Spanish course for the Radiation Protection Experts (RPE). A new approach in the methodology.

Authors: C Llorente, M Marco, S Falcón and J. Fernández
CIEMAT[1], Madrid, Spain

Introduction

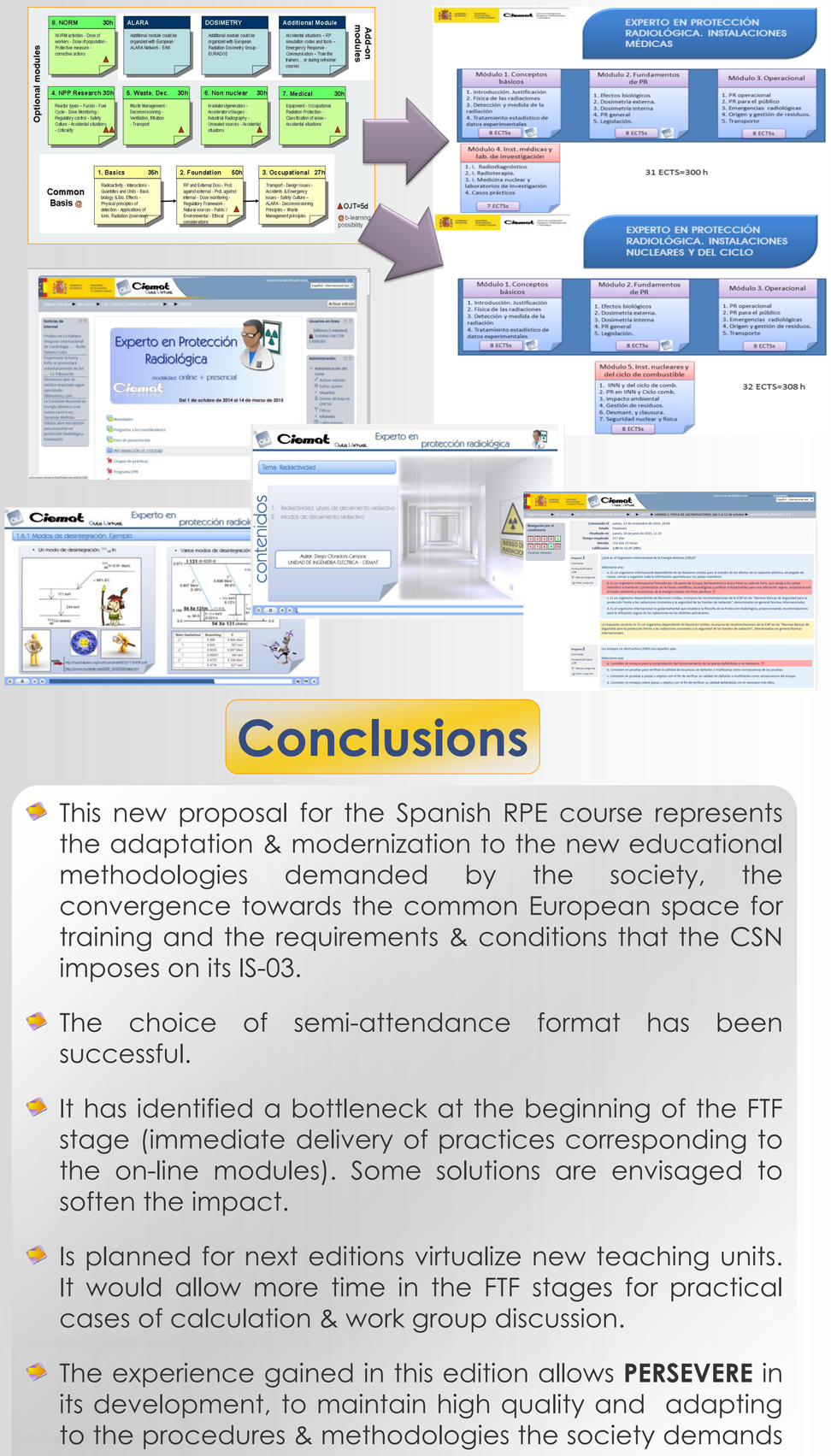
During the process of revision of the Basic Safety Standards (CD **2013/59/Euratom**), many efforts has been done launching different Euratom Fission Training Schemes in specific areas where a shortage of skilled professionals were identified. **ENETRAP II** set up the **"European radiation protection training scheme" (ERPTS)** for the **Radiation Protection Expert (RPE)** in convergence with the definition given in the BBS. CIEMAT has been immersed since the beginning in the **ENETRAP projects** and in the development of the ERPTS.

The figure of **RPE in Spain** currently is defined in The National Regulatory Body (CSN)[2] guidance **IS-03**. In this document is established the requirements to get the qualification to be recognized as a RPE. The applicant must have a **university degree** (level 6 EQF), approved a **300-hour training course**, **3 years experienced** in the RP field and finally **overcome the aptitude exams** of the CSN. Since the eighties, CIEMAT traditionally delivers this training course as part of its main E&T activities.

In the special context of CIEMAT, as part of ENETRAP & as experienced provider of training for RPEs, a new proposal of the course has been done, adapted to the new European situation, satisfying the CSN requirements and integrating the new pedagogical methodologies.

Objectives

- To provide the training required by the CSN to the RPE
- To module this training course to the ENETRAP Radiation Protection Training Scheme (RPTS)
- To converge with the European interests: promoting mutual recognition and facilitate the mobility of workers.
- To adapt the traditional face-to-face (FTF) course to the new educational tendencies: "**B-learning[3]**"
- To do an efficient review of all the topics avoiding overlaps.



Procedure

- Creation of a **multidisciplinary working group**: E&T FTF area coordinators + Virtual Classroom (VC) area coordinators + VC developing group + sector experts.
- Adaptation of the traditional course program to the **ENETRAP II RPTS**. Modulating: **3 common modules + 2 optional modules** (at least one mandatory)
- Selection of the best e-methodology to do a **smart virtualization** to guarantee the expected results, minimizing time of production (lecturers and VC group).
- Selection of the parts susceptible to be **virtualized**, identifying which parts are necessary to be **FTF** and doing the proposal of program **to integrate both methodologies in a coherent way**.
- Organization of all the contents in **didactic units**.
- **Train the online trainers (e-trainer)**:
  - guidelines to do the virtualization of the materials and to use of the microphones.
  - methodology to become an e-trainer: exercises, forums, evaluations,…
- Development of all the material and implement on the virtual platform (for both online and FTF parts): **symbiosis of two methodologies**.

Results

- The course was organized in 5 modules:
  - **Common modules**: 1. Basic concepts (*b-learning*), 2. RP Foundations (*b-learning*) and 3. RP Occupational (*FTF-learning*)
  - **Optional modules**: 4. RP Medical facilities & research lab. and 5. RP Nuclear facilities & fuel cycle, (both FTF-learning)
- Three course possibilities:

  A. Common modules + Medical module: **465h**
  B. Common modules + Nuclear module: **465h**
  C. Common modules + Med. module+ Nuc. module: **565h**

- The duration of the course:
  - **11 online weeks + 2 catch up week**
  - **8 FTF weeks**

- The online phase, has reduced in **5 weeks** the time of the students in Madrid (out of home and work). In this part through a virtual environment have been coursed the theoretical part of Modules 1&2, and have been supported the contents of the FTF part.
- The FTF phase, has covered: **i)** the laboratory sessions and the discussion & demonstrations seminars from Mod. 1&2; **ii)** Mod. 3, 4 & 5; **iii)** The Final Couse Project
- One of the key points of the training has been the **assessment system**, integrating all the elements of the course.

- **RESULTS OF 1ST EDITION**: 19 initial enrollment, only **17 students finalize the course** (11 in Med.+Nuc.; 2 in Med. ; 4 in Nuc.). All of them are university graduates in STEM[4] studies. Their motivation resides in necessities of the job position and in minor cases to enter in the labor market.

This is the ideal collective for the selected methodology: good starting level and a predisposition for self-study.

- **CONTINUOUS IMPROVEMENT:** assessment of quality indicators from the satisfaction surveys from 1 to 5 (5 highest score):

1) *Teaching materials*; all items very well valuated (↑medium) except number of exercises, asking more in order to prepare the exams.
2) *Online learning environment*; nearly 5 in all aspects,
3) *Teaching quality of lecturers*; there are ≈90 experts! This is one of the most important points. The 72% of teachers ↑4, and 28% between 3 - 4.
4) *Difficulties and improvement proposals*; there are several suggestions for implement a review of math basis, more standard exercises and include more technical visits.

Conclusions

- This new proposal for the Spanish RPE course represents the adaptation & modernization to the new educational methodologies demanded by the society, the convergence towards the common European space for training and the requirements & conditions that the CSN imposes on its IS-03.
- The choice of semi-attendance format has been successful.
- It has identified a bottleneck at the beginning of the FTF stage (immediate delivery of practices corresponding to the on-line modules). Some solutions are envisaged to soften the impact.
- Is planned for next editions virtualize new teaching units. It would allow more time in the FTF stages for practical cases of calculation & work group discussion.
- The experience gained in this edition allows **PERSEVERE** in its development, to maintain high quality and adapting to the procedures & methodologies the society demands today.

[1] CIEMAT, Spanish Research Center for Energy Environmental and Technology.
[2] CSN, Nuclear Safety Council, Spanish Regulatory Body,
[3] b-learning: blended learning or mixed learning, one part on line learning and other part face-to-face learning.
[4] STEM studies: acronym referring to the academic disciplines science, technology, engineering and mathematics

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