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Developing interactive digital learning tools for radiation protection training

The Use of New Technologies in E&T
AIRP-EUTERP train-the-trainer event

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- Lecturer Radiation Protection
  - RPE
  - RPO
  - Medical specialists
  - Dental department
- Super RPE

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Design criteria

1. Educational Design
2. Interactivity and Engagement
3. Usability and Accessibility
4. Flexibility and Modularity
5. Technical and Maintenance Considerations

1. Educational Design (SAT)

- Learning objectives:
  - Clearly defined and measurable learning outcomes
- Place in Scaffolded learning:
  - Structured progression from basic to complex concepts
- Multimodal learning:
  - Incorporates text, audio, video, animations, and simulations
  - Trains knowledge, skills and/or attitudes

Systematic approach to training in radiation protection
Tom Clarijs (SCK-CEN)

2. Interactivity and Engagement

- Simulations:
  - Realistic scenarios for handling radiation sources, using dosimeters, applying shielding, etc.
- Quizzes and feedback:
  - Immediate feedback to reinforce learning and correct misconceptions
- Gamification elements:
  - Badges, levels, or challenges to motivate participation
- Role-playing:
  - Virtual role-play for decision-making in emergencies or lab settings

3. Usability and Accessibility

- User-friendly interface:
  - Intuitive navigation and design for all experience levels
- Device compatibility:
  - Responsive design for desktops, tablets, mobile devices, VR headsets
- Multilingual support:
  - For broader reach and inclusivity

4. Flexibility and Modularity

- Modular structure:
  - Allows users to pick relevant modules (e.g., medical professionals vs laboratory workers)
- Updateable content:
  - Easy backend updates for regulations or best practices
- Customizable paths:
  - Adapt to different user roles or prior knowledge

5. Technical and Maintenance Considerations

- Low system requirements:
  - Ensure accessibility in low-resource settings
- Offline access:
  - Optional offline mode or downloadable content for remote locations
- Updateable content:
  - Updates possible for changing technical requirements

Our history with interactive learning tools

- 2019: 360° video
- 2020: COVID
- 2020: online practical “control a C-arm technician”
- 2021: H5P

360° video

Clear assignment included

Werkopdracht

Verantwoordelijkheid voor alles

Inleiding

Als medisch specialist ben je niet alleen verantwoordelijk voor de patiëntdosis, maar ook voor de dosis van de teamleden. In deze video zie je hoe een AIOS op de afdeling MDL een ERCP-procedure uitvoert. Maar tijdens zo'n procedure gebeurt van alles rondom de AIOS ….

Opdracht 1

Bekijk nu de VR video. Dit doe je als volgt:

- Scan de QR code met de camera van je mobiel (rechtsonder op pagina)
- Plaats je mobiel in de VR-cardboard
- Klik zodra de video afspeelt op het brilletje om het in VR-modus te zien
- Bekijk de scene in de video (je kunt 360 rondkijken in de ruimte!)
- Noteer wat je opvalt (goede punten en verbeterpunten).

Opdracht 2

Doe alsof de andere cursist de AIOS is en:

A. vertel de AIOS op een opbouwende manier wat volgende keer beter zou kunnen, of …
B. vertel de AIOS wat goed ging en waarom u vindt dat dit goed ging.

Verdeel onderling deze twee rollen.

Opdracht 3

Lees nu de bijlage "Radiation dose to patients during endoscopic retrograde cholangiopancreatography" en bespreek samen welke nuttige zaken u in dit artikel bent tegen gekomen.

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Inhoud

Tijd
30 minuten

Doel
Oefenen met de rol van verantwoordelijke; signaleren van risico's m.b.t. stralingshygiëne en instrueren van collega's ter voorkoming hiervan.

Opzet
Werk in tweetallen.
De opdracht wordt plenair besproken.

Hulpmiddelen
Bijlage: Radiation dose to patients during endoscopic retrograde

THE KISS PRINCIPLE

KEEP IT SIMPLE, STUPID

POLITECNICO
MILANO 1863

Examples of interactive learning tools with H5P

- Crossword puzzle
- Quiz
- Image Sequencing
- Interactive video
- Branching scenario
- VR video

- What's next?

https://h5p.org/content-types-and-applications

Quiz (Question Set)

Create a sequence of various question types

Summary

Create tasks with a list of statements

Virtual Tour (360)

Create interactive 360 environments

True/False Question

Create True/False questions

Complex fill the bla...

Fill in the missing words

Interactive Video

Create videos enriched with interactions

Course Presentation

Create a presentation with interactive slides

Branching Scenario

Create dilemmas and self paced learning

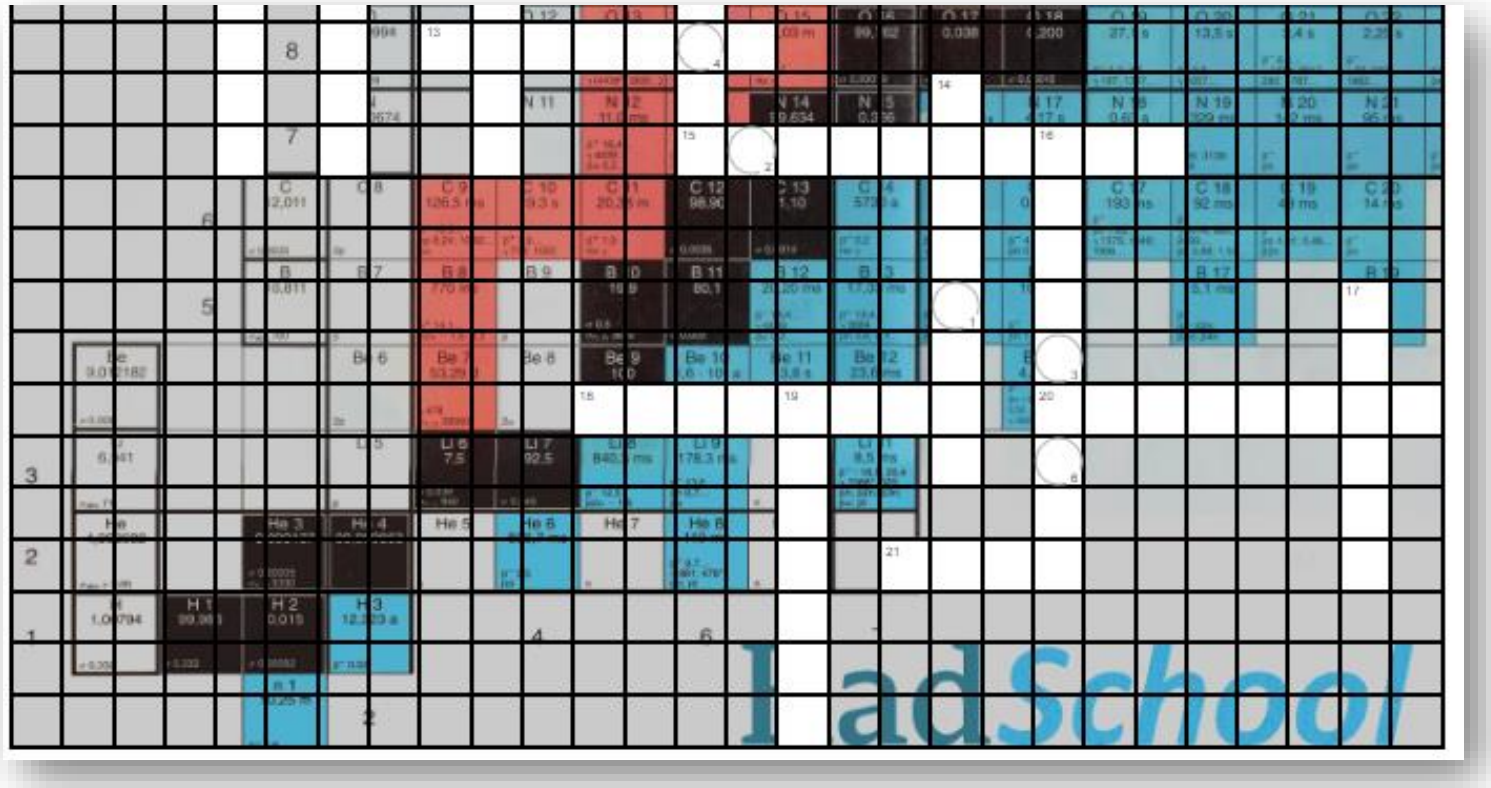
H5P

- Free software
  - Free H5P plugin for Drupal, Moodle, WordPress and some other web based platforms

- H5P.com
  - Web based platform built around the software H5P as a service
  - Free for many universities

https://snordian.de/2023/02/20/is-h5p-free-or-not ?

Crossword puzzle Radiation physics

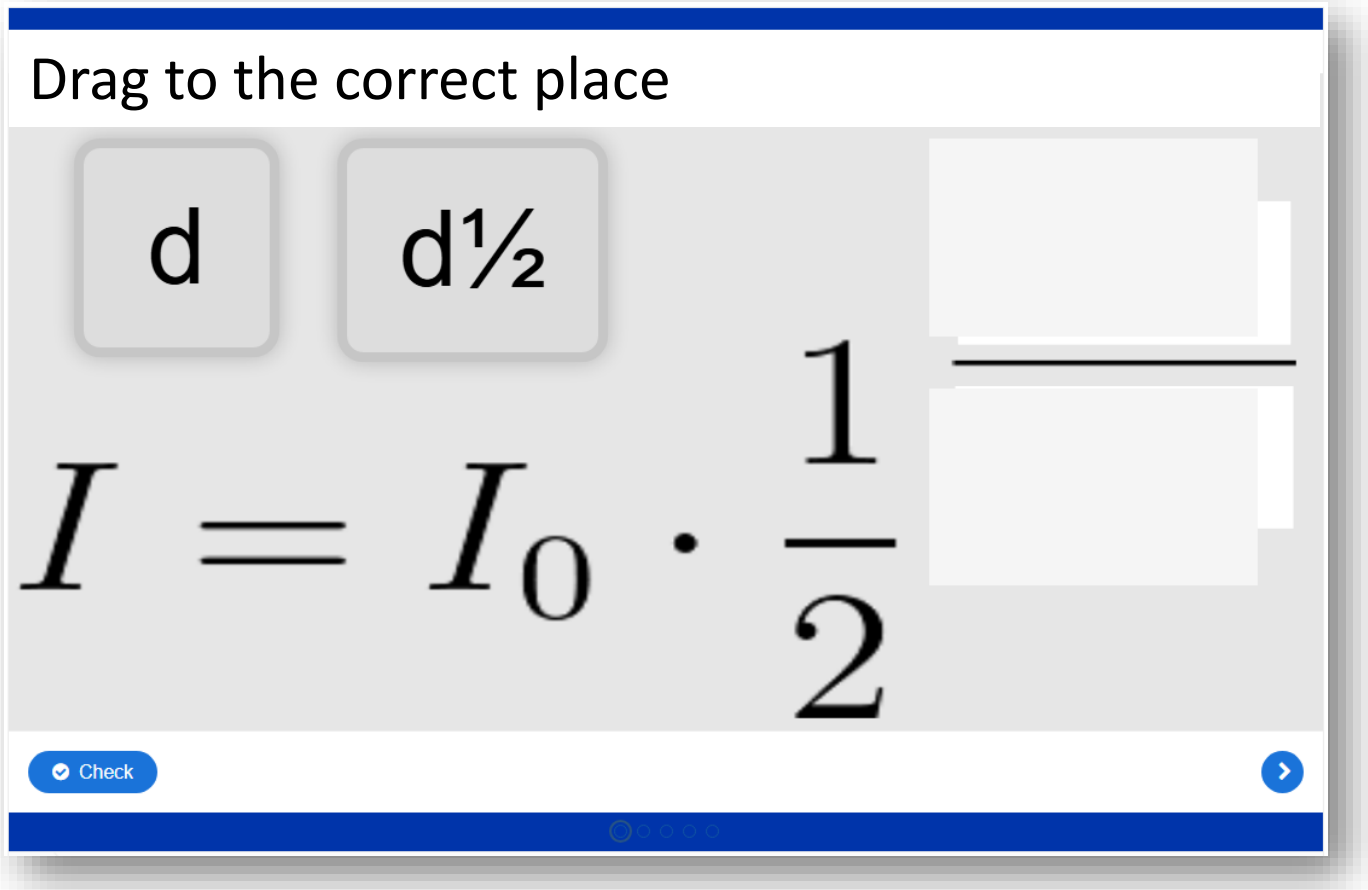


Is a cross word interactive?

- **User Interaction:** Learners engage by recalling or solving clues
- **Immediate Feedback:** Shows directly correct or incorrect answers which enhances the learning experience

- **Concept Reinforcement:** Helps memorize terms, definitions, acronyms, and concepts
- **Accessible**: Easy to use, no special tools needed

HVL trainer (Dutch language)



- Creates set of 5 random questions

Decontamination strategy

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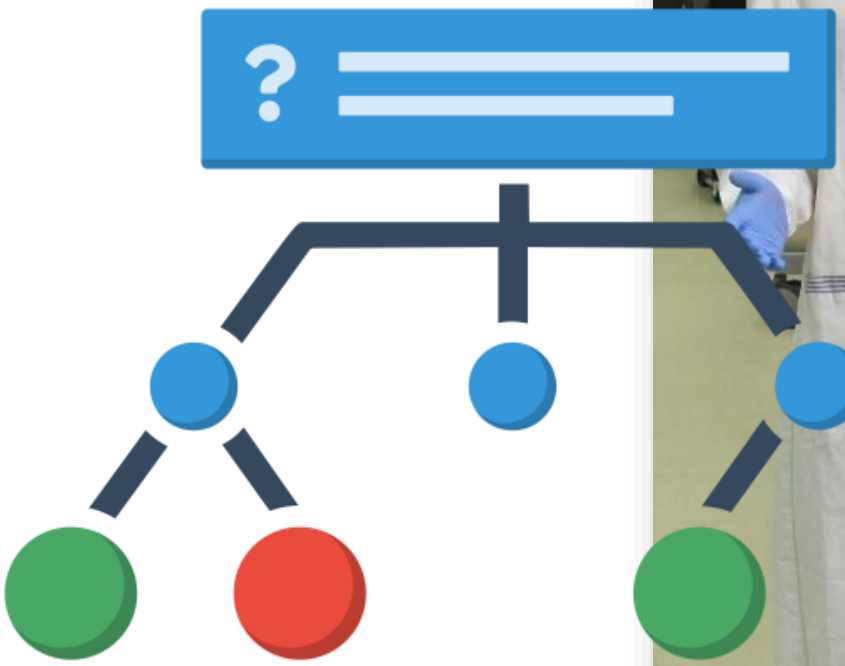
Escapelab



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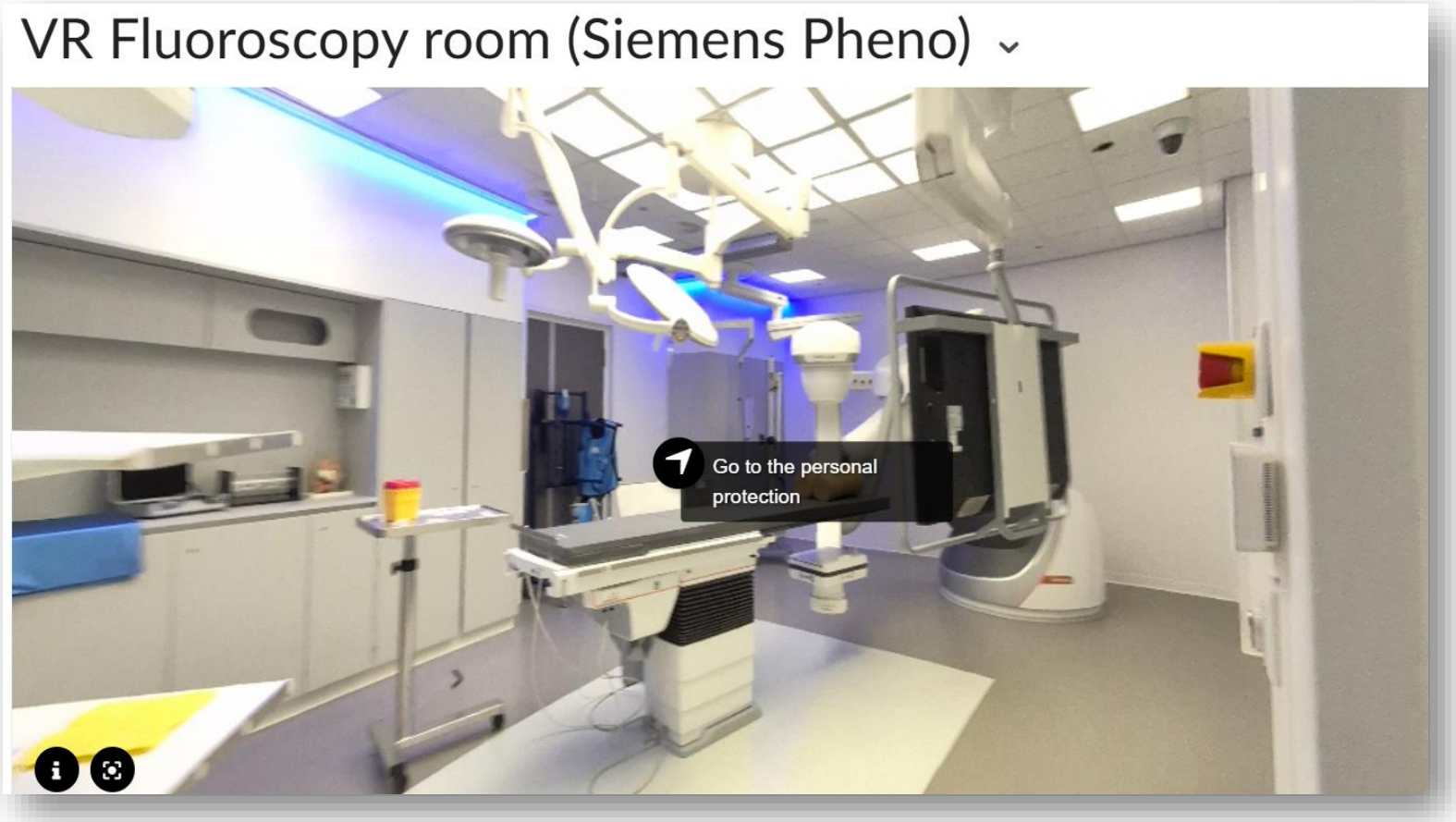
Fluoroscopy room



Pit falls of digital learning tools

- Educational design
  - Don’t put method before learning outcomes
- Time consuming development
  - Is it cost effective?
  - Return on investment (ROI)?
- Lot of options
  - make good choices at the start

Unfulfilled wish

- An AI chatbot/agent which gives feedback on online assignments
  - Works 24/7 (e.g. during shifts in the hospital)
  - Uses selected data
  - AI already has the skills
- Missing is:
  - Embedding in our online learning systems
  - Digital infrastructure
  - Digital security

Free to use, but let us know

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The End

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