Online Training: The Human Factor

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Why use online training
- Consistent high quality training
- Improved productivity
- Lower global training cost

Challenges
1. From the students' point of view
    1. The learning experience
    2. Work vs. training
    3. Getting answers
2. From the teachers' point of view
    1. Evaluating students
    2. Effects of online training on practical training
    3. Adapting to online training

Online training
- For the theory
- To familiarize with the concepts of calibration, scanning and data analysis
- To familiarize with real data

In-class training
- To setup an instrument, calibrate a setup, scan and analyse data
- To acquire the manual skills needed for scanning

For a good blending
- The online theory should be instrument neutral
- The instrument specialization should occur during the in-class training
- The online theory must be harmonized with the in-class theory

Students' point of view
THE LEARNING EXPERIENCE

Challenge: Providing an online experience that necessitate no explanation as to its functioning

Solution: A clean user interface presenting only the necessary information combined with a step-by-step learning process

Students' point of view
THE LEARNING EXPERIENCE

Challenge: Going trough a 600+ page training can be daunting

Solution: Provide an easily accessible dashboard and an internal search engine

PAUT LEVEL II TRAINING
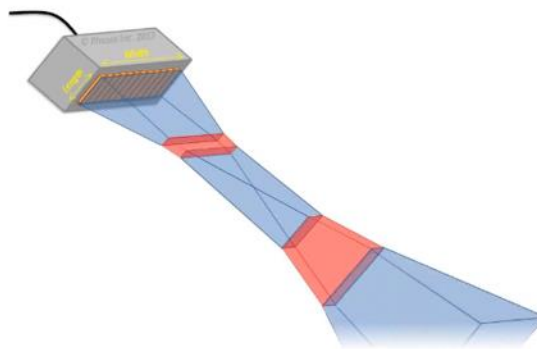
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SECTION 3: STEERING / CHAPTER 4: BASIC THEORY / BEAM STEERING

STEERING

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EXPLANATIONS

Beam steering is an essential part of PAUT. With beam steering it becomes possible to produce beams at different angles with one probe in a fixed position. An area can be covered from a fix position instead of only one angle with conventional UT.

To understand how beam steering works, a distinction must be made between the way each individual waves composing the beam react and how the phased wave front reacts.

- The individual UT waves are always refracting in the part at a fix angle because the wedge is at a fix angle. This cannot be modified. If the angle of the wedge is 36°, than the waves refract at 54.5° if the material of the wedge is Rexolite and the part is made of steel

$$\theta_1 = \sin^{-1}\left[\frac{3{,}240\,m/_s * \sin 36^o}{2{,}340\,m/_s}\right] = 54.5^o$$

- By manipulating the timing at which the individual UT wave are fired, it is possible to orient the wave front at different angles in the wedge thus resulting in the wave front being at different angles in the part

So, with parallel individual UT waves going at a fix angle, it is possible to create multiple beams each with a different angle.

And depending on the angle of the wedge, it is possible to generate shear wave beams or longitudinal wave beams.

FORMULAS AND GRAPHICS

Snell's law:

$$\frac{\sin\theta_1}{v_1} = \frac{\sin\theta_2}{v_2}$$

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Students' point of view
THE LEARNING EXPERIENCE

Challenge: Evaluating the level of understanding

Solution: Provide self-evaluation tests with in-question link to the page presenting the underlying theory
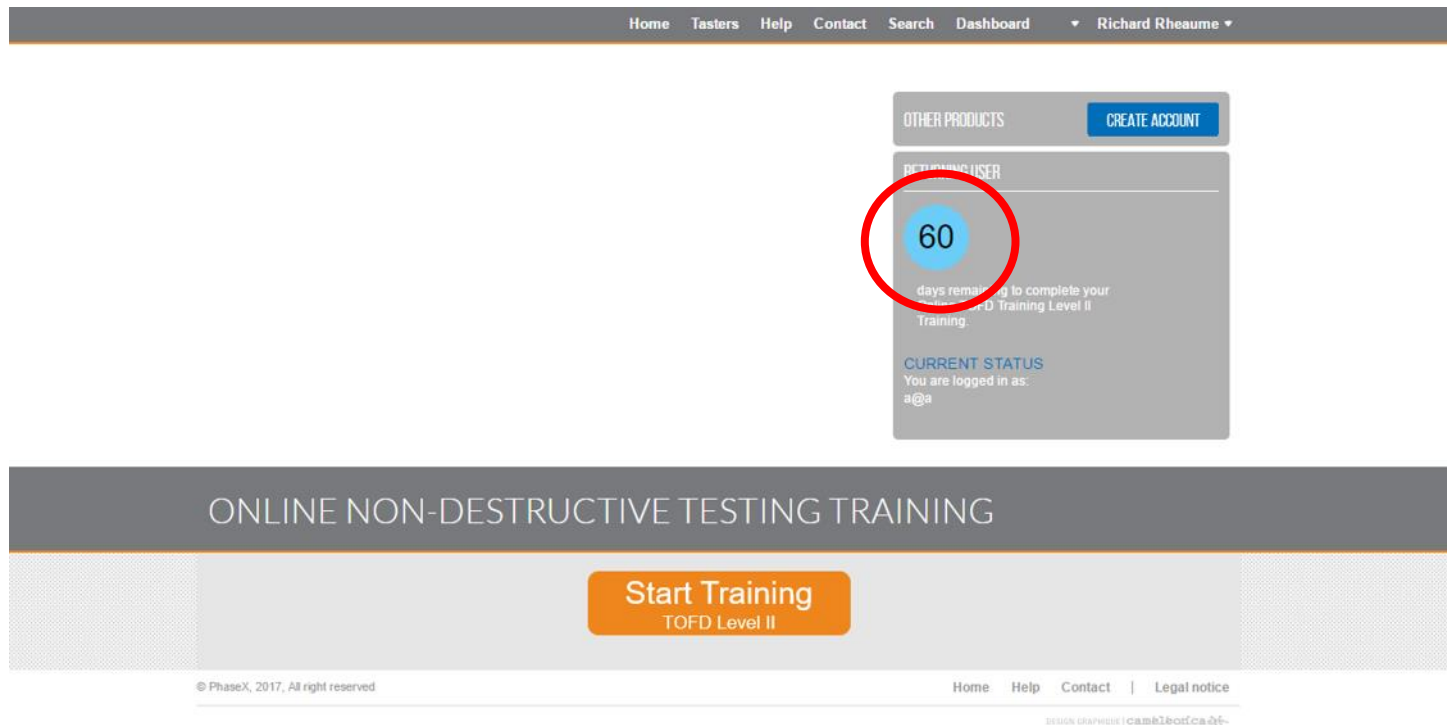
Students' point of view
WORK VS TRAINING

Challenge: Juggling work and training

Solution: Give a 60-day period to complete the training. Train for an hour each day.

Challenge: Switching from work to study

Solution: Use the flexibility of online trainings to study when and where it is most efficient

Open
24/7

Students' point of view
WORK VS TRAINING

Challenge: Commit to a 1-hour-a-day schedule and take time to revise

Solution: Have a teacher monitoring the student's progress

Students' point of view
GETTING ANSWERS

Challenge: Insuring that the theory is well understood

Solution: Videos and animations remain available for the duration of the training

Students' point of view
GETTING ANSWERS

Challenge: Answering the students' questions within a reasonable time frame

Solution: Having a forum monitored by the assigned teacher

Challenge: Insuring that the online training covers all required theory

Solution: The online training should be vetted by the teachers giving the in-class training

Teachers' point of view
EVALUATING KNOWLEDGE

Challenge: Insuring the students' level of knowledge is sufficient to perform the practical training

Solution: Administrate a final theoretical exam online and a theoretical exam in-class on the first day

Challenge: How to learn to calibrate, scan and analyse data without an instrument

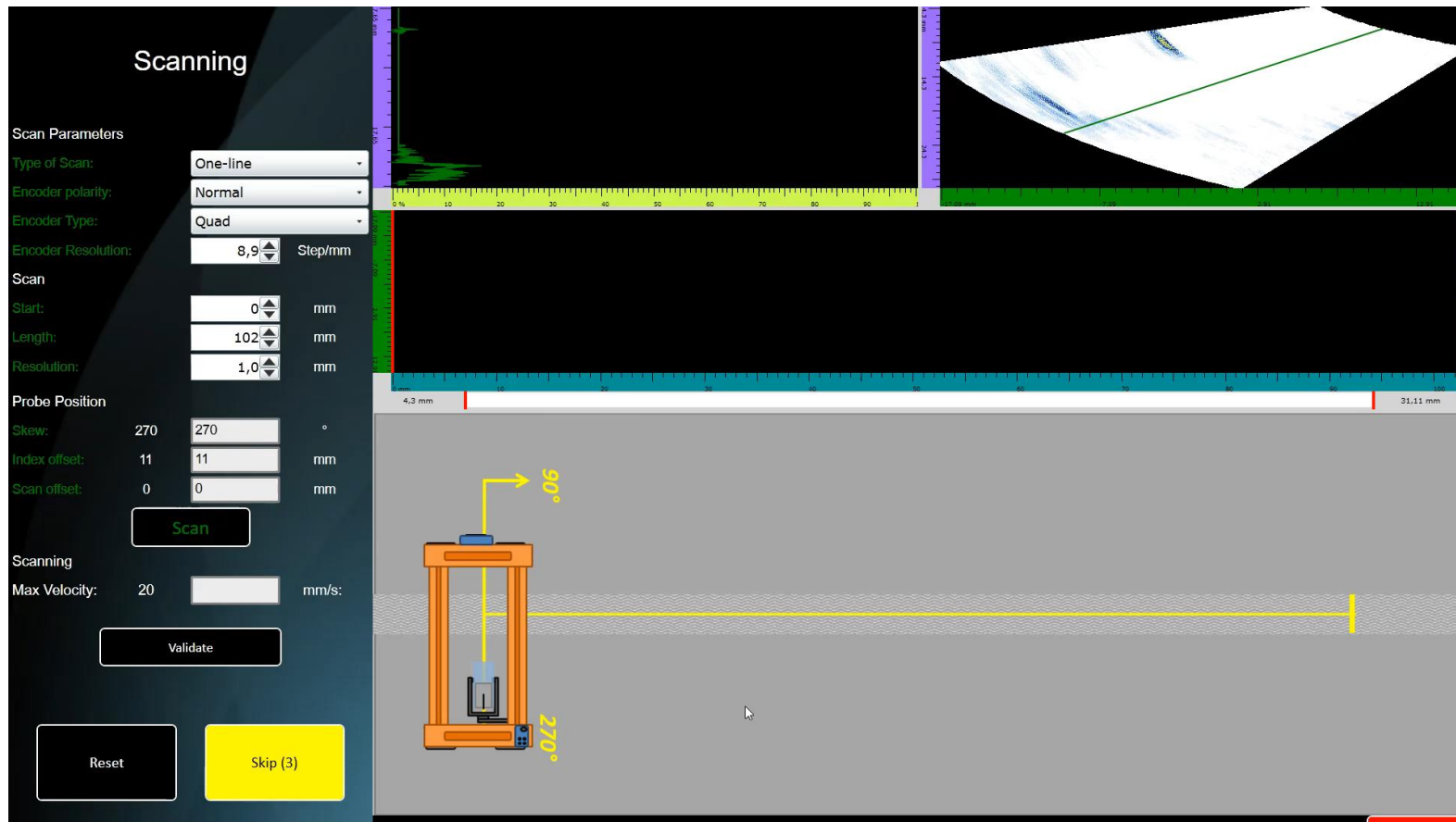**Solution:** The use of online interactive training exercises
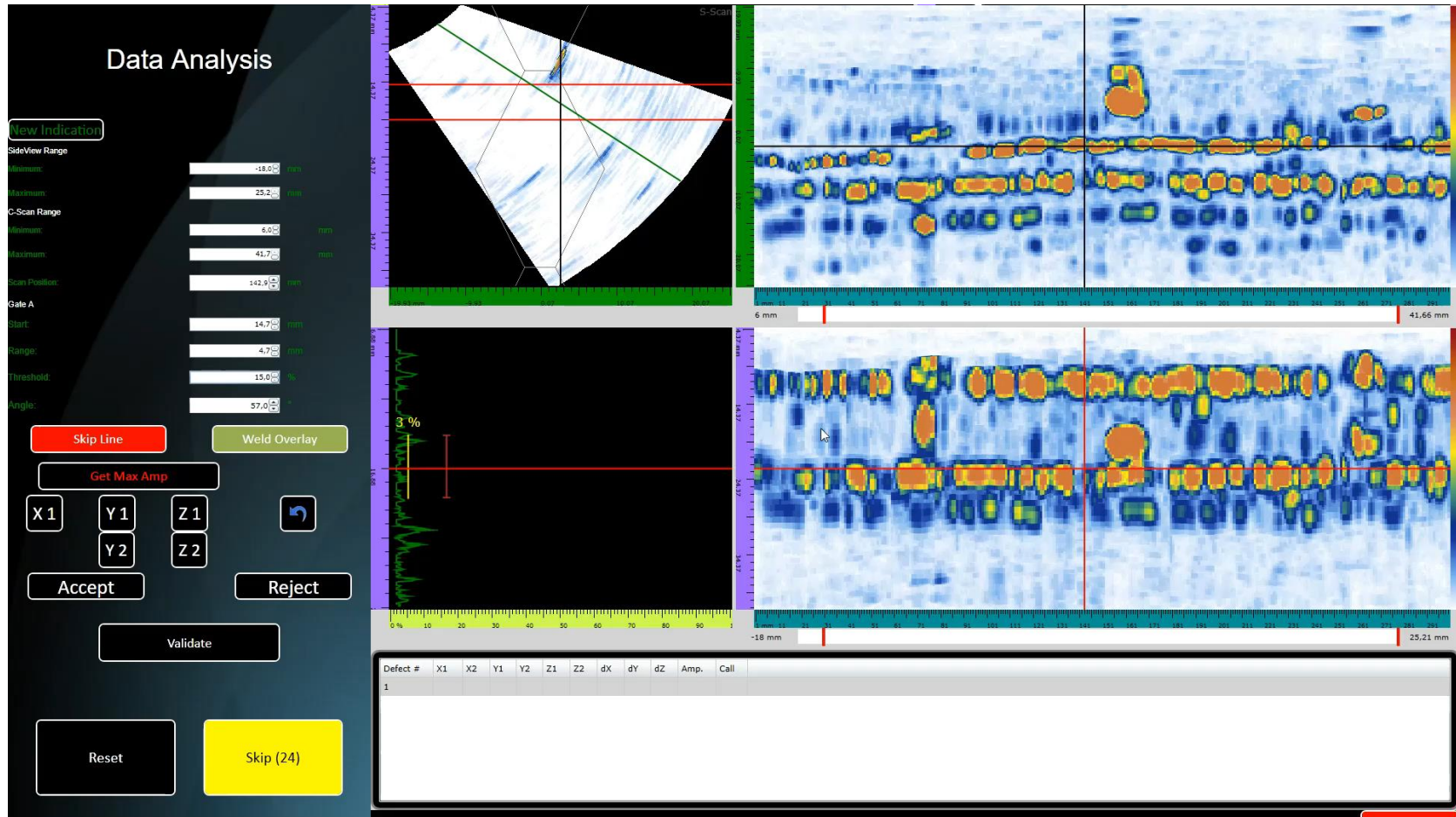
Challenge: Getting familiar with real data

Solution: Design the online interactive exercises to use real, scanned data from calibration blocks, tank walls and welds

Challenge: Teaching a class of knowledgeable students

Solution: Use discussions between students rather than lectures

www.toonsup.com/hsbcartoon

Challenge: Settling arguments
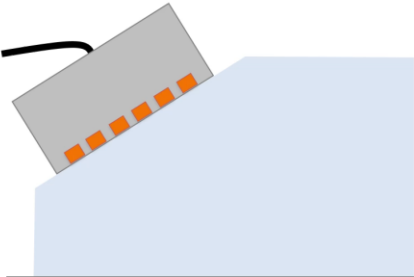
Solution: Use the same online material the students used to settle arguments

- Students appreciate the flexibility offered by online trainings
- Teachers appreciate having better prepared students
- Companies appreciate having their employees close-by while they study

Thank you!