

## Content-12: Put Chemical Management System into Practice

### Orientation

What can this unit help you with?

You may use this unit if you

- Want to assess training needs;
- Want to define learning outcomes;
- Want to develop a tailored training.

Intended results of the unit

- Students can relate to the basic steps in training development;
- Students can prepare a training matrix to document training requirements;
- Students can understand the importance of adult learning principles and know how to apply them;
- Students can understand the importance of experiential learning cycle based on chemical management system and utilize this to make their competence development programs more fruitful;
- Students can develop a tailored competence development program on the chemical management system.

# Input

In this unit, we will learn how to assess chemical training needs and develop a training plan. Here we will be able first to assess training needs, then define learning outcome and finally learn to develop tailored training using adult learning principles and experiential learning cycle.

## Assessing Training Needs

To assess training needs, we need to know a general-purpose and the type of training we want to provide. For identifying the general-purpose, we should ask the following questions: Why are we planning the training? Is it to develop or change attitudes, to enhance knowledge or to develop/enhance specific skills?

## Identifying the Type of Training



Figure 1: Points to consider while identifying the type of training. Source: Resource Efficient Management of Chemicals in Textile and Leather Sector Companies.

For identifying the type of training, we should consider if the trainees are: fresher, into-the-job, for-the-job, on-the-job and so on.

We have to consider these points because the type of training will vary according to the type of trainees. For example, we will have to introduce basic knowledge more to the fresher than the experienced professionals. So, we will have to tailor our training material by keeping the age, designation, work experience, etc., in mind.

## Documenting Training Needs Using a Training Matrix

We should also document the training needs using a Training Matrix.

Learning objective or subjects  Job title	Chemical hazard and exposure awareness	Recognize chemical labels and safety signs	Follow safe works practices as per work instructions	Use of personal protective equipment	Use Safety Data Sheets	...
Production Manager		●			●	
Production Supervisor	●	●	●	●	●	
Store Personnel	●	●	●	●	●	
ETP Staff	●	●	●	●		
Worker Area 1	●	●	●	●		
Worker Area 2	●	●	●	●		
EHS Officers	●	●	●	●	●	
Admin		●			●	
.....						

Figure 2: Documenting training needs using a Training Matrix. Source: Resource Efficient Management of Chemicals in Textile and Leather Sector Companies.

A Training Matrix is a chart where we can put the learning objectives or subjects on the columns and job titles on the rows, forming a matrix where we put dots against each job titled person

and their training needs. In this way, we can document the training needs and ensure the right people are getting the right training.

## Defining Learning Outcomes

Defining learning outcomes is very important for arranging successful training. We should use the following phrase and complete it by the learning outcomes we intend to have in training. The phrase is:

“At the end of this training, the participants will be able to...”

For defining the learning outcomes of chemical management training, we can complete the phrase like this:

- explain the meaning of hazard symbols on the chemical container;
- identify the required personal protective equipment and consult safety data sheets;
- correctly use respiratory protective equipment, etc.

We can see that while completing the phrase, we can automatically define our learning outcomes. So, completing this phrase is a great tool to brainstorm and define the learning outcomes of our training.

## Pedagogy vs. Andragogy

Now, we need to understand the psychology of the trainees and deliver the training materials and exercises accordingly. For that, we should have a sound idea about pedagogy and andragogy. Pedagogy is such an approach of teaching where the learners are dependent on the teacher, gain little to no experience, and learn by external pressure or a drive to get good grades. Here the teacher designs the learning processes and decides the subjects. On the other hand, andragogy is a teaching approach where the learners are self-directed, gain a lot of different experiences, learn without any pressure. Such an approach is focused on work situations and tasks. Learners enjoy their works from internal motivation and self-actualization. Here the teacher plays a role as a facilitator or enabler.

Type of differences	Pedagogy	Andragogy
The learner	Depending on teacher	Self-directed
Experience	No experience	Lots of different experiences
Readiness to learn	Told to have to	Need to or want to
Orientation	Acquiring prescribed subjects	Organized around life/ work situations, task focused

Motivation	External pressure, grades	Usually, internal motivation, self-actualization,
Role of teacher	Designs learning process and decided subjects	Facilitator, enabler

*Table 1: Pedagogy vs. Andragogy. Source: Resource Efficient Management of Chemicals in Textile and Leather Sector Companies.*

## Key Adult Learning Principles

There are some key principles that are connected to adult learning. Here we will discuss these principles one by one.

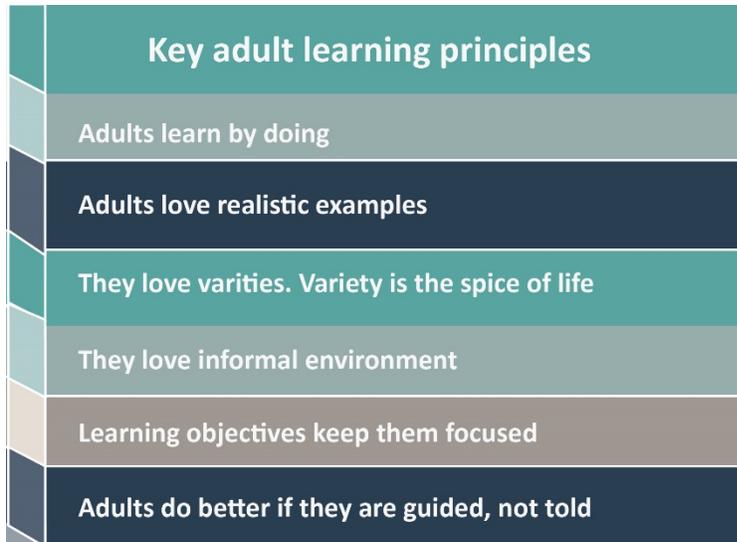


Figure 3: Key adult learning principles. Source: Resource Efficient Management of Chemicals in Textile and Leather Sector Companies.

**Adults learn by doing:** The trainer needs to act as a facilitator and give room to the trainees to immerse themselves in different activities. The ultimate learning experience comes from getting people to throw themselves into the task at hand.

**Adults love realistic examples:** A trainer needs to use examples that the trainees can relate to. Adults relate their learning to what they already know.

**They love variety:** A trainer needs to use tone and pace during the course of training. He needs to resort to various delivery modes to get the message across with fun and flair.

**Most of them love the informal environment:** The ideal learning environment has the following characteristics:

- Simple social activities or get-together sessions
- Good audio-visual support
- Appropriate seating pattern
- Comfortable chairs
- Good writing surface (depends)
- Room temperature and ventilation
- A good supply of coffee/tea and lunches

- Adequately soundproof room and free of other disturbances (telephone, walk-through)
- Natural daylight, at least 500 lux lighting.

Learning objectives keep them focused: Establishing clear objectives play a significant role in successful training. Learners should be allowed to keep track. Trainers also need to communicate at the beginning and reflect at the end.

Adults do better if they are guided, not told: As trainers, we need to provide all the help that learners need, for example: giving examples, demonstrations, using a multimodality approach. We need to allow participants to think through the lesson on their own and discover the answer.

## Implementing Experiential Learning

We can increase the effectiveness of learning by applying experiential learning, which means learning through experience. When we associate all of the senses: visual, auditory, kinesthetic, olfactory and gustatory, we get the most out of the learning. Studies show that, while learning, students remember by hearing: 20%, seeing: 30%, hearing/listening and seeing: 50%, Discussing or expressing: 70% and by application/making personal experience: 90%.

When learning, we remember by	Percentage
Hearing/listening	20%
Seeing	30%
Hearing/listening and seeing	50%
Discussing/experiencing	70%
Application/making personal experience	90%

Figure 4: The percentage of our remembrance by different activities. Source: Resource Efficient Management of Chemicals in Textile and Leather Sector Companies.

## Using Experiential Learning Cycle

The experiential learning cycle is a four-step learning process that can be applied multiple times to learn something fruitfully in every interaction and experience. The four steps incorporate: experience, reflect, think and act.

We can use the experiential learning cycle to instruct the safe storage of chemicals as an example.

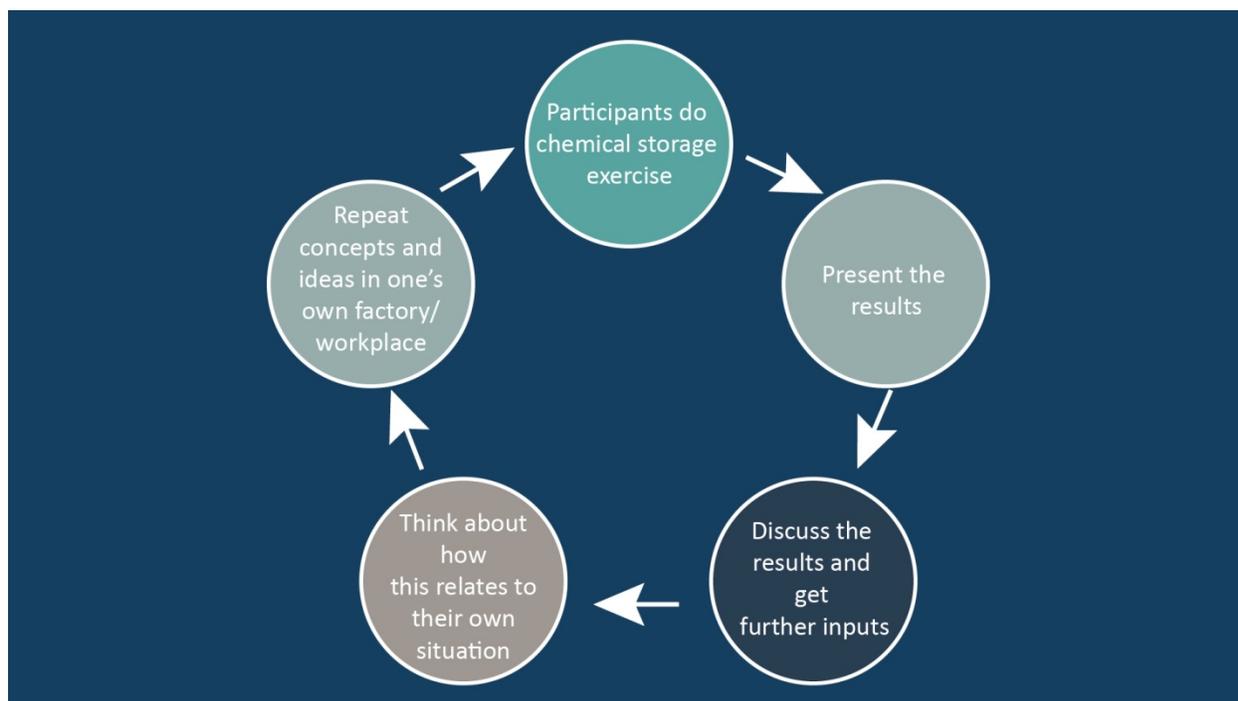


Figure 5: Experiential Learning Cycle to instruct the safe storage of chemicals. Source: Resource Efficient Management of Chemicals in Textile and Leather Sector Companies.

Here we can engage the learners by giving them chemical storage exercise, instruct them to present the results, discuss the results, make further inputs, think about how this relates to their situation, and repeat concepts and ideas in their own factory/workplace.

## We Should Not Forget To...

Apart from doing all the mentioned activities, we should not forget to:

- Select training methods and identify resources needed;
- Assess requirements and availability of trainers;

- Set training course dates, duration, agenda and venue frequencies;
- Establish methods of evaluation and follow-up of training results;
- Also, maintain documents and records of all our works.

# Didactical Elements

## Quizzes and Self-Tests:

### True-False

1	Studies show that, while learning, students remember by hearing: 60%, seeing: 30%	
	<ul style="list-style-type: none"><li>▪ Correct</li><li>▪ False</li></ul>	False
2	We can document training needs using a Training Matrix.	
	<ul style="list-style-type: none"><li>▪ Correct</li><li>▪ False</li></ul>	Correct
3	“At the end of this training, the participants will be able to...” using this phrase, we can define learning outcomes.	
	<ul style="list-style-type: none"><li>▪ Correct</li><li>▪ False</li></ul>	Correct
4	We can arrange simple social activities or get-together sessions to make a friendly atmosphere for the trainees.	
	<ul style="list-style-type: none"><li>▪ Correct</li><li>▪ False</li></ul>	Correct
5	We can use the Experiential Learning Cycle to create a grading system.	
	<ul style="list-style-type: none"><li>▪ Correct</li><li>▪ False</li></ul>	False

## Open Questions:

1	Why should we use Experiential Learning?
	<p><i>Open text</i></p> <p>We can increase the effectiveness of learning by applying experiential learning which means learning through experience. When we associate all of the senses: visual, auditory, kinesthetic, olfactory and gustatory, we get the most out of the learning. Studies show that, while learning, students remember by hearing: 20%, seeing: 30%, hearing/listening and seeing: 50%, Discussing or expressing: 70% and by application/making personal experience: 90%.</p>

## Choose multiple:

1	For identifying the type of training, we should consider if the trainees are: (Choose multiple)
	<ul style="list-style-type: none"><li>▪ Fresher,</li><li>▪ Fond of movies,</li><li>▪ Into-the-job,</li><li>▪ Habituated to drink coffee,</li><li>▪ For-the-job,</li><li>▪ On-the-job,</li><li>▪ Expert at driving.</li></ul> <p>Answer:</p> <ul style="list-style-type: none"><li>▪ Fresher,</li><li>▪ Into-the-job,</li><li>▪ For-the-job,</li><li>▪ On-the-job.</li></ul>

## Sorting tasks:

Sort the words to the correct sentences:

examples	experiential	expose	effectiveness	type	Trainers
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1. To assess training needs, we need to know a general-purpose and the \_\_\_ of training we want to provide.
2. We can increase the \_\_\_ of learning by applying \_\_\_ learning which means learning through experience.
3. \_\_\_ need to provide all the help that learners need, like giving\_\_\_, demonstrations, using a multimodality approach.

Answers:

1. type
2. effectiveness, experiential
3. Trainers, examples

## Exercise:

Consider the situation below:

In the second wave of the Covid-19 pandemic, everything is locked down. So, the textile company Beautiful Colors is also closed for a certain period of time. The top management team of the company has decided to use this valuable time to train their workforce on chemical hazards and exposure to chemicals. As a part of the team, you have to do the following tasks:

- Define learning objectives for this training.
- Suggest suitable training delivery mode.
- Create an experiential learning cycle for the trainees.

## Hotspots

Which activity has a higher percentage of remembrance?

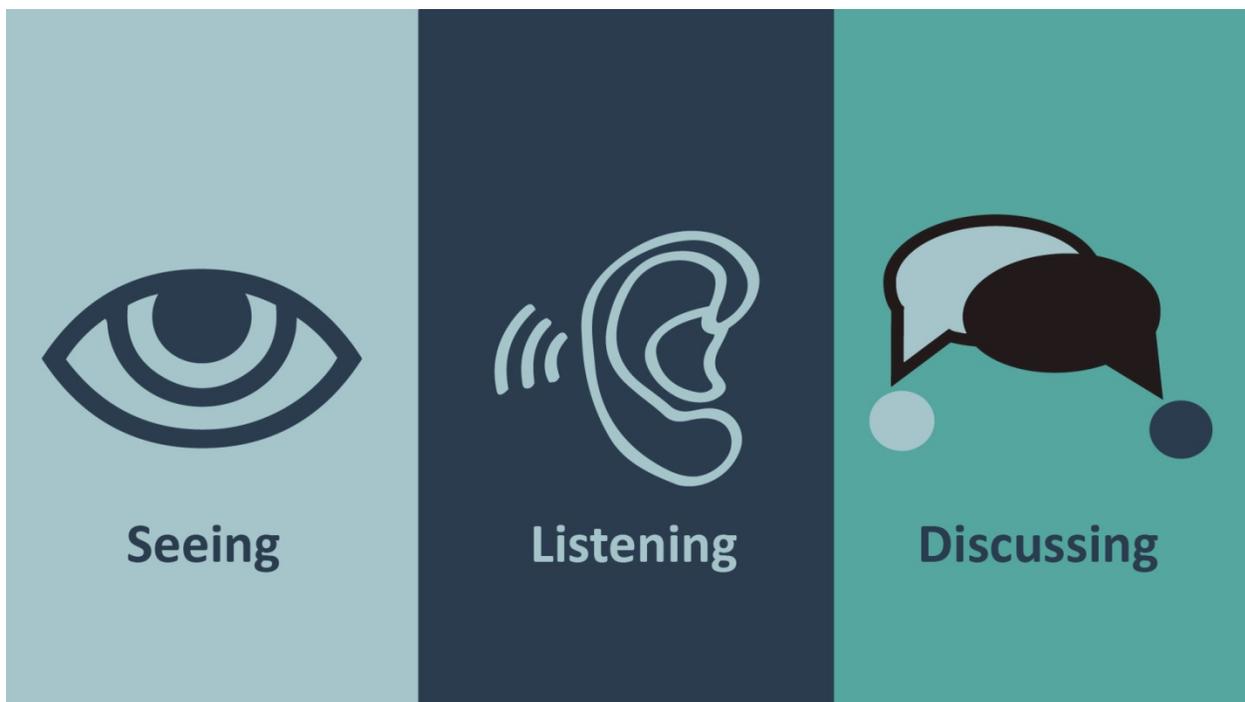


Figure 6: Hotspot. Picture courtesy: Kazi Farhan Hossain Purba.

Answer: Discussing.

## References/Additional Literature/Links

1. More information on assessing chemical training needs and developing training plan, can be found from this link: <https://www.sia-toolbox.net/solution/resource-efficient-management-chemicals-textile-and-leather-sector-companies>. By downloading the REMC Company Handbook from the 'Further information section', you can read section: 5.3 for that purpose.
2. To know more about pedagogy vs. andragogy, you can visit this link: <https://elearningindustry.com/pedagogy-vs-andragogy-in-elearning-can-you-tell-the-difference#:~:text=You%20can%20conclude%20from%20the,science%20of%20helping%20adults%20learn>.
3. To know more about adult learning principles and how to use them in your training, you can read this article: <https://www.valamis.com/hub/adult-learning-principles>.
4. To get more knowledge about the experiential learning cycle, you can go to this link: <https://carleton.ca/experientialeducation/what-is-experiential-education/experiential-learning-cycle-model/>

# Unit Feedback

If you wish you can give us feedback on the learning unit here. This is of course, optional.

## Technical Elements

How did the technical elements of the unit work for you? Did you have any difficulties?

## Didactical Elements

How did the didactical structure of the learning unit work for you? Do you have any comments or suggestions to make it better?

## Open

Do you have any other comments on this unit?

## Export feedback

On this page you can choose to export your feedback and send it to xyz.