

GUIDE TO GOOD TRAINING PRACTICES IN THE FIELD OF FOOD SAFETY



Project title:

ANALYSIS FOR IMPROVEMENT OF THE FOOD SAFETY TRAINING IN THE FOOD AND AGRICULTURAL SECTOR

Project acronym: AIFooST

Project number: 2013 2013-1-TR1-LEO04-47850

'This project has been funded with support from the European Commission.

This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.'

Acknowledgements

The AI FooST partnership would like to thank you the following companies and institutions for their contribution to the project:

- CONSELLERÍA DE SANITAT
- DULCESOL
- GRANJA RINYA
- ASOCIACIÓN DE QUESEROS CV
- UPV
- Bakery MANN
- MA 59
LEBENSMITTELAUFISCHT
- FACHVERBAND DER
LEBENSMITTELINDUSTRIE
- WEWALKA NFG & CO KG
- CONINVEST GMBH
- BOKU
- MINISTRY OF AGRICULTURE OF
THE CZECH REPUBLIC
- CZECH TECHNOLOGICAL
PLATFORM FOR FOODSTUFFS
- CZECH AGRICULTURE AND
FOOD INSPECTION AUTHORITY
- PORTUGUESE CATHOLIC
UNIVERSITY - FACULTY OF
BIOTECHNOLOGY
- PORTUGAL FOODS
- PORTUGUESE ECONOMIC AND
FOOD SAFETY AUTHORITY –
ASAE
- A POVEIRA

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Abstract

1 Introduction

1.1 OVERVIEW

The development in the European training sector leads towards higher quality of the trainings and higher specialisation of the trainers. The evolving awareness for Life Long Learning leads to higher sophistication regarding the requirements for trainings that will be needed to keep trainees up to date and interested.

This Guide shall support the effort for continuous improvement in vocational training and formation with the focus lying on the issue of Food Safety and the target audience being workers in agriculture and all steps of food production.

The Guide is designed to especially assist companies involved in the different steps of food processing. It shall enable business-owners to design appropriate trainings for their employees on their own initiative, where the aspects of Food Safety are treated comprehensively and in an understandable manner.

Benefits of the guide:

- Applicable for any food producing entity
- Can be used by staff members or external trainers
- Easy-to-use with step-by-step-instructions
- Online-availability
- Suitable for newcomers as well as experienced employees
- Proposition of different training methods for flexible use
- Adaptable to the needs of the specific audience (language skills)

1.1.1 Definition of Food Safety

Food safety is a sum of measures and methods that shall assure, that food will not cause harm to the consumer. It refers to the conditions and practices that preserve the quality of food to prevent contamination and foodborne illnesses and encompasses all steps including harvesting and production, trading and preparation as well as eating.

Food hygiene is part of food safety and describes all conditions and measures (e.g. cleaning and disinfection) necessary to ensure the safety and suitability of food at all stages of the food chain.

In the European Union a high level of **Food Safety** is reached through an **integrated approach** that takes into account the whole food chain (from farm to table) in all food sectors and including all Member States. It is based on scientific advice, ongoing data collection and analysis, that are considered in regulatory and control aspects and also involves consumer information as active part of Food Safety measures.

1.1.2 Legislative background and official control

Legislation and policy of the European Union put food safety in focus in order to protect and promote health of the consumer. High food safety standards are effective in order to control the impact of food production and consumption, which is a crucial issue in society, since it affects economy as well as social structures and the environment. With health protection remaining the highest priority, animal health and welfare as well as plant health are also integrated in the food safety approach of the EU. Thus, a high level of food safety can be established from farm-to-table throughout the whole production chain.

For the implementation of **food safety structures** several actions, including legislation and control, have been set. These activities deal with control systems, food standards (e.g. food safety, animal health, animal welfare, animal nutrition, cultivation of plants, third countries, exports), international trading relations, risk management and relations with the European Food Safety Authority EFSA.

Legal requirements are defined in “General Food Law” EC 178/2002 (indirectly by specifying the responsibility of producers for the safety and quality of food products) and EC 852/2004 (demanding explicitly the regular training of food handlers).

Standards such as ISO 22 000 and ISO 9 000 as well as ISO 9 001 do stress the need for qualified employees from a management point of view by demanding to analyse the need for trainings, their planning and budgeting as well as the monitoring of the results. In IFS and BRC training is among the criteria of high importance for achieving certification.

1.1.3 Stakeholders in the food chain

A broad variety of individuals has an impact on Food Safety when regarding the whole food production chain. These are the workers and operators in feed production, primary production, food processing, storage, transport and retail as well as the consumers.

Consumers bear a part of this responsibility, since they have to take care for the proper storage, handling and cooking of food.

With authorities to monitor and control the compliance to food safety standards and regulations, it is still the **feed manufacturers, farmers and food operators, who have the primary responsibility for food safety.** Their level of knowledge is crucial for the quality of their work and thus for the safety of the food produced.

Requirements are still becoming more sophisticated with standards being very explicit (e.g. handling instructions, cleaning procedures, traceability), and inspections and audits done regularly by a well established control system. Every single operator in the food chain has to be able to take proper decisions and keep detailed records within this elaborate framework, which requires profound background knowledge.

As stated in the White Paper on Food Safety by the Commission of the European Communities “ The policy needs to be kept under constant review and, where necessary, be adapted to respond to shortcomings, to deal with emerging risks, and to recognise new developments in the production chain.” To this end, all stakeholders shall be involved and make their contributions.

1.1.4 Background, scientific basis

Food safety is established by a bundle of actions and measures.

Good Hygiene Practice (GHP) is the foundation for all further steps. These fundamental conditions and measures encompass the proper construction and layout of premises, cleaning and sanitation, pest control, hygiene of personnel, storage, distribution and transportation, waste management.

Certain steps and procedures must be followed throughout the entire food chain, and a recognized way is to operate within a structured food safety management system with **Hazard Analysis Critical Control Points (HACCP)** being the very basis. The system is part of the Codex Alimentarius and recommended by the WHO.

Food Safety is achieved by acting preventatively, systematically and structured. The Management System is built on hazard identification and control and explains

identification of hazards (biological, chemical, physical, allergens) and their critical control points and limits. Preventative measures, monitoring and corrective actions are also part of the system as well as verification and documentation procedures. With the measures being effective in increasing confidence and use of resources, the documentation shows the quality of the management system, facilitates inspections and demonstrates “due diligence”.

1.2 STANDARDIZATION IN TRAINING

The quality of food is already subject to standards for a longer time, the quality of training measures has only recently been standardized. With “**ISO 29990:2010 Learning Services for non-formal education and training – basic requirements for service providers**” a first international document is available. The standard represents a quality level for learning services that has universally been agreed on.

The quality model is designed to provide a common reference for training services for the practice of lectures and the implementation of services, thus supporting the planning, development and execution of training and education.

This means, that education services are no longer classified by only individual quality models, but can be rated against the internationally recognised standard. ISO 29990:2010 describes the processes in detail and provides a clear process orientation including procedures of continuous improvement.

The focus is on the participants of the training services and the achieved results in knowledge transfer, in order to shift the emphasis on the full spectrum of possibilities in learning services. The competence of the learning service provider is considered.

Organisations and individuals shall find support, in order to choose the appropriate training service that complies to the needs and expectations related to competences and capabilities.

This standard includes a customized management system for both trainers and learning service providers and can be used as a tool to evaluate and ensure quality capability in the international education market. As a consequence the services of training providers are made transparent and can be compared.

The standard is dedicated to non-formal education, which means that it refers to organized learning activities beyond the formal system of elementary, secondary or

higher education. It encompasses services of vocational training, life-long learning, training on-the-job both by third parties and in-house.

Quality policy forms a crucial point in standard requirements and is built on the principles of quality management. It contains the sum of all intents and orientations of an organisation regarding quality and builds the frame for the definition of quality aims.

1.3 BEST PRACTICE MODELS

1.3.1 Case study Austria

Thematic networks organised on the basis of common interest and shared costs can attract many SMEs, potentially from different industry branches at national. The collective learning in these networks may generate a significant multiplication effect for the dissemination of the new knowledge into such SMEs that were not participating in the original network.

In Austria the need for an efficient and competent transfer body specifically dedicated to the food industry was detected in the late 90's. In direct contact with the Austrian Food Federation (FIAA) the so called “**Food Technology Network**” (**TechNet**) was founded. The TechNet is designed as a one stop shop, where skilled mediators are acting as proactive contact bodies for food companies, which are mainly SMEs, in order to process the ideas and answer the needs of the specific enterprise.

These mediators manage the exchange between science and research through intensive contacts with the national and international food research scene. By building a comprehensive training service and recruiting suitable lecturers, recent know-how is being brought to interested participants of the training programme. The network provides several services and takes care of the efficient conversion of basic research in practical processes and exploitable products for the food industry.

1.3.2 Case study Spain

A continuous training on food safety in milk production centres and cheese industries was set up in collaboration of various institutes such as schools, consultant firms and enterprises as well as official bodies and associations under the brand “Food Safety Cheese”. The collaborating partners under Spanish management have defined food

safety issues as crucial for the workers in the dairy sector, taking into regard the European Union policy on consumer protection.

Recent training methodology was applied and up-to-date training material developed. New information and communication technologies were adopted, in order to offer an optimized service for the training and information of workers in the dairy sector, which is of major importance in the economy of the European Union.

Milk and cheese are widely consumed and bear basic nutrients and play a significant role in the nutrition of the European population. Dairy products are sensitive to contamination and production processes require clean and hygienic conditions.

For these reasons “Food Safety Cheese” addresses workers in milk and cheese production with the aim to stress their responsibility for food quality and to ensure a high level of food safety through proper handling of the product during all processing steps.

Since workers tend to be less familiar with novel technologies, the project was also designed to make technological innovations accessible. These measures aim to keep workers up-to-date with changing requirements.

The Basic Course of Food Safety Cheese addresses employees working in the milk and cheese production. It encompasses ten learning units about legislation, production processes, and quality criteria of cheese, hazards to food safety, hygiene measures, risk prevention practices, and the HACCP-concept.

The multimedia-presentation is designed for common face-to-face lectures, as well as remote e-learning. For individual and independent use a text book is also provided.

The Trainers Training Course shall support instructors, who present the Basic Course, with background information on educational tools and didactic issues. Thus, a complete training system was designed, taking into regard the requirements set up by European policy, the needs of instructors and the level of workers, who have to be trained.

1.3.3 Case study Portugal

In fish processing Food Safety measures have to be sophisticated due to the special characteristics to the raw material, which is highly perishable.

Standardization in production is required to persist in an ever harder competition for marketing opportunities. In order to support Food Safety and improvement of working procedures in-house management systems are developed.

These circumstances lead to a need for intensive training for workers in the fish producing sector. Hygiene and safety measures have to be well communicated as well as standard requirements for the individual manufacturing steps. The knowledge transfer has to be organised effectively, in order to ensure an appropriate level of information and skills for each worker in the fish production chain. On this basis manufacturing processes can be performed correctly and according to the different needs defined by hygiene measures, food safety requirements and standard demands.

A training programme has been developed with regard to the different needs of individual employees from production to management. It is supported by a customized IT-system, which offers the opportunity to support learning activities avoiding paper work. At the same time the electronic system is interconnected with the actual production process and designed flexible and adaptable, thus information can be updated continuously and transferred in real-time.

The virtual system encompasses material and production management and has implemented several Food Safety related functions. In order to cope with the complex function of the digital information management, one employee was trained in detail on the features of the programme by the service providing IT-company, and is now capable of maintaining and further developing the system.

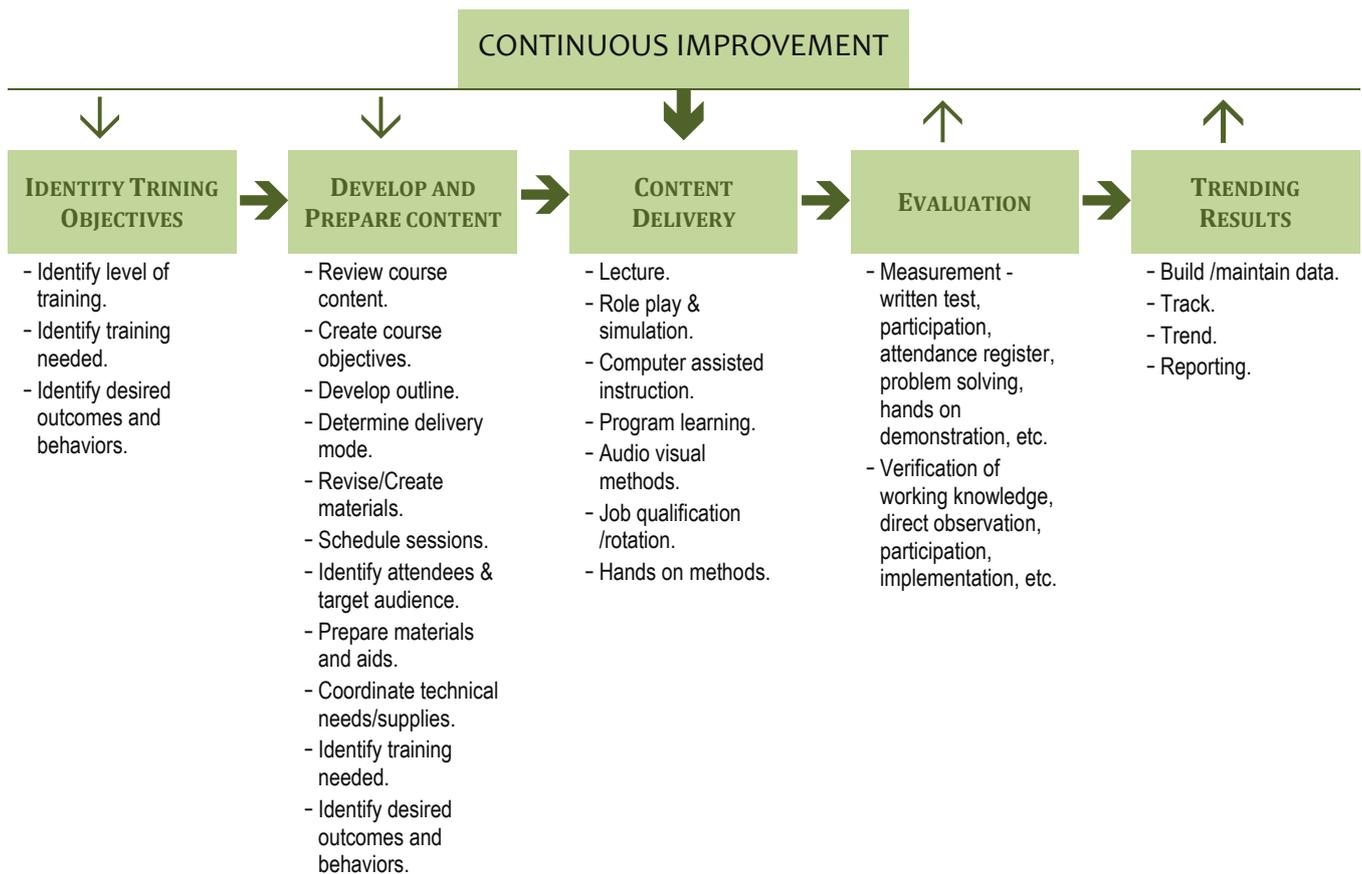
After successful knowledge transfer, the employee acts as information mediator for colleagues in the fish processing unit, training them on specialized topics, falling into the range of each respective responsibility. Trainings are designed individually for operators in the plant as well as for managers involved in monitoring processes. Basics of the software handling were thought in a two-week training with regard to the previous level of knowledge of IT. The system development was driven by a focus on intuitive handling, which supports the acceptance among workers with less developed IT-skills.

The design of the learning programme allows knowledge transfer in-house with regard to specific needs of individual participants and is fully supported by the digital management system, which is updated with real process and production data, thus enabling the participants to always receive actual information.

2 Planing food safety training

Proper and adequate employee training is absolutely essential. In many companies, food safety training has been integrated into existing training programs. Well developed, coordinated, in-house training programs have long been recognized as a key element in successfully assuring a safe food supply. There are several steps that need to be implemented in the development of cost-effective training programs (Training Process Map).

TRAINING PROCESS MAP:



2.1 CHOOSING THE RIGHT TRAINER

To transmit the knowledge required by the trainees to work in the food sector, trainers must be familiar with and skilled in presenting the training information and related methods, and they also must be at least familiar with many other aspects of the training not covered directly by the **Food Safety Guide**, for example, motivation theory, the art of public speaking, conducting discussions, course planning, written communication and so on.

Throughout the process of training, the trainer may find some difficulties associated with the socio-cultural characteristics of many of the groups of students who work in the food sector, such as:

- Low educational level of some workers, most with no more than a primary level education and no scientific or technical base.
- Poor reading and writing skills.
- Little participation in continuing education activities as a result of which they are unaccustomed to listening to a trainer explanation.
- Little or no perception of the importance of their individual work on the safety of the foods they handle.
- Resistance to change: people with heavily consolidated work habits and practices which are difficult to change, as a result of having worked for many years in the field.

For these reasons, the trainer must be able to overcome these difficulties by taking the right pedagogical approach, which should be based on:

- Active participation dynamics.
- Adapting language to the students' level.
- Using the support of graphic teaching aids: photographs, pictures, video, etc.
- Developing student motivation.
- Experimental practice work, exercises, practical case studies, etc.
- Emphasising the duality of the students - as mentioned above, as workers in the food sector and food consumers.

The most important element in a training situation is the trainer. The trainer who is **enthusiastic, energetic and genuinely interested** in both the subject and getting his or her message across will evoke the greatest response from the trainees. The trainer who **lacks interest** in training, who has little or no enthusiasm for the subject of the training and who merely goes through the motions of training is a failure. Such a trainer wastes not only his or her own time but also that of the trainees. The inept trainer is quickly identified by the trainees, who react with inattention, lassitude, undisciplined behaviour and absence from training sessions.

Further information at:

<http://www.fao.org/docrep/w8088e/w8088a03.htm>

- Using examples and current events: for example, recent outbreaks of food-related illnesses that have had an impact on society and broad media coverage.

That is why the trainer must take into consideration the following measures:

- Provide students with the perception that they are learning and acquiring new knowledge.
- Transmit messages focused on learning processes, and not on results.
- Help students to plan and tackle tasks.
- Set realistic goals.
- Break tasks into different steps.
- Find out solutions to overcome difficulties, identify mistakes and give reasons why they have happened.
- Ensure that the evaluation process is perceived by the student as an opportunity to learn.
- Avoid comparison between students, or at least, compare them with himself.
- Explain the reasons why something is right or wrong, and propose tools for its modification.

2.2 TRAINING PROGRAMMES IN THE FOOD SECTOR (TARGET GROUPS).

It is a legal requirement that workers involved in a food environment are trained and/or supervised according with their work activity regardless they are full time, part time members of staff, seasonal or occasional workers.

There is a widespread consensus that implementing a training programme is critical to the success of any food safety programme. It should be pointed out that, although food hazards can occur in any food industry, it is desirable to particularise such training depending on the type of industry. In order to tailor training to each food business in accordance with their identified needs, it is very important to transmit information to the trainer prior to course.

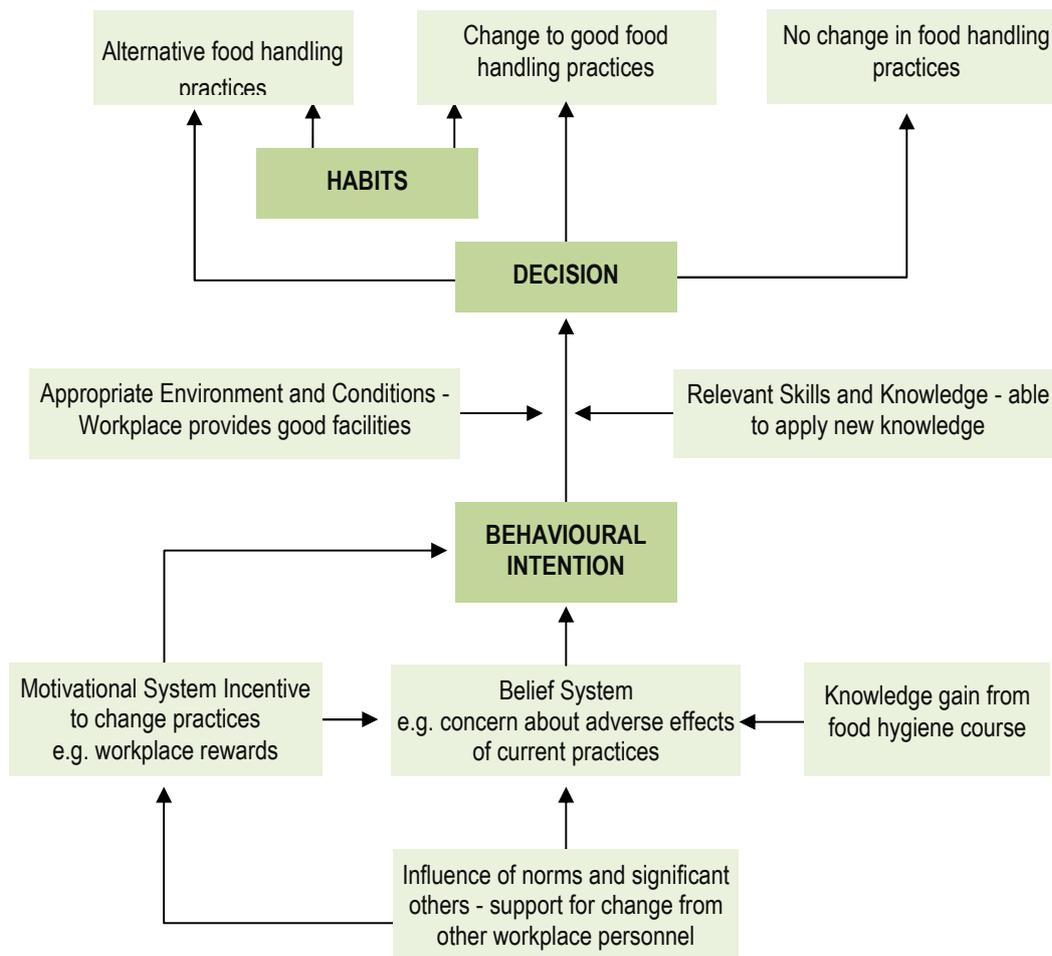


Figure 1. Tone's Health Action Model applied to Food Safety Education (from ref 22-2010)

In Figure 2, the Food Hygiene Training Model is illustrated. It takes into account both the effective planning of the training programme, the managerial support required to determine the correct type of training and the support needed to facilitate the training process, as well as the overall performance measures needed to ensure that training transfers into the desired safe food handling behaviours. Several steps have to be undertaken, three evaluation stages need to be performed and overall performance measures are directed both to the individual and to the organization.

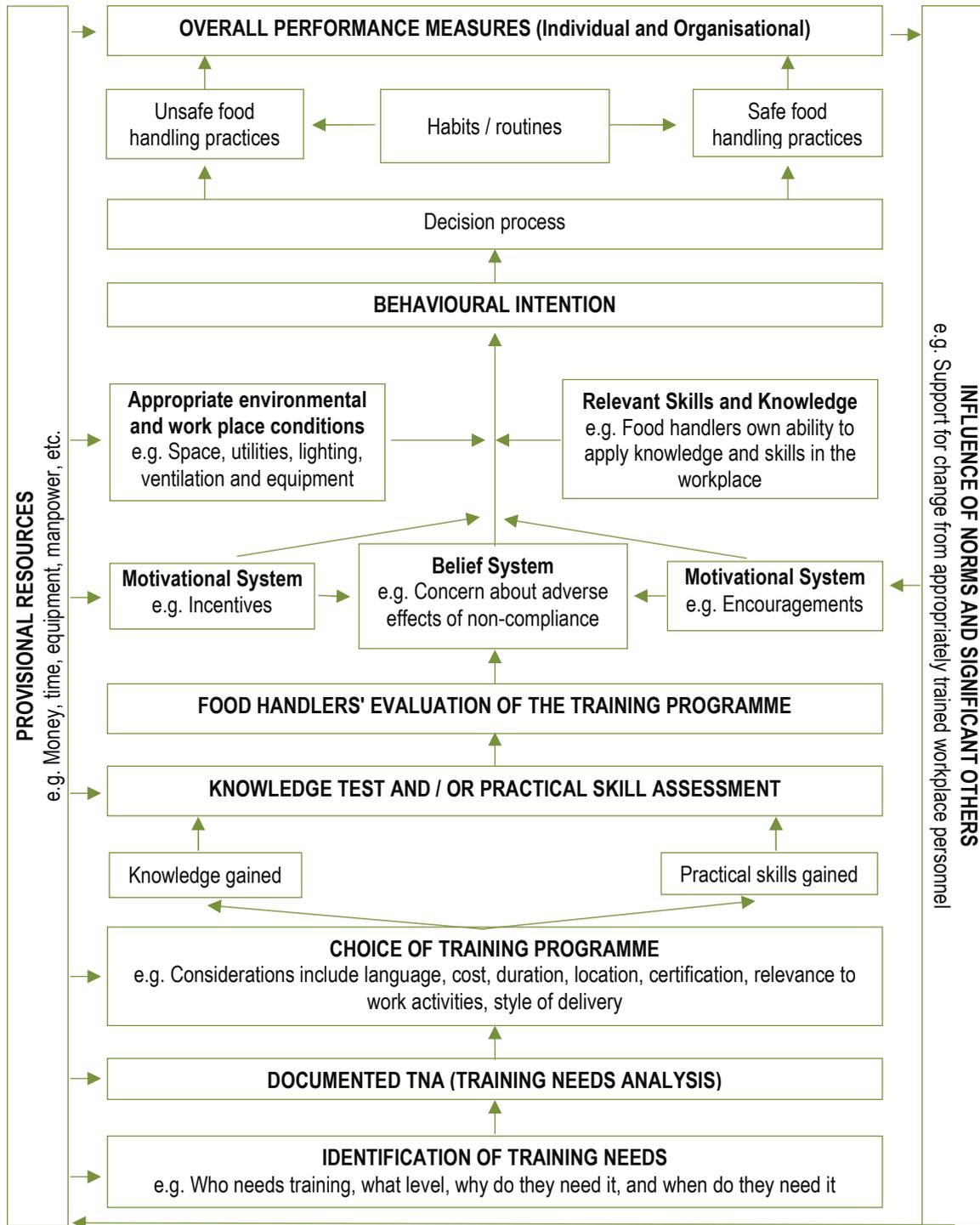


Figure 2. The Food Hygiene Training Model (from ref12-2010)

The main steps include:

Training Needs Analysis, which should be conducted in order to assess what type of modification or development, is required and to establish a starting point from which the training programme can begin. Obviously not all food handlers are the same and some have existing knowledge of food safety, from previous food handling experiences or media coverage. These food handlers may just require the opportunity to practice and demonstrate their skills in the workplace. Other food handlers may require relevant knowledge of the subject, and have no practical skills, thus require both theoretical and practical training. Some food handlers may be practically competent but lack the understanding of why they undertake certain practices, thus require theoretical training, and the final group of food handlers who have a negative attitude towards safe food handling practices may require incentives and motivational support to entice improvements in attitude. **Therefore, the challenge for a manager of a food business is to provide food hygiene training relevant to the needs of the food handler.** Traditional accredited food hygiene courses have set syllabi, and whilst the course can be adapted to specific industry sectors the food handlers may have to hear or read information which is not relevant to their needs, in order to pass the examination at the end of the training session. The training may therefore be perceived as a waste of time. By conducting a TNA many food industry managers may realize that most of their food handlers may not need to be trained with accredited training providers or be given formal examinations, but merely need to be given frequent refresher training by trained personnel, which could include feed- back on observed practical activities or a questionnaire to test their understanding of the subject. If observations and the testing of food handlers are conducted by personnel within the organisation, businesses must ensure these personnel are kept abreast of food hygiene legislation and regularly review their own professional development needs. Whichever the approach, appropriate managerial expertise is required to monitor, and evaluate the effectiveness of the programmes and to ensure learnt behaviours are adopted.

Contents of the training can be decided when planning the course by answering the following questions:

- **Audience:** Who needs to be trained?
- **Current roles:** What do members of this target audience presently do in their roles?
- **Knowledge gaps:** What gaps exist between what these providers know how to do, and what they need to know to carry out their roles successfully?
- **Outcome:** Will training help fill this gap?

- **Schedule:** When the training will be done?

These questions form the foundation of a **training needs assessment**. The following key questions need to be posed in any needs assessment: **26433 Developing Training**

- What do the participants need to know and do as a result of this training?
- What do we need to know about the course participants and the population they serve?

Key tasks in any needs assessment will include the following: **26433 Developing Training**

- Identify what type of professionals the course is designed for.
- Draw from your past experience with similar groups.
- Gather information from informal discussions among professionals in the network.
- Conduct surveys.
- Conduct focus groups.
- Work with an advisory panel.
- Observe participants.
- Interview participants.
- Learn about critical incidents.
- Determine what emerging data should be distributed.
- Understand the participants' characteristics: experience, cultural background, education, location, mind set/motivation, constraints (location, job demands, etc.).

Choice of the training programme – although some argue that the main stimulus for providing food handlers with food hygiene training appear to be due to legal obligation, other factors which affect the type of food hygiene training adopted are financial and convenience. Considerations shall include language, cost, duration, location, certification, relevance to workplace activities and style of delivery. The relevance or usefulness of the course to the trainee's job has been shown to be an important predictor of training effectiveness and a lack of relevance or perceived usefulness may result in the training being devalued by the food handler, therefore careful consideration needs to be given to the content and suitability of any food hygiene training programme. On the other hand the challenge is to provide food hygiene training in a language and at a level that allows the food handler to understand the content of the training. **In fact, if industry** employs food handlers from different ethnic backgrounds, and if managers do not take the language abilities of the food handler into account before choosing the course for them, thus many food handlers were put onto accredited food hygiene courses which were not appropriate to their language needs. If relevant food hygiene knowledge and practical

skills were to be taught slowly within the workplace by competent workplace staff, and there was appropriate time given to the food handler to practice those skills and assimilate relevant information, then many of the language barriers that food handlers face can be overcome without putting the onus on training providers. A more sensible approach could be that an appropriately trained person carry out, observations of food handling practices, at both busy and quiet times of the day, to measure practical competency even when the level of work is increased. Once competency has been adopted in the workplace the behaviour should be regularly monitored to demonstrate increased or decreased performance over time. These results should be then used to form part of an ongoing professional development programme. The success, therefore, of the Food Hygiene Training Model relies on appropriately trained managers, who have the appropriate skills and subject knowledge to mentor the food handlers appropriately in-line with their food handling responsibilities, and who are able to provide both a physical and psychological environment conducive to food handler development and the enactment of safe food handling practices.

Some examples of training programmes are described below in tables 1, 2 and 3 where five primary components of a training design are described: **26433 Developing Training**

- **Learning Outcomes:** What will participants be able to do as a result of completing the training?
- **Training Materials:** What materials need to be developed and what will the materials include?
- **Trainers and Content Experts:** Who will facilitate the training and act as content experts to review materials?
- **Training Methods:** What methods will be used so that participants meet the learning objectives and learn the content most effectively?
- **Logistics:** Where and when will the training take place? Who will be invited and how will they be notified? Will a per diem be paid to participants? Etc.

TRAINING PROGRAMME 1
HOURS: Initial training: up to 10 hours
Continuous training: 4 hours

Aimed at:

Any worker in the food industry, small, medium or large, making simple and routine tasks and operations that involve a degree of basic autonomy, always working under instructions of a responsible superior.

Main objective:

Understand the concept of hygiene and follow good hygiene practices taking into account the different aspects of hygiene to ensure the safety of the food they are producing, in line with legal regulations. Knowing the self-control systems that exist to ensure food safety. Knowing the major foodborne illness caused by microorganisms.

Specific Objectives

Understand the concepts of hygiene and food safety.
 Understanding the important role played by handlers in the cheese industry.
 Understanding the responsibility of all agents along the food chain.
 Recognize measures of personal and general hygiene related to their work to avoid risk of damage or deterioration of food products.
 Understanding what the HAPPC system, its importance and the advantages of applying it.

Contents

General introduction to hygiene and food safety.
 Legal issues related to food safety.
 The food chain.
 Foodborne illness.
 Food safety skills.
 Introduction to HACCP.

Methodological strategies, learning activities and teaching resources.

Through theoretical and practical classes the concepts of hygiene and food safety, traceability and HACCP and fundamentals of different cleaning techniques, best practices and specific hygiene personnel, and will be presented the relationship with the resources that can be used to carry out these tasks.

Different case studies will be presented and through the dynamics of Puzzle (application, discussion, problem solving, creativity) will deepen its analysis taking into account the objectives.

Learning activities will be based on:

Lectures:

- Presentation of summaries, outlines, etc.
- Battery of questions.
- Assessable activities on exposure.
- Concept maps, summaries, additional notes, etc.

Guided work:

- Activities of self-evaluation.
- Assessable activities (case studies, problems, project, etc.).
- Panel discussion (news, technical notes, practical course, etc.).

Spaces, facilities and equipment (further information at Unit 3.1.4)

Classroom training:

- Audiovisual equipment.
- Flip chart or whiteboard.
- Material classroom (books, etc).
- PCs installed in the network, and Internet barrel projection, optional.
- Table and chair for the trainer.
- Tables and chairs for trainees.

Table 1. Training programme 1.

TRAINING PROGRAMME 2
HOURS: 4 hours

Aimed at:

Production managers and middle managers in the small, medium or large food industry, carrying out tasks and operations that involve a degree of responsibility, always working under instructions of a superior.

Main objective:

Knowing the hazards associated with food that can affect consumer health and the guidelines and practices that make it possible to eliminate or minimise these hazards.

Specific Objectives	Contents
<p>Understanding the concept of health safety: what is food safety and why is it important.</p> <p>Knowing which international organisations promote health safety and the most significant food safety legislation.</p> <p>Understanding the concept of traceability and its importance.</p> <p>Understanding the types of food hazards that exist and where do they occur on the food chain.</p> <p>Recognize measures of personal and general hygiene related to their work to avoid risk of damage or deterioration of food products.</p> <p>Understanding what the HAPPC system, its importance and the advantages of applying it.</p> <p>Understanding the importance of Critical Control Points (CCP) for eliminating, minimising and preventing hazards.</p> <p>Knowing actions to take to deal with any food safety complaint.</p>	<p>Introduction to food safety.</p> <p>Legal issues related to food safety.</p> <p>Prevent cross contamination.</p> <p>Foodborne illness.</p> <p>Hygienic procedures.</p> <p>Food safety skills.</p> <p>HACCP.</p> <p>Deal with a food safety complaint.</p>

Methodological strategies, learning activities and teaching resources.

Through theoretical and practical classes the concepts of hygiene and food safety, traceability and HACCP and fundamentals of different cleaning techniques, best practices and specific hygiene personnel, and will be presented the relationship with the resources that can be used to carry out these tasks.

Different case studies will be presented and through the dynamics of Puzzle (application, discussion, problem solving, creativity) will deepen its analysis taking into account the objectives.

Learning activities will be based on:

Lectures:

- Presentation of summaries, outlines, etc.
- Battery of questions.
- Assessable activities on exposure.
- Concept maps, summaries, additional notes, etc.

Guided work:

- Activities of self-evaluation.
- Assessable activities (case studies, problems, project, etc.).
- Panel discussion (news, technical notes, practical course, etc.).
- Experimental practices

Spaces, facilities and equipment (further information at Unit 3.1.4)

Classroom training:

- Audiovisual equipment.
- Flip chart or whiteboard.
- Material classroom (books, etc).
- PCs installed in the network, and Internet barrel projection, optional.
- Table and chair for the trainer.
- Tables and chairs for trainees.

Table 2. Training programme 2.

Aimed at:

Technicians and managers in the small, medium or large food industry.

Main objective:

Knowing the hazards and main microorganisms associated with food that can affect consumer health and the guidelines and practices that make it possible to eliminate or minimise these hazards. Implementing and updating the HACCP system.

Specific Objectives

Understanding the concept of health safety: what is food safety and why is it important.
 Knowing which international organisations promote health safety and the most significant food safety legislation.
 Understanding the concept of traceability and its importance.
 Understanding the types of food hazards that exist and where do they occur on the food chain.
 Learning the different kind of microorganisms responsible of main foodborne illnesses.
 Knowing the composition of the food handled and its main quality characteristics.
 Recognize measures of personal and general hygiene related to their work to avoid risk of damage or deterioration of food products.
 Understanding what the HACCP system, its importance and the advantages of applying it.
 Understanding the prerequisites, its importance and the advantages of applying it.
 Understanding the importance of Critical Control Points (CCP) for eliminating, minimising and preventing hazards.
 Knowing other Food Safety Management Systems and the advantages of applying them.

Contents

Introduction to food safety. Legal issues related to food safety.
 Microbiology.
 Food handled and its main quality characteristics.
 Prerequisites
 Hygienic Design.
 Cleaning and disinfection.
 Good Hygiene Practices.
 Pest control.
 HACCP and other Quality Management Systems.

Methodological strategies, learning activities and teaching resources.

Through theoretical and practical classes the concepts of hygiene and food safety, traceability and HACCP and fundamentals of different cleaning techniques, best practices and specific hygiene personnel, and will be presented the relationship with the resources that can be used to carry out these tasks.

Different case studies will be presented and through the dynamics of Puzzle (application, discussion, problem solving, creativity) will deepen its analysis taking into account the objectives.

Learning activities will be based on:

Lectures:

- Presentation of summaries, outlines, etc.
- Battery of questions.
- Assessable activities on exposure.
- Concept maps, summaries, additional notes, etc.

Guided work:

- Activities of self-evaluation.
- Assessable activities (case studies, problems, project, etc.).
- Panel discussion (news, technical notes, practical course, etc.).

Spaces, facilities and equipment (further information at Unit 3.1.4)

Classroom training:

- Audiovisual equipment.
- Flip chart or whiteboard.
- Material classroom (books, etc).
- PCs installed in the network, and Internet barrel projection, optional.
- Table and chair for the trainer.
- Tables and chairs for trainees.

Table 3. Training programme 3.

So that different training programmes can be defined taking into account the **training needs analysis** and the requirements of the different quality standards such as HACCP, BRC, IFS, etc. The trainer should also consider that trainees' prior knowledge is essential for proper design the training process and to ensure that training is effective.

Training should be periodic and understood as a continuous process that accompanies the worker throughout his working life. Obviously it is not to repeat the same course each time, but from one hand remember concepts and, on the other hand, extend them in each training activity. This continuous process allows content updating by including new procedures and food safety practices.

There are two broad types of in-house training that are typically applied by food manufacturing facilities:

- 1 **Off-the-job-training** is characteristically employed by removing the employees from the work environment with sessions held in a class room setting. It is more formal and may utilize a trainer or other audio-visual / computer method to disseminate information.
- 2 **On-the-job training** is usually conducted in the actual work environment and typically involves direct observation of a task by both the employee and the trainer accompanied by hands-on or practical demonstration.

Different types of trainings: CGMP

1 **Formal Training:**

- **New Hire Orientation:** may be conducted in a class room setting and may include a plant tour of the area the employee will be working in. Includes an in-depth introduction to food safety procedures in visual, audio and written format to accommodate all learning types.
- **Scheduled Annual Training and Refresher Training:** may be conducted in a class room setting utilizing a trainer or computer generated curriculum. Includes a deep dive into current food safety procedures at least once a year and generally is applied to all employees. Material typically covers plant specific information depending on audience.
- **Train-the-Trainer:** Subject Matter Expert (SME) conducts knowledge exchange to other employees that show aptitude in training peers and subordinates. May be conducted in a class room setting utilizing appropriate methods (lecture, computer, audio/visual, etc.). This type of training is typically done to provide consistency to delivery and content and to provide enough trainers for large facilities or across multiple facilities.

- Workshops/Seminars/Conferences: may be brought in-house, but typically attended outside the facility or company. Offered through training organizations, universities, industry trade groups, working groups, etc. May cover a wide variety of subjects and offer the opportunity to network and ask questions of Subject Matter Experts (SMEs).
- Plant-to-Plant Training: employees from one facility will travel to another facility to share key learnings and practices. Formal training may consist of class room followed by hands-on. Typically involves installation of new equipment, new software, new technology, transfer of products, etc.
- Employee-to-Employee Training: formal Buddy or mentoring system that may be set up for new hires to work with a seasoned employee or for a transferred employee to pair up with an employee that is familiar with department standards/expectations. Involves information exchange and expertise sharing between employees.
- Kaizen or problem solving exercises: formal session involving all levels of plant employee (management, supervision, hourly) across all applicable functional areas to work together to discern root cause and corrective actions to an area of manufacture where challenges exist.
- Corporate sponsored/conducted: includes training sessions, such as an annual meeting of all management levels, from a multi-plant company where best practices, new procedures, technologies, changes to regulation, industry news, etc., are communicated.
- Supplier-conducted training: suppliers of raw materials (ingredients, processing aids, packaging) or equipment (manufacturing, laboratory, etc.) provide training for applicable plant employees. May include in plant hands on type training, supplier plant visits for knowledge exchange, classroom training or other applicable method to teach employees.
- Contractor training: formal training provided for all contractors that may impact operations on the necessary food safety policies and procedures in effect at a manufacturing facility. Typically occurs initially and then on an annual basis. May be held for all contractors or as a train-the-trainer session, depending on level of complexity and number of contractors be any utilized.
- Plant meetings: held as regularly occurring or special occasion. Plant management/ supervisors should meet with all employees on all shifts to offer important communications to impart knowledge, expectations, or reinforce behaviors or skills.

2 **Informal Training:**

- Supervisor-directed during operations: direction given to employees by supervisor during the normal course of a day.
- Huddle/team/line meetings: typically a short meeting with supervisory and line/area employees to discuss challenges or change in direction relevant to the operation of the line/area during that day's production.
- Departmental meetings: conducted by each department in a manufacturing facility for all employees.
- Shift change meetings: hand off that occurs between shift workers when one shift has completed its time and provides information to the next set of workers that will take over the operation.
- Coaching: may occur in relation to a problem or issue, or when preparing an employee to move to a higher level of responsibility.
- Job qualification: jobs within a facility need to have qualified individuals to complete the tasks assigned. Job qualification typically requires some type of test or apprentice type program.
- Corrective action: when deviations occur, training may occur if the initial training was not well understood or if a change to process or procedure is required.
- Product reviews: review of products produced with line personnel offer a visual method of training.
- Employee to Employee Training: informal sharing of information between co-workers.

Bearing in mind the educational level, experience or job position of the target audience and what they need to know to properly implement their work, the trainers or HR Managers can use one of the above defined programmes to ensure that employees handle food safely.

Dividing trainees into groups allows the trainer to adapt the contents of the training according to the roles, responsibilities and levels of responsibility of each worker. In the field of food safety it is strongly recommended this segregation depending on the job, with the sole aim of fully adapt training to the target group, since they are part of a similar level of knowledge among all trainees in the group and training can be fully related to its specific activity in the company.

Furthermore, according to the trainees' characteristics the trainer should choose a training methodology or another but always giving preference to **intuitive teaching methods** (see section 3.1 for further information), through which the trainer should try to approach the immediate reality to the trainees.

This is based in the realization of experimental activities or its alternatives (e.g., audiovisual materials) that focuses on the principle of intuition, prioritizing those actions that promote trainees' participation and experience, ie:

- Dynamics of active participation.
- Performing experimental practices or demonstrative methodologies. For example, the use of dip slides or Rodac plates for microbiological analysis of working surfaces allows trainees to detect the presence of microorganisms in working surfaces and realize that, although not shown, microbiological contamination is present (*Figure 3*). Another example is the use of Glo Germ to check the effectiveness of handwashing (*Figure 4*).
- Completion of exercises, case studies, examples and current cases, such as recent outbreaks of foodborne illness that have had social and mediatic impact.
- Support trainees' duality as food workers and as food consumers.

The trainer must have the necessary knowledge and skills to deliver a course and this is important not only to introduce the theoretical part (ie, the explanation of the teacher in the classroom), but also to perform exercises, give related information to the trainees in the way of Internet links, simulations, videos, self-assessment tests, etc.

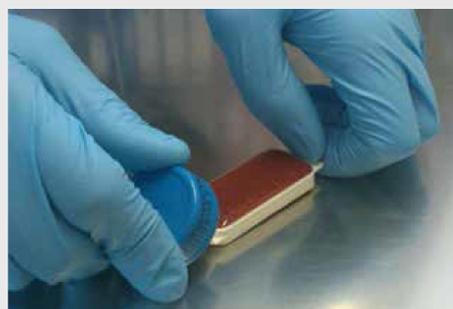


Figure 3. The use of dip slides or Rodac plates for microbiological control surface is a very effective intuitive teaching resource that allows students to detect the presence of microorganisms on working surfaces.



Figure 4. Handwashing results after using ultraviolet radiation by GloGerm device. In white areas remains the compound used as a marker, what means that they have not adequately washed its hands; in this way the student can self check if after applying the handwashing technique this is effective.

3 Food safety training

3.1 LEARNING THEORIES AND PRACTICES

The training key points:

- introduction of the trainer
- introduction of the issue
- explanation of the key words, glossary terms
- explanation of the risks a critical points
- explanation of the importance of safe food handling procedures
- to meet the key food legislation requirements
- to proposed all relevant materials, copies to learners
- to let them read loudly, to understand all information, to ask questions, to discuss about the topic
- to do practical exemplary training activity individually or as a group, active participation
- to put real life examples to remember the issue
- to ask them control, key questions
- to review key points

3.1.1 Training materials

Developing training involves writing materials, creating learning exercises, and working with content experts and trainers. Curriculum and material development usually include:

- Background and descriptive information.
- Directions on how to use the curricula.
- Course planning forms and checklists.
- Guidance on tailoring each particular workshop so it matches the needs or wants of participants, or fits a program's needs.
- Specific, measurable, and realistic learning objectives.
- Clear and complete course content.
- Integrated evaluation plan/tools.

Training materials may include:

- Questionnaires or discussion questions for gathering information from potential participants and/or their supervisors before the training.
- Questionnaires to be collected at the beginning of a training session.
- Suggested questions that trainers can ask at the beginning of the training.
- Exercises that help participants think about their own learning objectives.
- Pre-tests or activities to determine what participants already know; or what they want to learn.
- Suggestions for revising the training so it better addresses the needs of the group.
- Optional sessions, when relevant.

Training methods need to be carefully selected to match the purpose and learning outcomes of each session.

3.1.2 The active learning concepts and practices

- **Think-Pair-Share:** Trainees reflect on a question or issue for one or two minutes, noting factors, ideas, strategies, etc., that pertain to the topic. At the end of the designated time period, trainees turn to a peer and work together to formulate a correct response or provide an overview of the information. Pairs then share their answer or overview with a large group or with the entire class.
- **Meeting of the minds panel:** Trainees role-play different figures who bring alternative points of view to the discussion topic. Set up the roles in advance and provide trainees with hints regarding critical pieces of information that will be critical to the character's success in the discussion.
- **Fishbowls:** A small number of trainees must respond to questions distributed in a previous class session. These trainees become experts in a given field and supplement the trainer as a source of information and feedback.
- **Cold-calling:** A single trainee must share with the class his/her conclusion supported by reasons and evidence. This technique can be used as an individual homework assignment for which trainees receive a question/issue in advance and have the opportunity to prepare answers. It can also be used as a group activity during which trainees compare evidence and prepared reasons without knowing who will be called upon to provide the final justification.
- **Case Study /Discussion Method:** An open ended story or case study provides a vehicle for analysis, criticism, and reaching conclusions.
- **Reciprocal Peer Questioning:** Trainees prepare questions on a lecture, reading, experiment, etc. that they share with a group and discuss to answer with

supporting evidence. Each group chooses one question to share with the large group as a discussion starter.

- **Conference Style Learning:** Trainees read materials that build on previous class activities and prepare key ideas as well as questions for debate. The trainer functions as a facilitator, time keeper, and discussion guide, adding strategic questions to keep the discussion going. Trainees perform as experts on a given issue.
- **Dialogue Analysis:** Trainees receive written dialogues to analyze. In small groups, trainees must identify the different viewpoints of each participant in the dialogue, analyzing the discussion for biases, presence or exclusion of important evidence, alternative interpretations, misstatement of facts, and errors in reasoning. Each group must decide which view is the most reasonable. After coming to a conclusion, each group can act out their dialogue while offering a critical analysis of the key points and successes.
- **Spontaneous Group Dialogue:** One group of trainees are assigned roles to play in a discussion (such as leader, information giver, opinion seeker, and disagreeer). Four observer groups are formed with the functions of determining what roles are being played by whom, identifying biases and errors in thinking, evaluating reasoning skills, and examining ethical implications of the content.
- **Ambiguity:** Provide trainees with conflicting information that they must think their way through in order to create a response that can be justified.

Training well-skilled practitioners require an integration of work-integrated learning modalities as teaching tools:

- A well-structured framework focused on complex practice and trainee centred learning.
- Learning outcomes based on graduate attributes and alignment of the learning outcomes to teaching practice (mode of delivery, teaching tools) and assessment practice (constructive alignment using revised Blooms taxonomy)
- Implementation and continuous improvement of the above via quality assurance mechanisms incl. Quality circles.

3.1.3 Use of ICT as teaching tools

Information and Communication Technologies (ICT) are defined as a “Diverse set of Technological tools and resources used to communicate, and to create, disseminate, store and manage information”. ICT means new digital technologies (hardware and software) and ICTs are a powerful tool in supporting education.

ICT has become a very important part of the educational delivery and management processes. The new communications technologies are changing processes of teaching and learning by adding elements of vitality to learning environments including virtual environments for the purpose. New technologies make it possible for complicated collaborative activities of teaching and learning by dividing it in space and time, with seamless connectivity between them. Due to its capability to offer anytime and anywhere, access to remote learning resources, ICT is a potentially powerful tool for offering educational opportunities.

The new digital ICT is not single technology but combination of hardware, software, multimedia, and delivery systems. Today, ICT in education encompasses a great range of rapidly evolving technologies such as desktop, notebook, and handheld computers, digital cameras, local area networking, Bluetooth, the Internet, cloud computing, the World Wide Web, streaming, and DVDs; and applications such as word processors, spreadsheets, tutorials, simulations, email, digital libraries, computer-mediated conferencing, videoconferencing, virtual environment, simulator, emulator etc. It is important to mention that the use of newer ICT is being integrated with use of older technologies, enabling the existing resources and services to be continuous use.

Integrating varying formats such as lecture, text, graphics, audio, video, Web resources, projection devices, and interactive devices in a lesson increases motivation, alertness, and can improve the quality of learners responses. Simultaneous presentation using multiple formats allows learners to learn using multiple senses:

- Camera: learners can be recorded as they perform a skill so they can review their performance later; document cameras can be used to share a single item with the entire class by projecting the image; microscope cameras allow one specimen to be projected to the entire class to ensure all are looking at the same thing; record lectures or demonstrations to share with trainees through video streaming or on a DVD.
- Film or Television: using film or television clips or whole shows to engage trainees during lectures or to fuel discussions of course content by pointing out either fallacies or realities depicted there; examples include using science fiction films to discuss physics concepts or CSI shows to discuss biology or forensics.
- PowerPoint: used to highlight major points; can integrate with video.
- Audio: Using mp3 compression to make audio files small enough to be broadcast, downloaded, or emailed by instructors and trainees. Files may include lectures or verbal feedback regarding assignments.

- Enhanced: Combining images, such as PowerPoint, and audio, such as instructor voice over, which are compressed and viewable on a computer or photo/video iPod.
- Video: Digital video, such as classroom lectures or interviews with experts, which are compressed and viewable on a computer or video iPod.
- Video-conferencing: point to point or point to multipoint discussions using a digital format.
- Web-based Instruction: Web resources to support learning: blogs; building a Website; discussion boards; online testing and quizzes; research; virtual tours; web-streaming; wikis.

Examples of free online tools for teaching and learning: Wallwisher; Prezi; Animato; Wordle; Storybird; Popplet; Google Docs; Dipity; Storify.

3.1.4 Classroom requirements

As Fred Jones, a noted classroom management expert, explains: “A good classroom seating arrangement is the cheapest form of classroom management. It’s discipline for free.” Many experienced trainers recommend assigned seating for trainees to facilitate discipline and instruction. They argue that trainees left to their own devices will always choose a seat that places the trainer at the greatest disadvantage. Best practices suggest a few common-sense rules to guide classroom arrangements:

- Trainees should be seated where their attention is directed toward the trainer.
- High traffic areas should be free from congestion.
- Trainees should be able to clearly see chalk board, screens, and trainer.
- Trainees should be seated facing the front of the room and away from the windows.
- Classroom arrangements should be flexible to accommodate a variety of teaching activities.

Classrooms are defined as having both traditional tablet arm chair configuration or narrow table and chair configuration providing added trainee work surface. Room capacities typically range from 30 to 100 stations. Different pedagogical techniques require different types of learning spaces. Lecture rooms: Classrooms for large classes with either fixed table and chair seating or traditional T heater type seating. Room capacities typically exceed 100 stations.

- Seminar: Collaborative/ Classrooms with movable tables and chairs which provide the instructor flexibility to arrange the class in small discussion teams or meet with

the class as a whole. The category includes seminar rooms, which are typically small rooms, less than 30 stations, with conference style seating.

- **Instructional: Computer Scheduled classrooms/class labs** equipped with computer terminals at each trainee station, providing trainees the ability to individually access and manipulate class materials stored on computer files. The rooms are typically equipped with standard desktop computers which support the technology requirements for courses in a broad range of academic disciplines.

Seminar rooms are designed to facilitate interaction and face-to-face discussion among trainees and instructor in small classes, usually fewer than 20 trainees. These rooms sometimes are used also as for departmental meetings or conferences:

- **DIMENSIONS:** The seminar rooms typically have tables and chairs, the total room area should allow 20 square feet per trainee station. Long narrow rooms limit eye contact and reduce personal interaction among participants in a class. Ceiling height should be ten feet minimum. The projection screen or chalkboard/markerboard defines the front of the room. If achieving maximum capacity is an objective, a single entrance at the front of the room will allow the incorporation of the entry space into the instructor area. A single rear entrance reduces interruptions from late-arriving trainees but will require more space. In rooms without installed technology, the front of the room should be large enough to accommodate at least basic AV equipment, such as a computer and LCD projector. It is recommended that a projector used in a seminar room may need to be equipped with a short focal length lens to reduce the distance from the projector to the screen. Placing the projector on the table where trainees sit may create distracting noise and heat.
- **WINDOW AND WALL TREATMENTS:** Fenestration should be kept to a minimum. All windows must be equipped with window coverings (shades, drapes, venetian blinds) that are opaque and mounted to prevent ambient light leakage around the edges.
- **FURNISHINGS AND EQUIPMENT:** Movable tables and chairs are the primary furnishings for seminar rooms.
- **MULTIPLE USE CONSIDERATIONS:** General purpose seminar rooms that also will be used as meeting or conference rooms may need to have built-in counter space, with lockable storage.
- **CHALKBOARD/MARKERBOARD:** Seminar rooms typically provide a large amount of chalkboard or markerboard space. The boards should be four feet high and mounted to the wall so the bottom edge is three feet above the finished floor. A

twoinch tack strip with movable mounting/map hooks should be above the writing surface. Tack boards are not standard and should be placed in the room only if required by the users.

- PROJECTION SCREEN(S): Because many seminar rooms are rather small, they may have a single screen. If users need a second screen and space permits, it is always preferable to mount two screens. The screen(s) should be matte white and mounted so that board space is available when one screen is down.
- AUDIOVISUAL EQUIPMENT AND CONTROLS: Often, portable audiovisual equipment is used in seminar rooms so that it can be shared among several locations.

3.1.5 Psychology of the training

Effectively managed classrooms are orderly (relatively speaking), with a minimum of trainee misbehavior and reasonable levels of time on task. Effective classroom managers are more skilled at preventing disruptions from occurring in the firstplace. Specific approaches to keep trainees focused on learning and reduce the likelihood of classroom disruption were indentified. These included:

- Withitness: Communicating that you know what the trainees are doing and what is going on in the classroom.
- Overlapping: Attending to different events simultaneously, without being totally diverted by a disruption or other activity.
- Smoothness and momentum in lessons: Maintaining a brisk pace and giving continuous activity signals or cues (such as standing near inattentive trainees or directing questions to potentially disruptive trainees).
- Group alerting. Involving all the trainees in recitation tasks and keeping all trainees “alerted” to the task at hand.
- Stimulating seatwork. Providing seatwork activities that offer variety and challenge.

Classroom Management Strategies:

- Hold and communicate high behavioral expectations.
- trainee
- Make clear to trainees the consequences of misbehavior.
- Work to instill a sense of self-discipline in trainees; devote time to teaching selfmonitoring skills.

- Maintain a brisk instructional pace and make smooth transitions between activities.
- Monitor classroom activities; give trainees feedback and reinforcement regarding their behavior.
- Create opportunities for trainees (particularly those with behavioral problems) to experience success in their learning and social behavior.
- Identify trainees who seem to lack a sense of personal efficacy and work to help them achieve an internal locus of control.
- Make use of cooperative learning groups, as appropriate.
- Make use of humor, when suitable, to stimulate trainee interest or reduce classroom tensions.
- Remove distracting materials (from view when instruction is in progress).

Trainer management styles:

- The authoritarian trainer places firm limits and controls on the trainees. Trainees will often have assigned seats for the entire term. The desks are usually in straight rows and there are no deviations. Trainees must be in their seats at the beginning of class and they frequently remain there throughout the period. This trainer rarely gives hall passes or recognizes excused absences. Often, it is quiet. Trainees know they should not interrupt the trainer. Since verbal exchange and discussion are discouraged, the authoritarian's trainees do not have the opportunity to learn and/or practice communication skills. This trainer prefers vigorous discipline and expects swift obedience. Failure to obey the trainer usually results in detention or a trip to the principal's office. In this classroom, trainees need to follow directions and not ask why.
- The authoritative trainer places limits and controls on the trainees but simultaneously encourages independence. This trainer often explains the reasons behind the rules and decisions. If a trainee is disruptive, the trainer offers a polite, but firm, reprimand. This trainer sometimes metes out discipline, but only after careful consideration of the circumstances. The authoritative trainer is also open to considerable verbal interaction, including critical debates. The trainees know that they can interrupt the trainer if they have a relevant question or comment. This environment offers trainees the opportunity to learn and practice communication skills.
- The indifferent trainer is not very involved in the classroom. This trainer places few demands, if any, on the trainees and appears generally uninterested. The indifferent trainer just doesn't want to impose on the trainees and often feels that

class preparation is not worth the effort. Things like field trips and special projects are out of the question. This trainer simply won't take the necessary preparation time and may use the same materials, year after year. Also, classroom discipline is lacking. This trainer may lack the skills, confidence, or courage to discipline trainees.

- The laissez-faire trainer places few demands or controls on the trainees. "Do your own thing" describes this classroom. This trainer accepts the trainees' impulses and actions and is less likely to monitor their behavior. The trainer strives not to hurt the trainees' feelings and has difficulty saying no or enforcing rules. If a trainee disrupts the class, the trainer may assume that the trainee is not getting enough attention. When a trainee interrupts a lecture, the trainer accepts the interruption with the belief that the trainee must surely have something valuable to add. When discipline is offered, it is likely to be inconsistent.

Active lectures blend 10-15 minute presentation segments with interactive experiences such as asking provocative questions and class or small group discussions. Using visual aids such as graphic organizers, video clips, or a few PowerPoint slides to emphasize main points and an engaging voice improve results. Implementation Suggestions:

- Ask trainees. Give out evaluations to your class. Do this early, and do it often!
- Ask peers. When others visit your class, they frequently offer a helpful perspective different from your own.
- Observe yourself. The Faculty Center for Teaching and Learning will gladly videotape your class and allow you to witness your own strengths and weaknesses. Simply email us to request a visit.
- Observe others. Don't feel you must observe classes only in your own field; good teaching works well in any discipline.
- Track your progress. Maintain a teaching portfolio with your good ideas, feedback, and documentation.
- Voice projection. Your voice is probably the most important element of a trainer's "presence" in the classroom. You should be able to speak loudly enough, and project your voice far enough, that everyone in the classroom can hear you. You must also speak clearly, which may mean slowing down if you speak with an accent. At the same time, be aware of the unintended effects of your voice. If you have to speak loudly, does it make you sound irritated? If you slow down your speech, does it come across as helpful or condescending?
- Tone of Voice. Some effects of your voice are not obvious to the speaker. Even if you are making an effort to keep your voice neutral, often your internal mood can

filter through your tone of voice. Strive to maintain that supportive, interested, and patient tonality you associate with the good trainers you've witnessed yourself. And pay attention to even more hidden effects of your voice. Some trainees tune out if instructors speak in monotones or otherwise come across as boring.

- Posture. Like your voice, your posture signals your attitude toward trainees quite independently of the words coming out of your mouth. Teaching is sometimes compared to being “on stage” because all aspects of your performance, not just the knowledge contained in your words, affect trainee learning. The best way to ensure a supportive and fostering posture is to carry into the classroom a supportive and fostering attitude – the two are inextricably related.
- Setting the tone. The instructor sets the tone for the entire class. Instructors who are irritable, bored, or disengaged often find their trainees mirroring their attitude, in many cases completely unconsciously.

Motivated and enthusiastic trainer is necessity of the training and motivation of employees to learn is crucial. Motivation is an internal state that activates, guides and sustains behavior. Motivation can have several impacting effects on how trainees learn and how they behave towards subject matter:

- Provide direction towards goals.
- Enhance cognitive processing abilities and performance.
- Direct behavior toward particular goals.
- Lead to increased effort and energy.
- Increase initiation of and persistence in activities.

Good communication skills are essential when training adults. There is an abundance of resources available to provide helpful information on how to communicate most effectively with participants. These tools help develop training messages, provide facilitation tips, and offer ways to improve presentation skills for personal growth as a trainer. There are three important things a facilitator can do to help create an effective learning atmosphere for course participants:

- Support the group of participants by building an atmosphere of trust and modelling a positive attitude.
- Ensure that the entire course content is covered.
- Model effective facilitation skills.

It is radically different to design training courses and material for adults than any other group. Adult learning follows certain principles listed below:

- Adults are often concerned that participating in a group will make them look weak, either professionally or personally.
- Adults bring a great deal of experience and knowledge to any learning situation.
- Adults are decision-makers and self-directed learners.
- Adults are motivated by information or tasks that they find meaningful.
- Adults have many responsibilities and can be impatient when their time is wasted.

Generally there are four modes of learning and people could be one or another or even switch between different modes depending on the subject matter:

- Doer: Likes to be actively involved in the learning process, wants to know how he or she will apply learning in the real world, likes information presented clearly and concisely.
- Feeler: People-oriented, expressive, focuses on feelings and emotions, thrives in open, unstructured learning environment.
- Thinker: Relies on logic and reason, likes to share ideas and concepts, analyses and evaluates, enjoys independent work.
- Observer: Likes to watch and listen, tends to be reserved, will take his or her time before participating, and thrives on learning through discovery.

4 Food safety training evaluation

4.1 INTRODUCTION

Developing guidelines or even standards to evaluate vocational education and training programs has been matter of several attempts in Europe, within all subjects, including food safety. However, the measurement of the success or failure of training programs is still under discussion and no harmonized guidelines exist regarding their evaluation.

This chapter intends to bring together the different elements involved in the evaluation of training - the clear definition of goals and objectives, the selection and characteristics of trainees, the design of examinations, the learning theory and cost-benefit analysis. While most of the evaluation measures of the training rely on reaction criteria, mainly immediate questionnaires after the training program, periodic assessments of the effectiveness of the knowledge transfer and attitudes should be made.

Some basic principles deriving from evaluation standards published elsewhere are presented, before the proposal of the main guidelines for the evaluation of the training quality, specifically applied to the food safety training. Two sections will be particularly covered: (a) Evaluation of the training quality and (b) Skills management of employees.

4.1.1 Basic principles in evaluation of training programmes

Evaluation is considered an essential step to provide information for decisions on the future scale and orientation of training, but most of the research in the field of training uses trainees' reactions to a course and their beliefs about the amount they have learned to assess its effectiveness. This information is usually gathered at the time of training, and little work has been undertaken to examine the extent to which trainees effectively apply the knowledge, skills and attitudes acquired in a training context once they are back in their job. Evaluation is needed in order to improve future programs and to eliminate those programs which are ineffective.

The dominant model on training evaluation has been the “Four Stages Model” consisting of reaction, learning, behavior and results:

- **REACTION:** includes the assessment of training participants' reaction to the training program; in practice it measures the most common affective responses to the quality (as the satisfaction with the instructor) and the relevance (work-related utility) of the training. Clearly reaction is a decider in the continuation of the training program, but alone it is a poor determinant of its overall effectiveness. Traditionally the reaction-criteria has been gathered by means of a post-course questionnaire or most commonly "the happy sheet". Some criticism about this criterion relies on the fact that it may represent a superficial evaluation of the course and subjected to considerable amount of bias and influence.
- **LEARNING:** includes measures of the learning that has taken place, and it is essentially concerned with the principles, the facts and the techniques understood and absorbed by the trainees. It includes the evaluation of the extent to which the training objectives were achieved and the use of pre and post tests to assess the improvement.
- **BEHAVIOUR:** it is related to the knowledge transfer from the training environment to the job. Surveys, interviews and observations are some of the more common tools used in this stage.
- **RESULTS:** this stage is concerned with the achievement of the end-goals and the desired performance outcomes. This is the most complex level to conduct evaluation. Some argue that contextual factors may interfere in the results, as the learning culture of the organization, the nature of the interpersonal support in the workplace, the climate for learning transfer and the adequacy of material resources, such as tools, equipment and supplies in the workplace.

The Kirkpatrick's model has made valuable contributions to the training evaluation thinking and practice, by focusing on the outcomes, and it is still the foundation of the most actual guidelines for the training evaluation, because of its potential to simplify that complex process. However some limitations regarding its incompleteness in considering individual or contextual influences in the evaluation of training, turned difficult their worldwide adoption.

Evaluation standards should be designed to be suitable for a huge variety of evaluation approaches and to be applicable to the broadest possible scope of applications. In 2002, the German Evaluation Society proposed the transfer of the US standards for programs evaluation, of the Joint Committee on Standards for Educational Evaluation, originated in the school and university sectors to the area of initial and continuing vocation training. Both prescribe four basic qualities for evaluations: utility, feasibility, propriety and accuracy. While the quality descriptor of **utility** is related to the central goal of

evaluations and suggests that the information and conclusions they provide should actually be used by the evaluated programme stakeholders, the **feasibility** descriptor emphasises that in implementing evaluations one must always consider economic, social, political and organisational factors. The **propriety** descriptor contains requirements which we know from the ethics of science, protection of individual rights, disclosure of findings and other demands and finally the **accuracy** demands that evaluation should be based on scientific methods. *Table 1* points out the most important sub-items that should be considered in each descriptor.

Descriptor	Subject	Comments
Utility standards	Stakeholder Identification	Persons or organizations involved in or affected by the evaluation should be identified, so that their needs can be addressed.
	Evaluator Credibility	The persons conducting the evaluation should be both trustworthy and competent to perform the evaluation, so that the evaluation findings achieve maximum credibility and acceptance.
	Information Scope and Selection	Information collected should be broadly selected to address pertinent questions about the program and be responsive to the needs and interest of clients and other specified stakeholders.
	Values Identification	The perspectives, procedures, and rationale used to interpret the findings should be carefully described, so that the bases for value judgments are clear.
	Report Clarity	Evaluation reports should clearly describe the program being evaluated, including its context, and the purposes, procedures, and findings of the evaluation, so that essential information is provided and easily understood.
	Report Timeliness and Dissemination	Significant interim findings and evaluation reports should be disseminated to intended users, so that they can be used in a timely fashion.
	Evaluation Impact	Evaluations should be planned, conducted, and reported in ways that encourage follow-through by stakeholders
Feasibility Standards	Practical Procedures	The evaluation procedures should be practical, to keep disruption to a minimum while needed information is obtained.
	Political Viability	The evaluation should be planned and conducted with anticipation of the different positions of various interest groups, so that their cooperation may be obtained
	Cost Effectiveness	The evaluation should be efficient and produce information of sufficient value, so that the resources expended can be justified.

Descriptor	Subject	Comments
Property standards	Service Orientation	Evaluations should be designed to assist organizations to address and effectively serve the needs of the full range of targeted participants.
	Formal Agreements	Obligations of the formal parties to an evaluation (what is to be done, how, by whom, when) should be agreed to in writing
	Rights of Human Subjects	Evaluations should be designed and conducted to respect and protect the rights and welfare of human subjects.
	Human Interactions	Evaluators should respect human dignity and worth in their interactions with other persons associated with an evaluation, so that participants are not threatened or harmed.
	Complete and Fair Assessment	The evaluation should be complete and fair in its examination and recording of strengths and weaknesses of the program being evaluated
	Disclosure of Findings	The formal parties to an evaluation should ensure that the full set of evaluation findings along with pertinent limitations are made accessible to the persons affected by the evaluation
	Conflict of Interest	Conflict of interest should be dealt with openly and honestly
Accuracy standards	Context Analysis	The context in which the program exists should be examined in enough detail
	Impartial Reporting	Reporting procedures should guard against distortion caused by personal feelings and biases of any party to the evaluation

Table 1. Most relevant points to consider in the evaluation standards.

On the other hand, Schwartz and Mayne have identified three types of evaluation standards, those covering evaluation products, those for the evaluation process, and those focused on the usefulness of the evaluation (*Table 2*).

Criteria	Subject
Product quality	Well-defined scope
	Validated criteria
	Accurate data
	Sound analysis
	Substantiated and impartial/objective findings/conclusions
Process quality	Efficiency in production
	Fair and objective data gathering and production
	Involvement of stakeholders in the planning and conduct
	Involvement of qualified investigators
	Disclosure to affected parties of pertinent findings
Usefulness	Relevance to key decisions

Criteria	Subject
	Timeliness
	Transparency in analysis
	Clarity of messages

Table 2. Standards for Good Quality in Evaluation

Specifically regarding the food safety training, studies for testing the effectiveness of hygiene education proved that improving knowledge alone was not sufficient and that attitude and practices have to be evaluated. The enactment of food safety practices, learnt during the training programmes, require that the food handler to use the resources available to them and implement the knowledge and skills into practical application, therefore translating the training into positive behaviours. Seaman proposed the Food Hygiene Training Model as a conceptual framework for the effective implementation and monitoring of food safety training programmes. It was based on the Tone’s Health Action Model. Most of the recognized influencing factors are incorporated – the knowledge about food hygiene obtained from a course; the influence of norms, which could be altered by the provision of support for changes in food handling practices from management and colleagues in the food industry; some incentive to change behaviour, e.g., perhaps improved job satisfaction or financial inducements; the facilitating effects of a workplace that provides a suitable range of equipment and facilities; and the development of personal skills to apply the knowledge gained from a course.

The model considers three evaluation stages:

- 1 **Training Needs Analysis** - it provides an important permanent individual record of the capabilities of the food handlers, their training needs, why they should be trained and when they should be trained, thus establishing a starting point from which the success or failure of food hygiene training programmes can be measured, and shows due diligence by the manager in assessing food safety risks. It is recommended that records should be reviewed each year to enable management to determine the training needs of both individuals and the business as a whole. This will help ensure that food handlers are trained commensurate with their duties, especially if their duties or work practices have changed, and that any updating requirements are identified.
- 2 **Knowledge test and/or practical skill assessment** – it measures the knowledge retained by the food handler and/or their practical capabilities shortly after training. This evaluation stage should be conducted in a controlled and closely monitored

environment to establish if knowledge or skills have been imparted correctly and assesses if the food handler is capable of comprehension of the subject and/or the practical application of learnt practices. Any deficiencies in skill or knowledge should be addressed at this stage and highlighted to the food handler so they can learn and adapt to ensure full compliance with the training provided. This is the LEARNING evaluation criteria proposed by Kirkpatrick. However, some authors stress the relevance of the employees' supervisors within the context of the workplace to encourage compliance with desired food safety behaviours among workers and to appropriately "ask" workers to follow a food safety rule.

- 3 **Food handlers' evaluation of the training programme** – it provides an indication of the food handlers' reactions to the training, thus the RESULTS evaluation criteria as suggested by Kirkpatrick. The food handlers' reactions to the training programme could be measured through the use of a questionnaire encompassing both open and closed questions to measure the perceived value and relevance of the training programme to the food handlers responsibilities, thus allowing respondents the opportunity to portray approval or disapproval towards certain aspects of the training.

Finally, the Food Hygiene Training Model proposes **Overall Performance Measures**, which can be divided into the final two evaluation categories: the effect of food hygiene training on the individual food handler and the effect of food hygiene training on the organisation.

Individual performances can be measured through observation or assessment in the workplace, under the supervision of an appropriately trained manager or supervisor. The food handler could be asked questions pertaining to food safety in their workplace, at a set time (i.e., 1 month) after initial food hygiene instruction, and results recorded to show how much the food handler has retained in relation to their training and food handling duties. Alternatively, observations of food handling practices could be carried out, again by an appropriately trained person, to measure practical competency.

The effects of food hygiene training on the organisation can be measured through various means including: Environmental Health Inspection reports, staff and customer satisfaction surveys, the nature and frequency of customer complaints, laboratory bacteriological test results, increased or decreased food wastage due to food spoilage or contamination and the type and frequency of food pest infestations.

In sum, considering the most relevant approaches for the evaluation of the training effectiveness, the next topic will include practical guidelines to assess the training quality.

4.2 EVALUATION OF THE FOOD SAFETY TRAINING QUALITY

When considering the evaluation of the training program, having in mind the previous relevant considerations, the evaluation of the training program should contain topics addressed to all of those involved, namely: (a) the organization that supports or contracts the training program (which needs to know if the training promotes the effective desired effects in the trainees and consequently in the organisation); (b) the instructors/teaching organism (which need to know if the covered topics and their depth or length are adequate, if the type of training is the most recommend, if the material used is within the context of the training learning process and if its competence is enough for the level of knowledge and practical skills of the participants) and finally (c) the participants or trainees (which need to know if they learn what was taught and if the desired outcomes are transferred to the workplace within long-term activities).

Guidelines of the training evaluation addressed to the management organization include:

- Was a training needs analysis conducted (who needs training, what level, why do they need it and when do they need it)?
- The objectives of the training and the desired outcomes were clearly defined?
- The participants, their background and job position, were previously assessed and that information was delivered to the instructors?
- The untrained food handlers were interviewed about their food hygiene training needs during the early stages of employment?
- Had the choice of the training program taken into account the regulatory demands, the language, the cost, the duration, the location, the certification the relevance to the work activities and the style of delivery?
- Was the management committed to the success of the food safety training, as for example denoting the guarantee to provide the necessary supplies (soap, paper towels, hairnets, gloves, etc.) to provide the desired behaviors?
- Were the managers aware that food safety training is essential to the commercial viability of the company as it:
 - assists companies in becoming more efficient, competitive and profitable,
 - raises performance standards,
 - reduces wastage,
 - assists in the production of safe food,

- complies with food legislation requirements,
- promotes a good company image,
- increases staff morale and
- improves staff retention?

Guidelines of the training evaluation addressed to the instructor or teaching organization include:

- For theoretical training, were all the topics covered (those needed to be considered)?
- For theoretical training, each lesson in the program includes visual aids and a script outlining presentation content with the specific learning objectives?
- For theoretical and practical training were discussion topics, demonstrations and hand-on activities used?
- Was feedback assessed by the managers of the organization and after the training program by participants to: (1) determine if the teaching methodologies were appropriate in the specific industry setting; (2) ensure that the lesson lengths and the resources needed to deliver the lessons were suitable and available?
- Did managers and supervisors cooperate previously, during and after the training program?
- Did the instructors conducted a pre-test and a direct observation at the participant's company to record baseline food safety practices (as hairnets and personal adornment usage or employee hand-washing practices)?
- Was the same knowledge test used in the pre-test, administered to the participating workers and supervisors, at least 1 week after the last lesson? And the same for the direct observation?
- Did the instructors train the supervisors (if applicable) for the practical behaviors, particularly before starting work, after each break and after using the rest room? Were also supervisors asked to act as role models by practicing the desired behavior themselves at all times?
- Did the instructors inform the participants about the assessments and their objectives?
- Did the instructors display the results of the assessments in due time?
- Were post-lessons assessments and direct observations repeated after at least 5 months from the training program?

Guidelines of the training evaluation addressed to the participants include:

- Were the participants aware of their training needs?
- Were the participants informed and consent of the assessment that needs to perform during the training evaluation?
- Were the participants motivated by any form of reward?
- Was self-evaluation conducted?

Training evaluation should take place throughout each phase of the training process, not as a last step. The most obvious and frequent kind of evaluation occurs immediately after training; participants complete a course evaluation form following the training before leaving the site. Evaluation can also take place at the end of each day of training through quick "How did it go?" discussions, or even in organised focusgroups with participants. Longer-term, follow-up evaluations conducted three months to a year or more after training are also a possibility. These evaluations measure how participants use their newly acquired information and skills in their professional roles.

4.3 SKILLS MANagements OF EMPLOYEES

The list below was extracted from the Guide of Food Safety – Level 1, 2 and 3, from the Food Safety Authority of Ireland (FSAI). It includes a summary of food safety skills for employers (level 1 and 2) and management (level 3). The Food Safety Training Standard - Level One outlines the training which must be demonstrated at the induction stage of employment. Induction level training has been broken down into two stages; stage one which must be completed before the employee commences work and stage two which must be completed within the first month of employment. Level Two refers to training that should be given 3-12 months after employment has begun and will provide trainees with additional skills of food safety. Employees at management level should also have level three training in order to cope successfully with food safety management issues.

LEVEL 1 - INDUCTION SKILLS

STAGE 1 - FOOD SAFETY SKILLS FOR EMPLOYEES – before commencing work

- (1) Wear and maintain uniform/protective clothing hygienically

- (2) Maintain a high standard of hand-washing
- (3) Maintain a high standard of personal hygiene
- (4) Demonstrate correct hygienic practice if suffering from ailments and illnesses that may affect food safety
- (5) Refrain from unhygienic practices in a food operation
- (6) Demonstrate safe handling practice
- (7) Maintain staff facilities in a hygienic condition
- (8) Obey food safety signs
- (9) Keep work areas clean

STAGE 2 - FOOD SAFETY SKILLS FOR EMPLOYEES – within the first month of employment

- (10) Know their legal responsibility in ensuring safe food for the consumer
- (11) Recognise how food can be put at risk by chemical, physical and biological hazards
- (12) Demonstrate an understanding of cross-contamination and the hygiene practice necessary to prevent it
- (13) Explain the difference between high and low risk activities
- (14) Avoid unnecessary handling of food, food utensils and surfaces
- (15) Where applicable to the job, record the temperature of foods as required
- (16) Keep appropriate food safety records
- (17) Keep pests out of the food operation and operate a satisfactory waste disposal system
- (18) Take action when aware of unhygienic practices that may put the safety of food at risk
- (19) Co-operate with authorised enforcement officers
- (20) Where applicable to the job, check deliveries appropriately

LEVEL 2 - ADDITIONAL SKILLS FOR EMPLOYEES – within 3-12 months of employment

- (1) Demonstrate the food safety skills required at Induction Level Stage I and II
- (2) Outline the requirements necessary for bacterial growth
- (3) Use time-temperature controls to prevent and control bacterial growth
- (4) Describe foodborne illness and the factors which contribute to incidences of it
- (5) Implement the HACCP procedures in place
- (6) Apply pest control in the workplace
- (7) Outline their legal food safety responsibilities

Where applicable to the job:

- (8) Use hygienic procedures in receiving deliveries

- (9) Ensure food safety during storage
- (10) Ensure food safety during preparation
- (11) Ensure food safety during cooking and cooling of food
- (12) Ensure food safety during transportation
- (13) Apply correct and appropriate cleaning procedures in maintaining a clean food operation
- (14) Take all reasonable care to prevent cross-contamination of products by food allergens
- (15) Follow the procedure for dealing with recalled food products
- (16) Deal with a food safety complaint effectively
- (17) Co-operate with food safety auditors
- (18) Use hygienic procedures when displaying/holding or serving food
- (19) Deal with returns in a hygienic manner
- (20) Use hygienic procedures in storing raw/in-process/processed food items
- (21) Use hygienic procedures in storing ancillary items
- (22) Apply the required heat treatment
- (23) Label food correctly
- (24) Take samples for laboratory analysis
- (25) Test raw, in-process and/or processed food items to ensure food safety

LEVEL 3- FOOD SAFETY SKILLS FOR MANAGEMENT

Skills Required Prior to Management Training

- (1) Demonstrate the food safety skills required at previous levels

Microbiology

- (2) Explain the importance of the growth requirements, benefits and dangers of microorganisms in the food operation.
- (3) Explain the purpose of food preservation.

Personal Hygiene

- (4) Demonstrate commitment to good food hygiene practice.
- (5) Promote a high standard of personal hygiene throughout the food operation.
- (6) Explain the implications of foodborne illness in the food operation.
- (7) Ensure food workers suffering from foodborne illness do not work in contact with open food.
- (8) Manage and maintain a procedure for the control of contractors and visitors.

Structural Hygiene

- (9) Identify or report structural deficiencies in the food operation.
- (10) Manage and maintain an effective pest control system.
- (11) Manage and maintain a satisfactory waste disposal system.

Food Safety Operations

- (12) Manage and maintain an effective cleaning programme
- (13) *Where applicable to their job:* ensure food safety during product purchasing.
- (14) Ensure food safety during delivery receipt.
- (15) Ensure food safety during storage.
- (16) Ensure food safety during product preparation.
- (17) Ensure food safety during cooking/processing/cooling/holding/service of food.
- (18) Encourage good hygiene practice during the transportation of food.
- (19) *Where applicable to their job:* ensure products are labelled correctly.

Food Safety Management

- (20) Manage and maintain the traceability system within their area of the food operation.
- (21) Recognise the significance of product threats/tampering for the consumer.
- (22) Manage/review food safety complaints effectively.
- (23) Implement company procedure for the withdrawal/recall of non-conforming food.
- (24) Take all reasonable steps to ensure the customer is aware of the presence of food allergens.
- (25) Review and follow up on results from laboratories.
- (26) Demonstrate an awareness of the legislative requirements relating to their business.
- (27) Implement and review the food safety management system (based on HACCP principles).
- (28) *Where applicable to their job:* conduct internal audits.
- (29) Provide assistance to internal and external auditors.
- (30) Provide assistance to enforcement officers.
- (31) Follow-up non-conformances with corrective action.
- (32) Manage and maintain food safety documentation and records.

Staff Space Training and Management

- (33) Ensure the food safety training needs of staff are met.
- (34) Review the implementation of food safety skills by staff.

- (35) Monitor and maintain required standards of behaviour and performance with regard to food safety.
- (36) Establish and maintain effective working relationships with members of staff to ensure food safety.
- (37) Encourage the evaluation of food safety related activities.

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