Jožef Stefan Institute,
Ljubljana, Slovenia

Nuclear Training Centre
Milan Čopič
Ljubljana, Slovenia

SYSTEMATIC APPROACH TO TRAINING – IS IT ONLY A TOOL FOR SUCCESFUL DESIGN AND IMPLEMENTATION OF TRAINING, OR ALSO AN INSTRUMENT TO SUPPORT INTERNATIONAL RECOGNITION OF QUALIFICATIONS

Matjaž Koželj

Jožef Stefan Institute, Ljubljana, Slovenia

matjaz.kozelj@ijs.si

Systematic Approach to Training (SAT)

DEFINITION:

SAT is an approach that provides a logical progression from the identification of the tasks required to perform a job to the implementation and evaluation of training.

Why do we use a systematic approach?

- It is a logical process for training development
- To communicate with others who are not learning specialists (all stakeholders)
- To establish milestones and targets for acquiring mastery
- To work with specialists who are not experts in the learning process
- It can address technical competencies and “soft skills”

SAT phases

- SAT consists of 5 interrelated phases
  - analysis
  - design
  - development
  - implementation
  - evaluation

Analysis phase

- Analysis determines training requirements. Determines if training is needed and makes sure it is the right training
- The following types of analysis can be used to gather information

  - ***Needs analysis-*** *uses a variety of instruments to gather data.*
  - ***Job analysis*** *– breaks down the person's job into logical parts, identifying and organizing the knowledge, skills and attitudes (competencies) required to perform a job correctly.*
  - ***Task analysis*** *– is the process of finding out what tasks are necessary to do a job. The end result is a task list for a particular job.*

Result : KSA = Knowledge, skills and attitude (attributes)

Design phase

- In this phase the training approach is determined. This leads to the most efficient and cost effective training strategy.
- In this phase LEARNING OBJECTIVES are defined:
  - Learning objectives are clear and concise statements of the intended learning outcomes of a training event. They are specific, measurable, realistic observable and can be understood by everyone.

Development phase

- The goal of development phase is to produce the materials required for the implementation of the training programs.
  - Along with the design phase, the development phase ensures that the training is **appropriate** and **adequate**.

Implementation phase

- The purpose of the implementation phase is to deliver the training program in an **efficient** and **effective** manner

Evaluation phase

- The purpose of the evaluation phase is to determine and document the degree to which training has achieved its stated objectives i.e. to evaluate:
  - the adequacy,
  - appropriateness,
  - effectiveness, and
  - efficiency of training.
- Levels of evaluation: reaction level, learning level, transfer evaluation, and impact evaluation
- **FEEDBACK** to other phases

Learning objectives

- Are **tools** for the design, development and evaluation of training
- For all stakeholders (everyone) to understand learning **expectations**
- Describe required **performance** to be achieved
- Formalize means of **filling the "gap"**
- Formalize means of **measuring learning "success"**

Types of learning objectives

- **Terminal (Overall) Objectives** describe a major outcome of learning.
  - Example – Operate Dose rate meter

- **Enabling (Specific) Objectives** represent “way points” in the learning process
  - Examples – Position batteries, identify functions of push buttons, select dose and dose rate alarms, identify audible alarms, identify symbols on the display, etc

Learning objective components

- The learning objective consists of four parts:
  1. **Conditions**: What inputs are needed?
  2. **Performance**: What the person will be able to do on the job
  3. **Standards**: How well and/or how much?
  4. **Evaluation**: Who can judge?

Given instrument Manual the learner will asses radiation dose field of a package with radiactive source to the extent that maximum dose rate on the package surface and 1 m from the package are determined as evaluated by supervisor.

Recognition of foreign training and education in Slovenian legislation

- Radiation Protection Experts (RPEs): “A foreign legal or natural person shall obtain an approval to carry out tasks of an authorized RPE if, …(in his country)… this person has an approval equal to the one pertaining to RPEs defined by the Act…”

  - RPE is formally considered “Regulated Profession” (like medical doctors, e.g.) and the procedure for recognition is established in the special regulation.

Recognition of foreign training and education in Slovenian legislation (Cont´d)

- Radiation Protection Officers (RPOs): “Recognition of foreign training is possible upon submission of evidences to the administrative body that the extent and quality of training complies with Slovenian requirements.”

But…

- Considering the specific issues the training must be organised in cooperation with the facility owner, and
- Knowledge about national legislation is obligatory

Krško NPP

- We have developed Learning Objectives for Radiation Protection Officers and Radiation Workers in our NPP
- Input to the Design phase were legal requirements (“needs”) and Job and Task analysis(for RWs from Westinghouse Snupps and NUREG 1122)
- The result are lists of Learning Objectives:
  - For RPOs: 294 LOs (186 for classroom training, and 108 for practical exercises and on-the-job training)
  - For RWs: 154 LOs (120 for classroom training, and 34 for practical exercises)

Radiation Workers in ¸Krško NPP

- All phases of SAT were implemented for RWs (it is a part of SAT training)
  - The list of LOs is a “detail programme” of training
  - Training is usually a part of more extensive Course (for technical staff or reactor operators), some LOs are positioned outside the formal radiation protection section of the Course.
  - Participants receive certificate at the end of the Course

Radiation Protection Officers in NPP

- We are in development phase (materials preparation).
- Nevertheless, we use the list of LOs for some purposes:
  - To verify foreign radiation protection training against our requirements
  - For refresher courses
  - To verify other training events against our requirements

Verification of foreign radiation protection training

- Three years ago a NPP has sent a group of workers on a Course in USA
- After their return we were asked to evaluate the training against the Slovenian legislation.
- We have verified training programme and materials against our list and identified 109 LOs that were not achieved (85 LOs for classroom training and 24 LOs for on-the-job training)
- As a result, 80 hours supplemental training was prepared before the final exam (which is obligatory)

Refresher courses

- Refresher courses are prepared annually (for two groups of participants, each in two years cycle)
  - We use list of LO to decide on the refresher course content
  - Important LOs are always included
  - We were also able to identify deficiencies in the previous training (The importance of Decay heat, e.g.)

Verification of other training events

- Three years ago a lady with PhD in physics and considerable experience started working in RP unit on our research reactor
- According to our legislation she should attend 200 h course in radiation protection prior to final exam
- She submitted proofs of attending different courses and training events where we were able to identify almost all LOs from our list.
- Therefore she was allowed to take just obligatory exam

Conclusions

- SAT is invaluable and also recommended tool for training of NPP workers
- Approach can be successfully used also in radiation protection training
- We were able to use the results of first two phases of SAT (analysis and design) as a tool for training verification, and also to support and improve refresher training for active RPOs.