INTEGRATION OF HUMAN-FACTORS WITHIN THE DESIGN OF A TRAINING TOOL WITHIN THE RADIATION-PROTECTION FIELD:

AN OPPORTUNITY TO FOSTER THE TOOL’S APPROPRIATION AND DEVELOP THE TRAINER’S COMPETENCES

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A necessary link between RP engineers and human factors specialists to fit training needs and technological developments...
GOALS : TO TRAIN MORE EFFICIENTLY TO RADIATION-PROTECTION PRACTICES THANKS TO SOPHISTICATED TRAINING SCENARIOS

POSTULATE : A BETTER UNDERSTANDING/ EXPERIMENT OF THE IRRADIATION IN TRAINING SHOULD DRIVE TO MORE COMPLIANCE & ADAPTED BEHAVIOR IN REAL WORK SITUATIONS

TRAINING SCENARIOS

**Limited scenarios**
No irradiation simulation & verbal simulation

**Objectives**
- To go in and out in controlled area/ HP rules to work in safely conditions
- To identify the expected HP rules according to the work step : start, realization, closure

**The Trainees comply with rules**

TRAINING SCENARIOS WITH CERNUM

**Scenarios**
Irradiation simulation

**Objectives**
- To compare the real HP work conditions with the estimated conditions
- To detect high dose rate level
- To adopt the right behavior in case of events : alarms, unexpected problems, hazard, foreign materials, …
- To control the individual dose per day and the collective dose per day.

**The Trainees manage work situations : acceptable and perturbed**

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TRAINING TOOL DESIGN required WORKS ANALYSIS

[Boccara & Delgoulet, 2016]

Training situations had to be built on the work in production

Acquired skills should be operational
INTRODUCTION OF SIMULATION TOOL

WORK IN TRAINING

TRAINERS

TRAINNEES

Training situation

USE CONDITIONS

WORK SUITABLE TOOL

PROFESSIONNALIZATION PATH

ACCOMPANIMENT ...

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ERGONOMIC APPROACH to anticipate the likely future work of the TRAINER

WORKS ANALYSIS

- Literature review
- Observations (12 days)
- Interviews

Heterogeneous trainers profiles
- Work experience
- Age
- Pedagogical skills
- Professionalization Path

5 trainers Work needs
- Create scenarios
- Prepare scenarios
- Animate scenarios
- (Debrief)

PARTICIPATORY DESIGN

- Designers working groups (4)
- Human machine interface W.groups (5)
- Stakeholders W.groups (3j)

HMI PROTOTYPE

- Future tool integrated in WORK & TRAINING

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IHM organized into 5 additional modules in line with the work needs

- 2014: IHM designed by a TECHNICAL APPROACH
- 2016: IHM designed by an ERGONOMIC APPROACH

- DESIGN: Building scenario and the radiological stage
  - 4 spec. 56 spec.

- PREPARE: Check scenario and site preparation
  - 7 spec. 21 spec.

- ANIMATE: Watch dosimetry & manage radiological stage
  - 13 spec. 16 spec.

- DEBRIEF: Consolidate learning
  - 4 spec. 11 spec.

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TRAINING WORK

INTRODUCTION OF SIMULATION TOOL

USE CONDITIONS

WORK SUITABLE TOOL

PROFESSIONNALIZATION PATH

ACCOMPANIMENT ...

TRAI宁 WORK

Training situation

TRAINERS

NEW TOOL

Trainees

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Impact study trainers practices and their professionnalization path

Issues, organization and roles of professionalization stakeholders

Trainers cartography
- Profiles
- Professionalization paths

Cues for professionalization transformations

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Impact study of inserting the new tool on trainers practices and their professionnalization path ...
**MAIN CONCLUSION:**
**ERGONOMICS CONTRIBUTIONS**

At the beginning Cernum was a TECHNOLOGICAL TOOL. At the end, Cernum, is a complete TRAINING PACKAGE.

The integration of ergonomic approach is crucial in the design step to draw results:

- Drive operational choices
- Avoid further costly reviews
- Anticipate the appropriation

**PERSPECTIVES**

- Deployment & evaluations
- Professionalization path
- Technical developments
- Training specifications

**TRAINERS**

**TRAINEES**

**TRAINING CENTER**