

# EVALUATING THE PERFORMANCE OF MICRO-TRAINING ACTIONS FOR ENVIRONMENTAL LEARNING

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## **Abstract**

The impact and significance of a training process may not be easily noticeable in the short term, and is difficult to track in the long term. This is more common when training targets are acquiring positive attitudes and competences (i.e. environmental awareness) rather than specific technical procedures. Thus, such training requires specific evaluation tools for quantifying the degree of achievement the objectives.

Microteaching is a training methodology characterized by brevity and flexibility, which focuses in promoting active learning and evaluating its long-term impact (including performance indicators). The methodology was developed during two European projects (Leonardo da Vinci Programme (Overschie,2006; Pérez-Moya, 2008, [www.microtraining-support.eu/](http://www.microtraining-support.eu/)).

This methodology was applied in two case studies for validating the assessment procedure developed. In both cases, the focus was improving performance of their Environmental Management System (EMS):

### **Company A**

- Private company. Industrial electronics sector.
- Objective: improving the communication between departments, detecting elements subject to the “continuous improvement” statement associated to the EMS application.
- Initial status: ISO 14000 certification.

- Proposed working group: Department managers and management team (including the general manager).

### **Organization B**

- Public organization. Higher Education sector.
- Objective: improving the communication between staff and wake up interest in EMS.
- Initial status: lack of environmental management certification
- Proposed working group: technical staff (department head was not attending the sessions).

The application of the training and assessment methodologies is described for both cases. Finally, the actions resulting from the training and the corresponding outcomes are presented and both experiences are discussed regarding these results.

### **Keywords**

*Training evaluation, Microtraining, Long-life learning.*

## **1. Introduction**

Organizations demand a practical and flexible methodology to ensure knowledge transfer during the daily working demands. Environmental management, technological innovations, processes improvements ... requires a continuous and efficient learning and knowledge transfer.

Microtraining methodology is aimed at improving the efficiency of learning and knowledge transfer in the commonplace working environment. The learning sessions long no more than 15 minutes. Each session starts actively, followed by an exercise and a short discussion, and ends with directions to further information and a brief preview of the next session. Microtraining method helps to truly understand and apply knowledge. Participants are activated to share their expertise with others and to contribute solutions that benefit the organization.

However, even the marked advantages of the Microtraining methodology as any other learning methodology, it is compulsory to quantify the degree of achievement in the learning objectives. A multi-level flexible evaluation scheme has been designed as a tool so that it can be easily customized and adapted to different:

- organizations, companies or departments (target groups)
- moments, needs and objectives within a given organization.

At the upper level, the entire evaluation process is designed as part of the training (formative process) itself. This level of assessment is linked to the medium-term time horizon and

should be regarded as a formative evaluation of both the training process and the extent to which the organization's environmental objectives have been achieved.

The aim of this formative evaluation is to check whether the instruction is progressing successfully and to identify and solve any problems, and thus improve the training process.

From this point of view, the instruction is designed to train people to achieve goals while achieving these goals. In the first stage, the microtraining group has to identify problems and consider solutions (learning). In the second stage, the participants have to commit personally and collectively to implementing the solutions that have been selected.

Both stages follow the basics of continuous improvement and constitute a genuine strategic planning, which at the same time is learnt and put into practice for a limited organization (the trainees) and a limited and very specific set of objectives. This is covered by the entire set of questionnaires that has been developed (Q0 to Q4, see Table 1).

At the lower level, the assessment is linked to the short term and focuses on the first stage of the entire process. When training is limited to identifying problems and solutions, the main target is to evaluate the success of the MT sessions. This can be done by using only the first three questionnaires (Q0, Q1, and Q2), which measure the performance of the trainer and the learning perceptions of the trainees.

As second stage, the assessment is focused on measuring people's commitments regarding the changes that are in progress, as well as their confidence that the objectives will be achieved, after starting specific actions. Surveys are issued (questionnaires Q3 and Q4) to the people in charge of each specific task to obtain the results of the actions carried out in terms of established indicators and performance indexes. The methodology used to assess of the effectiveness of MT follows a three-stage process:

1. **Ex-ante-evaluation:** It is required that the Managers and the Microtraining participants identify the organization's training needs. The trainer need to know and conciliate the concerns of the participants and the organization's training needs. Q.0. Organization's expectations and Q.1. Participants' expectations are the tools developed to cover this aim.
2. **Post-evaluation:** After the overall evaluation of the MT process and the review of the learning process, the participants are ready to propose improvements. Expectations should be linked to commitments (resources) and activities participants can carry out in their respective areas of responsibility, and must be measurable in terms of specific parameters or indicators (could be established by participants).The trainer explains the procedures regarding the implementation of the evaluation process in the next stage, as well as identifying the procedures for communicating the results.

3. **Monitoring-evaluation:** This last step focus in assessing the degree to which the original objectives have been achieved, using the pre-determined indicators or parameters.

Figure 1 shows the sequence of this process, while Table 1 summarizes some of the specific characteristics of the various stages.

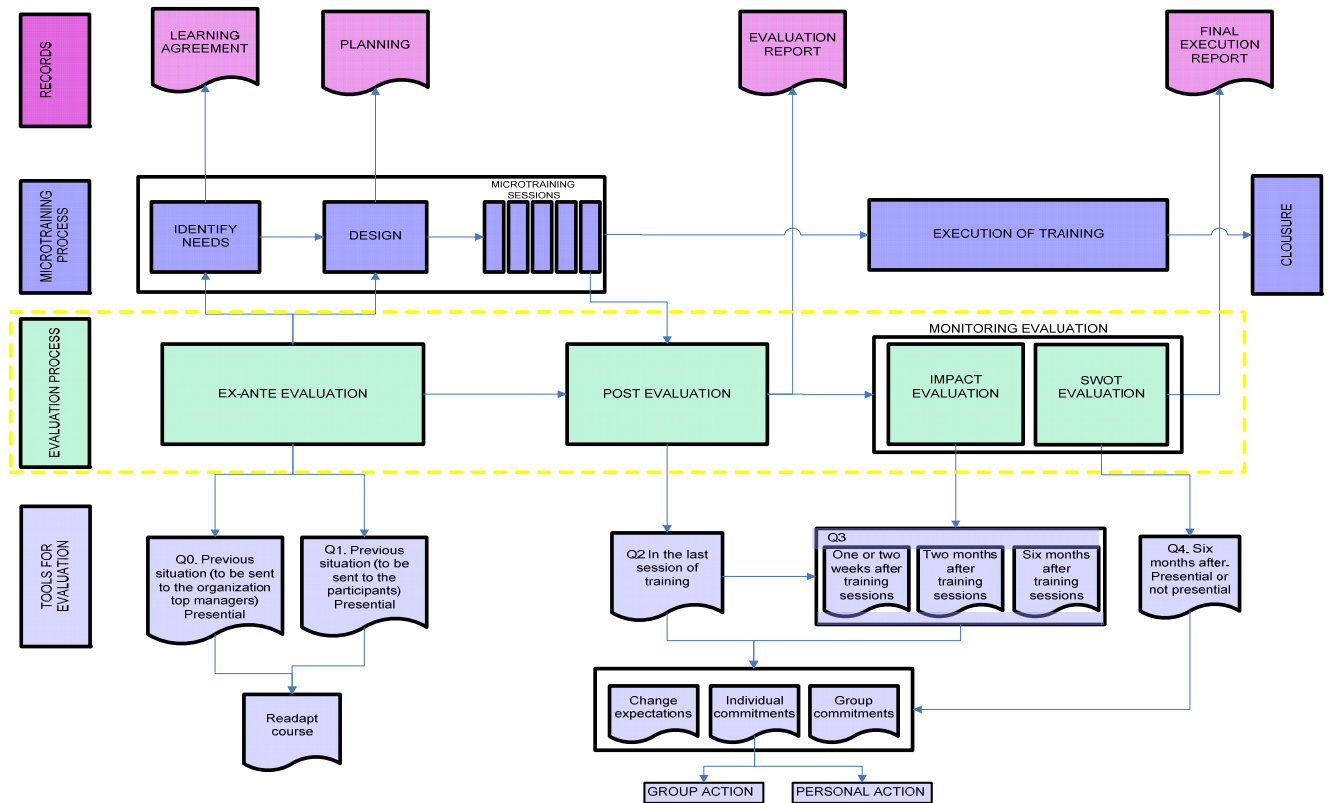


Figure 1. Stages of Evaluation Effectiveness Methodology (Process sequence). Tools for Evaluation.

As mentioned in the different sections of this document, each stage has different goals, and specific aspects must be considered, as well as the responsibilities of the actors in the course of the training process. Although general responsibilities are mentioned in the next section; they need to be clarified during the Microtraining process.

Table 1. Specific characteristics of each tool for the evaluation of MT effectiveness.

Stage	Tools for Evaluation	Objective	Procedure	Interviewer	Interviewee	Implementation date / Duration
Ex-ante Evaluation	<a href="#">Q.0</a>	Identify the training needs of the organization from the information provided by managers and participants	Interview	Responsible of MT project	Managers of the Organization	Before Microtraining sessions / 1hr
	<a href="#">Q.1</a>		A meeting with the group	Trainer (Internal* or External)	MT Participants	Before Microtraining sessions / 15 min.
Post-Evaluation	<a href="#">Q.2</a>	Global evaluation of the MT process (**). Define change expectations (commitments and actions).	During the last session	Trainer	MT Participants	The last microtraining session / 15 min.
Monitoring-Evaluation	<a href="#">Q.3</a>	Evaluate the degree of fulfilment of commitments through performance indicators at three different points in time	To be defined by trainer	Trainer	MT Participants	Three periods of time: one week, two months, six months, after Microtraining sessions. 5 min / period
	<a href="#">Q.4</a>	Evaluate overall training at the end of six months, considering the performance indicator values obtained by the actions.	To be defined by trainer	Trainer	MT Participants	Six months after Microtraining sessions. 5 min

\* Internal refers to a person who works within the organization

\*\*The immediate perception of the trainees about the training process is also recovered, as an indirect measure of the MT potential effectiveness

## 2 Training and assessment methodologies in Company A

Company A is one of the most important corporations in the World in the manufacturing of electrical connectors for all type of electrical networks and also for any kind of industrial applications. In addition, the above mentioned company provides the tools required for the installation of all these connectors.

Its wide product range, developed and manufactured through more than 40 years of experience, is recognized by electrical companies of the entire world.

Company A has already implemented ISO Quality Standards and a formal Environmental Management System, which guarantee the correct and responsible application of all its activities. Nevertheless, the company is completely compromised in the continuous improvement of the environmental management system implemented. The company was interested in apply the MT methodology and furthermore in learning the methodology to do its own MT session with an internal microtrainer. As a first test, the company was concerned in improving the communication between the different areas and in helping to actively progress in environmental subjects as:

- Water management
- Waste segregation
- Communication

The company also realized the need of introducing sustainable development concepts and good environmental practices at both work and home. The company thought that MT

methodology may deeply change the behavior of people who will communicate and solve specific problems through team commitments.

## **2.1 Microtraining sessions in Company A**

The focus in MT sessions in company A was about continuous improvement of the environmental management system implemented.

After some preliminary phone contacts with the Quality and Environment responsible, there was a first visit to the company facilities as well as an interview with the Plant Manager and the Quality and Environment responsible.

After that, the sessions were planned in the following way:

*First session:* Introduction to the MT methodology + First MT session subjects:

- Learning objectives (Q1)
- *Environmental Management System (EMS)*

*Second session subject:* Water management

*Third session subject:* Waste segregation

*Fourth session subject:* Quality versus Environment

*Fifth session subject:* The importance of the communication

*Sixth session (the closing session) subject:*

- Highlights of the previous sessions
- MT Evaluation

One key point in order to be successful during the MT sessions is to know the participants backgrounds (education, position in the company, interrelation between participants...). In this specific case, the group was formed of around five to seven employees, all with technical and higher education level, it is important to note that, the shift manager and the responsible of each area took part in the sessions.

All kinds of active approaches were used. During the introductory session, the participants proposed subjects to be developed during the MT sessions by filling (Q1). The topics were fitted with those previously suggested by the organization (Q0) so the group was involved in the sessions from the beginning. The rest of the sessions always included an active start, exercises and activities to increase the interaction and the peer learning between the participants. The closing session was dedicated to revise the previous sessions (What have we learned?). In addition, a brainstorming session was conducted about commitments to put in active the learning attained during the MT experience. Between the commitments, the group agrees in

✓ Monitoring the following:

- Water consumption

*The 14th European Roundtable on Sustainable Production and Consumption (ERSCP)*

*The 6th Environmental Management for Sustainable Universities (EMSU)*

- Electricity consumption, making special emphasis in lighting (rational use and efficiency improvement)
  - Oils and fats consumption
  - Waste segregation: batteries, plastics, water from process, tonners,...
- ✓ Apply MT methodology to improve the communication inter and intra departments

## **2.2 Evaluation of the Microtraining performance in Company A**

The participants were actively involved in the sessions; they were always encouraged to participate in the sessions by their direct head. This fact might have helped agreements for later implementation. There was a very good work atmosphere.

The group agrees that MT was a method to solve problems fast and direct and requiring not much additional effort. The participants are interested in the use of MT in the near future as internal tool to improve communication and solve day to day problems.

Company A has been clearly encouraged by the MT sessions. Nowadays, still follows up the commitments monitoring. Every trimester the main points of the commitments (which also appears as activities in their environmental program) are measured, contrasted and published so all the organization is aware of the status of the EMS and the effectiveness of the improvements. The monitoring evaluation stage is a strategic tool for the companies when the direct heads are involved in the MT sessions.

## **3 Training and assessment methodologies in Organization B**

Organization B is a public higher education and research institution specialized in the fields of architecture, science and engineering, internationally active in teaching and research, with significant participation in international mobility programs of students and professors. Besides, it is involved in the design of the European Higher Education Area.

Even so, Organization B presents a lack of environmental management expertise and also it does not hold any formal environmental management system (EMS) certification. The company is concerned in waking up interest in EMS and also in improving the communication between its own staff.

With this aim, company B is interested in applying the MT methodology. As first step the MT methodology has been assayed in one of the high education schools. The mentioned university school counts with 200 employees as teaching staff plus 50 employees as administrative staff.

### 3.1 Microtraining sessions in Organization B

The focus in MT sessions in Organization B was about “*Environmental management as a tool for continuous improvement*”.

The first contact was with the Director of the engineering school. After a second in depth interview with the Director, who is concern about the need of encouraging the company staff to step forward in environment management, the sessions were planned in the following way:

*First session:* Introduction to the MT methodology + First MT session subjects:

- Learning objectives (Q1)
- Environmental Management System (EMS)

*Second session subject:* SWOT analysis of the actual situation

*Third session subject:* Water management + Waste segregation

*Fourth session subject:* Quality versus Environment + The importance of the communication

*Fifth session subject:* Consumption of natural resources + Maintenance of the facilities

*Sixth session (the closing session) subject:*

- SWOT Results and analysis
- Highlights of the previous sessions
- MT Evaluation

The MT sessions participants were around six to eight, all with high educational level, working as lab technicians for different departments: Chemical Engineering, Mechanical Engineering, Electrical Engineering and Electronic Engineering. Unfortunately, in this case the responsible persons of each one of these areas were not able to attend the sessions, which clearly affected the level of commitment that could be achieved after the MT sessions.

As in case of company A, all kinds of active approaches were used. During the introductory session, the participants proposed subjects to be developed during the MT sessions by filling (Q1). The topics were fitted with those previously suggested by the organization (Q0) so the group was involved in the sessions from the beginning. The main difference with respect to company A was that Organization B was not aware of their own **Strengths**, **Weaknesses**, **Opportunities**, and **Threats**; subsequently it was required to perform a first SWOT analysis which in the final session was also discussed. Finally, a brainstorming session was conducted about commitments, to put in active the learning attained during the MT experience. Between the commitments, the group agrees in

✓ Monitoring the following:

- Electrical consumption.
- Waste segregation: batteries, plastics, water from process, tonners,...

✓ Analyzing



- Progress the waste materials recycling
- Develop improved resource management
- ✓ Applying MT methodology to improve the communication inter and intra departments
- ✓ Creating a Standard Work Procedure for all the departments
- ✓ Improving the communication channels between the teaching staff and the administrative and technical staff.

### **3.2 Evaluation of the Microtraining performance in Organization B**

The participants were actively involved in the sessions; they were only disappointed because of the lack of participation of their direct heads in the sessions. This fact might have prevented the formulation of commitments and agreements that could have been later implemented. There was a very good work atmosphere which helped to improve the communication without taking so much of their working time. Among the different discussed topics, the participants confirmed an especial interest regarding water consumption and waste generation.

The group agrees that MT could easily help to improve sustainability, and facilitates the smooth introduction of good environmental practices that are necessary at both work and home. The participants also remarked that the MT system assists to communicate and solve specific problems, and also that work meetings based on MT could improve the communication between departments. However, the participants found difficult to organize new MT sessions by themselves.

Organization B has not follow with the commitments monitoring, as it was expected due to the second stage. The proposed evaluation tools are clearly less efficient when the direct heads are not involved in the sessions

### **4 Global evaluation of the Microtraining process**

In both experiences, during the last microtraining session questionnaire Q2 (figure 2) was filled up by the participants, in order to capture the immediate perception of the sessions; their satisfaction regarding the training process was also recorded, as an indirect measure of the potential effectiveness. In figure 3, the results from both experiences are compared and contrasted.

Training: xxxxxxxxxxxxxx								
Trainer/organization: xxxxxxxxxxxxxx								
Date: xxxxxxxxxxxxxx								
Training Evaluation								
0 Very poor	1 Regular	2 Good	3 Very good	4 Excellent				
TRAINING OBJECTIVES				(0)	(1)	(2)	(3)	(4)
1	Training objectives were clearly defined from the very beginning			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	The selected training topics match the real needs			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	The level of the topics developed was suitable to the needs and capabilities of the group			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
MICROTRAINING SESSIONS								
5	The sessions encourage participation.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	The MT method creates a thoughtful environment regarding the topics being discussed			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Sharing experiences with colleagues to solve problems is positive.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	The planning of the session (timing, topics, etc.) was suitable.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
TRAINER								
9	The trainer was good at leading the MT sessions.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10	The trainer organized the MT sessions in a suitable way.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11	The trainer promoted a good learning environment.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
RESULTS								
12	The MT sessions covered the training objectives.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13	The knowledge and skills acquired can be applied in practice.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
14	The MT sessions were very useful for my work.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
COMMITMENTS								
15	Identify two actions designed to bring about change you are planning to apply in your workplace <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Implement specific procedures for waste segregation at the department in order to avoid mixing it with raw materials.</li> <li><input checked="" type="checkbox"/> Increase waste segregation by 30% by the end of the next trimester.</li> <li><input checked="" type="checkbox"/> Monitor waste segregation on a monthly basis.</li> </ul>							
16	Identify two actions designed to bring about change you propose for your organization <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Publish the newly established waste segregation protocols.</li> <li><input checked="" type="checkbox"/> Encourage organization members to segregate waste in their workplace.</li> <li><input checked="" type="checkbox"/> Behave in a visible and exemplary way in relation to waste segregation and thus be a good model for other members of the organization.</li> </ul>							

Figure 2. Example form for questionnaire Q2.

As figure 3 shows, the general global evaluation from both companies is positive, in all the cases is higher than the central value (2). Anyway the questionnaire also reveals some discordance in the perception of both groups. For example: the item “The planning of the session (timing, topics, etc.) was suitable” was more positive for company A which also has a very clear idea of the specific topics to be analyzed and developed in each session that company B, thus the trainer should take note of this for future experiences.

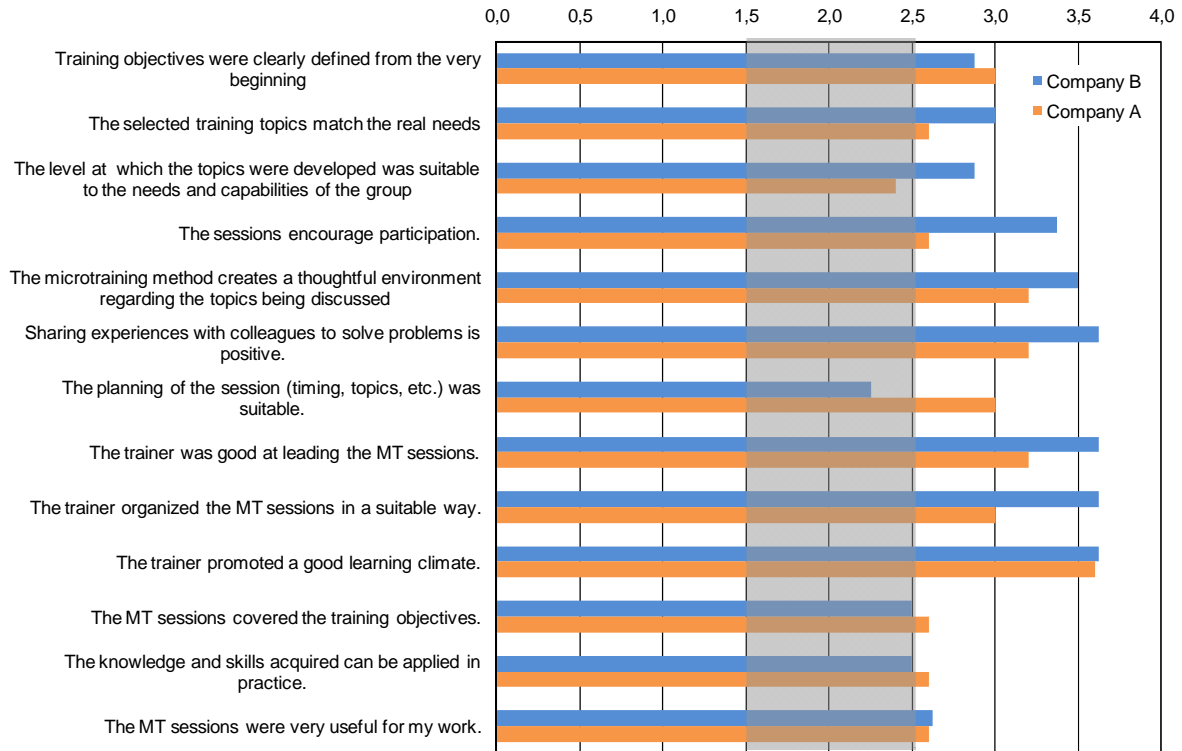


Figure 3. Results from questionnaire Q2. Both experiences, company A and Company B are compared and contrasted.

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