Learnstruments

Increasing the learning and teaching productivity

Learnstruments are objects which automatically demonstrate their functionality to the learner. They

- ▶ aim at increasing the *learning and teaching productivity*,
- ▶ provide adequate *learning goals* to the user,
- ▶ use existing and new information and communication technology (*ICT*) and
- ▶ *support* the user in achieving the learning goals.

Learnstruments can be used directly in the *work process*. They enable employees to *overcome* occurring problems and *improve the efficiency* of the process.

Examples for Learnstrument-prototypes

The *CubeFactory* is an experience-based approach for the mediation of a closed loop material cycle, designed as a self-sustaining mini-factory for the production of 3D printed objects. To operate, the *CubeFactory* requires only sunlight and thermoplastic waste. An improved understanding regarding basic sustainable manufacturing competencies and recycling capabilities shall enhance the awareness regarding sustainability-related aspects of value creation, with particular focus on the efficiency and effectiveness of resources.

Interactive 3D-PDFs enable workers in special machinery business to perform assembly processes for previously unknown machines. The learning and performance time is reduced compared to instructional films or illustrated instructions. Their language reduced content helps to understand the information presented in different countries as well as their interactivity enables workers with different knowledge background to gather all necessary information.
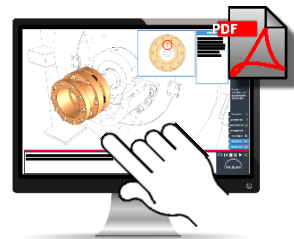
The *RecycleBin* is used to communicate the simplicity of plastic recycling. The machine transforms thermoplastic waste into 3D printer filament, and thus into the first stage of a new product life cycle. An improved understanding regarding recycling capabilities shall enhance the awareness regarding sustainability-related aspects of value creation.

The assembly of bicycle e-hubs is trained with Vietnamese students at the *Smart Assembly Workplace* (SAW) to check the transfer of assembly process knowledge between distant countries. The experimental set-up consists of the remote "teach-in" of assembly instructions, motion tracking on workplaces and the evaluation of student's performance. The SAW is designed to mediate knowledge on assembly planning to unskilled users. As methodological basis, Methods-Time Measurement (MTM) is used. MTM is a system of predetermined times, allowing to calculate the target time for an assembly task.

Agenda

Time	Content
25.09.2017	Keynote speech from Prof. Seliger with focus on Learnstruments
26.09.2017	Workshop on Learnstruments
25.-27.09.2017	Exhibition of existing Learnstruments