availability of real-size examples of the final product allows experienced carpenters to copy the product without much difficulty.

Other aspects, like customer relations, in-house installation, business administration and marketing can be part of an integrated training programme.

(e) <u>Practical Exercises:</u> Sufficient materials, tools and other equipment or space should be available for the practical exercises. The group should be split into smaller units when insufficient equipment is available. One group can do the practical while the other group does the theoretical part. This, of course, requires two trainers.

Practical exercises are essential for artisans to learn on-the-job. In many cases, a skilled carpenter will understand how to make an article when he sees one. The skills development of making or delivering the product at the house within a certain accuracy, time and quality and according to the satisfaction of the client needs to be practised. For example, to ensure that the groove in the profile is centric, the profile needs to be turned 180° and passed again over the saw.

Practical exercises of unskilled youth are best done in conjunction with experienced carpenters where the trainees work as an assistant. After having learned the theory and some basic knowledge about the tools and machines, practical work will enhance their skills and at the same time teach them something about the general work environment of a commercial enterprise. The training institute needs to make agreements with the entrepreneurs well in advance before placing the trainees. The trainee (one at the time) should not become a burden to the entrepreneurs.

To ensure that the corner joint is precise, a mitre box is used. The joint can be adjusted by additional sawing. This requires good skills of the carpenter.

When giving a training on thermal insulation, the trainer should have a variety of calculation examples of floors, roofs, walls and allow the trainees to come with their own designs. They should be able to make the required calculations of thermal resistance, condensation point and heat storage.

> Training is achieved by obtaining the same information from different angles or sources and by repetition. That information can be presented in different formats. This is similar to the real situation where every situation may be a little different. Providing a variation of exercises about the same theme is important.

For the add-on window training exercise, the practical part of the in-house installation needs to be organised beforehand or the trainees must make agreements with clients as part of the training programme. If the training organisation is to organise the in-house installation of the add-on windows, houses with different case situations and with sufficient working space to allow a small group of trainees to follow the installation need to be chosen.

Sufficient working space is needed to accommodate several trainees.

OTHER ASPECTS OF A TRAINING CURRICULUM

New Training Programmes

New training programmes need to have a trial run by the trainer to make sure that the available time is adequate. After realising the first training, the training module needs to be updated with practical information about time, location, recommended number of trainees and the possible problems that can be encountered.

Training of artisans needs to consider their limited time availability. Village carpenters may have little work during the winter season; learning a new product that can be installed during the winter may be interesting for them.

Cost of the Training Programme

The cost of the training activity needs to be assessed. Artisans who will be trained for new skills that will generate income are usually prepared to come to the training without being paid for the training.[2] That includes housing and transport, as long as the training period is short. This means that the training programme should be partitioned into an initial practical and theoretical component, with the option to come back for another short period to learn additional theoretical information and association formation. A third period may be possible for business training. The cost and timing of the training activities must be clear to the trainees.

Training Diploma or Certificate

When the training is successfully completed, the trainee should obtain a diploma or certificate. This certificate should provide precise information about the training, the period and the results by the trainee. When carpenters have completed a short course on making add-on window, it is not appropriate to give them a general “Carpenters Diploma”.

Feedback

The training guideline as indicated in the former chapters and the logical framework should be followed so that no elements are overlooked. During the training programme, constant feedback needs to be realised by the trainer(s) through question and answer sessions and close observation of the trainees during the practical exercises. For trainees working for the first time with machines, additional training components need to be included about safety precautions.

Examinations

Both theoretical and practical examinations need to be incorporated into the training programme. The exercises will give an indication on the accuracy, speed and quality of the work of the trainee and provide at the same time feedback to the trainer on what items were clearly understood and what items were not adequately understood.

Giving a rating of the examination results allows the trainer to compare the different trainees. It is valid to mention the examination results on the training-completion certificate.

Directly after the examination or after the training as a whole, trainee feedback is important to handle any observations or complaints from the trainees.

Delayed Feedback

Feedback from the trainees six months after the training is useful to understand what types of problems they have encountered in their work situation and which were not addressed during the training, as well as an impression whether or not their business level has increased as a result of the training. This information is important to justify the training and can be used as an argument for new trainees to pay for the training course. Asking the ex-trainees if they are prepared to host young trainees as apprentice may result in additional posting opportunities.

[2] Training programmes requiring the trainees to be paid for receiving the training are usually not sustainable and should be avoided.

TRAINING METHODS

Several training methods can be applied within one training module. The following gives a brief description, along with their advantages and disadvantages.[3] The different training methods will develop knowledge, skills and attitudes in a different way.

Depending on the objective and type of training results that are required, different training methods need to be selected. The first four listed are the most relevant training methods for carpenters. The end of the list gives other training formats that are less suitable for vocational training.

Lesson <15 persons		**KNOWLEDGE**
Main Use	**Advantages**	**Disadvantages**
For all types of training. For all teaching, except manual learning methods. For (group) exercises on problem solving and decision making.	Close contact between trainer and trainees. Students can receive individual attention by the teacher. Possibility to do group exercise. Teacher receives immediate feedback about training. Speed of training can be adjusted to the group.	Depends very much on the quality of the trainer and the interaction between trainer and students. For effective training, group sizes should be <10 persons, making the training expensive in trainer and equipment time.
Demonstration		**KNOWLEDGE**
Main Use	**Advantages**	**Disadvantages**
For showing how-to-do. Showing correct and incorrect working methods or procedures. Providing a standard to the trainees to follow.	Small and large groups of students or visitors can be addressed. For skilled trainees, rapid way of knowledge transfer.	Requires much time to produce. With large groups, little contact with group during presentation. Can be much too fast for some trainees to follow when a special skill is required.
Practical Work and Supervised Practice or Coaching <5 persons		**SKILL, KNOWLEDGE, ATTITUDE**
Main Use	**Advantages**	**Disadvantages**
All types of skills training. Changing knowledge and attitudes. Between experienced entrepreneur and trainee.	Trainees are actively engaged. Close supervision by trainer. With group work, there is exchange of ideas and experiences. End product can be evaluated. Pace of work adapted to skills development by trainee. Immediate feedback to teacher.	Time consuming and expensive in materials, tools and equipment. Personalities in the group may differ and cause conflicts. Depends on quality trainer. Only a very small number of students can be handled at the same time.
Exchange Visits		**SKILL, KNOWLEDGE, ATTITUDE**
Main Use	**Advantages**	**Disadvantages**
Between like-minded sector professionals. When the option of sector linkages and association building exists.	Individual learning experience for the trainee with skilled entrepreneur. Practical skills on enterprise operation are learned. Learning about whole product cycle and client contacts.	Learning ability of the trainee depends on observation skills. Mistakes have a negative impact on production of trainer.
Discussion <5 persons		**ATTITUDE, KNOWLEDGE**
Main Use	**Advantages**	**Disadvantages**
Problem-solving exercises. Development of decision-making qualities of students. Developing attitudes among trainees.	Trainee activity is intensive through participation. Interest by the students is high. Real case situations can be dealt with.	Large time requirements to obtain a useful result through resuming by the trainer. Needs to be well controlled. Students need own opinion or experience from real situations.

[3] Source: ILO, Training Resources Unit

Project or Company Visit		ATTITUDE, KNOWLEDGE
Main Use	**Advantages**	**Disadvantages**
Understanding new techniques and working methods. Widening technical horizon of students.	High interest of trainees. Other resource persons than course trainers. Observation of real industry situation. Small or large groups.	Requires precise agreements with company what to show. Training group needs to travel.
Slides[4], PowerPoint[5], Film[6] and Video[7]		**KNOWLEDGE, ATTITUDE**
Main Use	**Advantages**	**Disadvantages**
For orientation purposes. For demonstration purposes. To provide background information. Animation for illustrating abstracts concepts.	Allows recording of real situations and present these in a structured manner. Speed of presentation can be adjusted or halted for study. Allows animated presentation. Details can be enlarged. Keeps audience focussed.	Expensive to very expensive to produce. When poorly made, trainers will lose interest. Can be out-dated with newer developments or techniques. Can be overpowering medium.
Role-Playing by Trainees with Trainee Observers		**ATTITUDE, SKILL**
Main Use	**Advantages**	**Disadvantages**
Exercises where emotions play an important role. Changing or modifying attitude. Increasing the knowledge or understanding of human behaviour. Psychological studies persons.	Generates great interest. Active participation by trainee. Reflects real life situation. Works on emotions.	Role players learn more than the observers. If observer trainees and role players are reversed, another role-playing is needed. Success depends on the imagination of the players. Attitude change may be short lived.
Business Games <5 persons		**SKILLS**
Main Use	**Advantages**	**Disadvantages**
Decision making. Planning skills. Development of interactive skills. Formation of interest groups.	High participation of trainees. Students will more easily accept own weakness. Stimulates short-term decision making by trainees. Mistakes can be made without fear of negative consequences. Fast learning process.	Competition can result in diverting from the objective. Time consuming to produce. Need for rapid calculation skills. Can be outside the experience of the participating trainee. Senior participants may lose face in exercise.
Programmed Learning >1000 persons		**KNOWLEDGE**
Main Use	**Advantages**	**Disadvantages**
All types of knowledge learning. For teaching concepts and procedures. For teaching problem solving and decision making.	Trainee can work at own speed. Trainee can work in own time. Material is precisely formatted into small learning steps. Trainee gets immediate feedback on the results. Trainees have high motivation. Low cost when replicated (CD).	Each module is time consuming and therefore costly to produce. Trainees need to learn how to operate the programmed learning method.

[4] Slide shows and PowerPoints can be paused for extended explanations.
[5] In many cases, PowerPoint presentations are wrongly used with large amounts of text to read. The use of more than 100 words in a 20 slide PowerPoint is excessive.
[6] Films need to be adapted to the speed of comprehension of the audience. In a new learning situation, this may be slow. Films and video can be rerun at the end of the training course as a reminder.
[7] The supply of CDs can assist DIY workers in the village.

Project Development		SKILLS
Main Use	**Advantages**	**Disadvantages**
Trainees are meeting other people outside the training environment. Learning about complexity of development issues.	The learning ability depends on the initiative of the trainee. Creates interest. Own rhythm in development. Can be done in own time. End product can have use.	Needs close control by teacher. Motivation is easily lost if students do not get sufficient feedback from trainer. Working in groups, needs organisation.
Simulation in Operative Training		**ATTITUDE, SKILLS**
Main Use	**Advantages**	**Disadvantages**
When the normal learning time is long. When equipment is dangerous to work with or very expensive.	Progressive approach to performance in real work situations. Allows individual feedback. Allows practice without the risk of negative results. Builds confidence of trainee.	Difficult to identify the best elements to be simulated. Extra equipment necessary. The development of an environment similar to the real case is important, but costly.
Job Rotation within Company – one person		**SKILLS, KNOWLEDGE, ATTITUDE**
Main Use	**Advantages**	**Disadvantages**
Widening the trainee's experience in the company and work in real situations.	The trainee gets contact with several employees and working situations within the company. Trainee is often in a coaching situation receiving close attention. The coaching time is shared.	Trainee is often regarded as an extra help and is put on jobs other employees do not like. Not always certain that the trainee gets a wide variety of job activities to deal with.
Discovery by One Trainee or in a Group		**SKILLS, KNOWLEDGE**
Main Use	**Advantages**	**Disadvantages**
Development of know-how, skills in operations and management. Applies mainly to advanced learners.	Trainee activity high with good motivation. Understanding and retention of information or skill is high.	Time consuming for the trainer to prepare learning materials. Student can try to find out what is already known, wasting time. Working method can become haphazard and unstructured.
Case Studies (see also role-playing)		**SKILLS, ATTITUDES**
Main Use	**Advantages**	**Disadvantages**
Problem solving and developing analytical skills of real cases. Gaining confidence in short time decision making. Changing or modify attitudes towards problems.	Provides clear themes for discussion, as well as good and bad practices from reality. The experiences from the trainees can be included. Provides active participation.	Time consuming to produce. Difficult to evaluate when not all the circumstances are known.
Sensitivity Training		**SKILLS**
Main Use	**Advantages**	**Disadvantages**
Develops understanding of behaviour and reaction. Carry out skilful behaviour in a given situation.	Highly participative.	Difficult to evaluate. Needs skilled staff to guide.
Lecture >30 persons		**KNOWLEDGE**
Main Use	**Advantages**	**Disadvantages**
Fast production of information and facts for many trainees. Can be supported with handouts and audio visuals, including the presentation of models.	Large number of students or trainees in one session with only one trainer. Large amount of material covered in a short period. Determined and uninterrupted presentation period possible.	Trainers are passive observers and do not actively participate. When knowledge is only by speech, it is difficult to remember. The trainer has little feedback from the students. Maximum absorption point by students is rapidly reached.

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