Mobile Learning Scenarios

OSZ II Barnim

Stop-Motion movies to illustrate the production and construction processes in vocational school classes

OSZ II Barnim / Metal-Competence-Centre

Subject Mechatronics

At the Metal-Competence-Centre of the OSZ II Barnim apprentices are taught in different professions of metal technology. The project working group consisted of apprentices in mechatronics of the 2nd and 3rd year of training. The practical training of the apprentices is conducted by many different companies.

Project Description

The apprentices create a stop-motion sequence with their smartphones that demonstrates the step-wise construction of a pneumatic cylinder. First the needed components for the assembly of a pneumatic cylinder were designed with the CAD-software “SolidWorks”. The building instruction of the components was programmed with a CNC-software to than let the CNC-machine automatically build these components. Another group of apprentices was using a free stop-motion app called “shortcuts” that enabled them to record all necessary steps of the cylinder construction process in an effective way and intelligible to all.

Study Results

The apprentices…

- are able to install a stop-motion app on their smartphones and use it to create descriptive animations
- can develop a concept for a video sequence for a targeted group of people and implement it visually on their smartphones
- know all necessary steps for a CNC-conform construction of building components introduced in the project-oriented classes and are able to use the needed soft- and hardware
- can reduce all construction steps to a necessary minimum to create a intelligible video sequence for the user

Technical and organisational preconditions

- Laptops and smartphones
- Downloading the “Stop-Motion App“ for Android respectively the “Stop-Motion Studios” for iOS
- Dismantling a functional unit that was constructed beforehand into its components
- Work space with a light surface, sufficient lighting, stepladder or camera tripod
- Putting the components together to get the whole functional unit
- Using assembly tools to professionally install all components and a pneumatic energy source (3 bar) for a final performance check

Project Realisation

After showing the assembly process in an avi-video sequence of the CAD-software “SolidWorks“, apprentices of the 3rd year of training were asked to produce a short stop-motion video sequence which will be used to train future apprentices. Hence all assembly steps were photographed with the smartphone and summarized in a stop-motion video sequence. The final performance check was documented in a short video sequence.

After downloading the stop-motion app approximately 180 pictures showing the assembly process were taken and transformed into a descriptive video sequence that can be further used in metal technique lessons.

Pictures were taken from a stepladder in 2 meters height. To enhance the contrast a big light paper sheet was used as a background combined with a separate source of light. The pictures could be easily processed to a stop-motion video sequence and edited on the PC afterwards.

The quality of the video sequences was enhanced by increasing the image resolution with the Windows Movie Maker. Additionally the Windows Movie Maker was used to arrange, cut and add music to the video sequences.

Possibilities

Complex processes like the assembly of a complicated functional unit can be easily demonstrated by a stop-motion video sequence. The construction steps can be simplified to help the apprentices to grasp a complex process in class visually. Apprentices can be easily interested for making a stop-motion video using a smartphone and come up with their own ideas and suggestions and thus are dealing with the topic in an interactive way. Additionally they are very much interested in the results of their projects and are very critical too because the stop-motion videos will be used for the following classes.

Challenges

- Optimal group size is 6 apprentices
- The photographing apprentice has to be secured when using the stepladder
- It is recommended to use different sources of light
- At least 4 class units of 90 minutes each are needed
- Equipment, e.g. tools, ladder, camera tripod and the software have to be available
- The video sequence should be easy to implement and should show some explanations