

EDU500023

Dual Education 4.0 in Germany with Fusion 360

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Learning Objectives

- Identify the value of a holistic learning approach
- Understand German Dual Education 4.0
- Implement Fusion 360 in an online learning platform
- Take on challenges in digital education

Description:

Nachwuchsstiftung Maschinenbau (Young Mechanical Engineering Talent Foundation) provides support for digital teaching and learning with its specially developed online platform MLS (Mobile Learning in Smart Factories), which many well-known companies for dual education are already using. MLS creates the possibility to easily create practice-oriented learning content and to link many additional digital tools to the learning task. Increasing digitalization means, that training companies have to prepare their trainees for Industry 4.0. The full integration of Fusion 360 software in MLS makes it possible to present a holistic learning process without media discontinuity, providing trainees with new learning experiences.

Speaker:

Christian Wiegmann

As a graduate industrial engineer, Christian Wiegmann has been working as a consultant for industrial companies for the "Nachwuchsstiftung Maschinenbau" since 2017. He focuses on advising in dual education, introduction of digital training, change management and employee qualification.

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Co-Speaker:

Doris Fischer

For more than 13 years Doris is part of the education team at Autodesk and works closely with educational institutions in Germany, and through her previous consulting experience she also knows what's needed in industry. Now her focus and passion is on engaging the next generation of engineers with Fusion 360.

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2. Introduction MLS
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 - 2.2 Task overview in interaction with the holistic learning approach
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3. Taskbuilding in MLS
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4. Summary and recommendations

1. Dual education in Germany

For the general understanding of the dual education it is necessary to understand the reason for this way of learning. The dual education combines theoretical learning at school directly with the practical learning in a company.

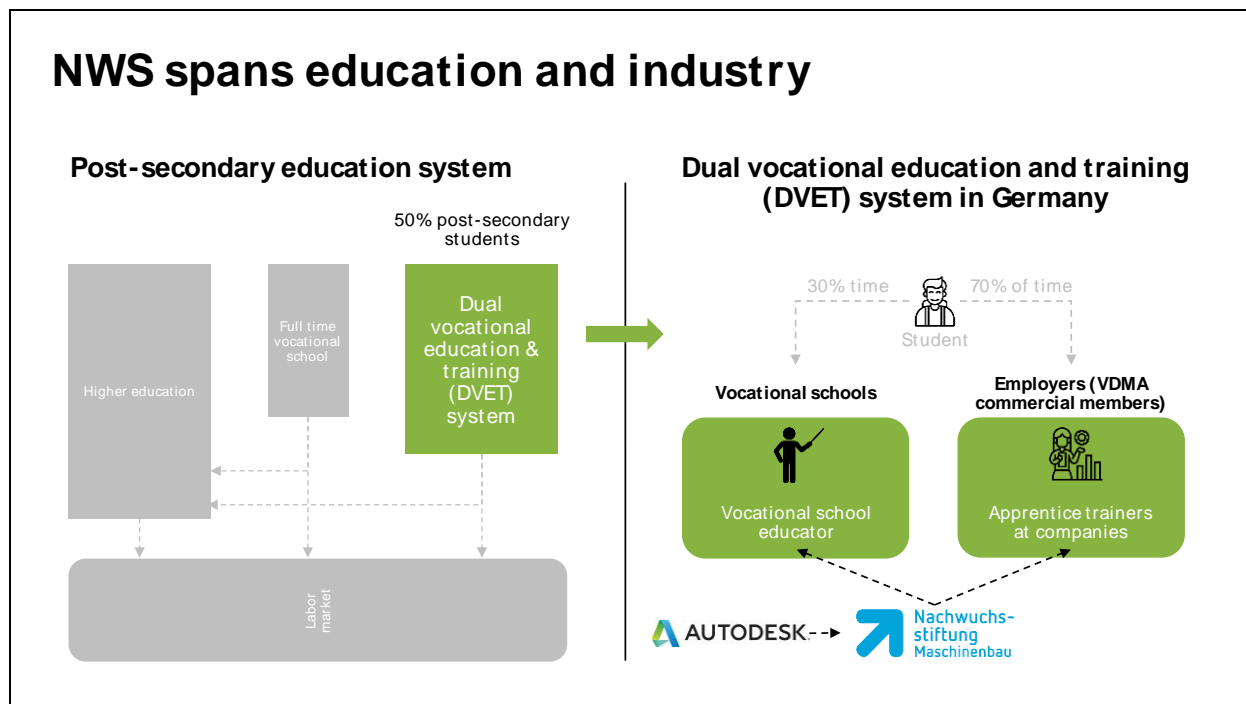
This procedure qualifies young talents faster than doing it sequentially. Like this, we save time and money. And that is, for sure, typical German.

After high school you can decide between two ways in general: Go to the university or start a defined apprenticeship. We have different job descriptions for varied apprenticeships like baker, industrial mechanics or electronic technician.

These apprenticeships run mostly for three or three and a half years and if you pass the final exams you get a certificate that you are a qualified person in this job.

With this certificate you can apply at any company. And a company can easily find a fitting person exactly for the necessary tasks.

In the following figure you see on the left side our schooling-system in Germany and on the right side the dual vocational education and training system in Germany:



Picture 1: German education system and the dual vocational education and training system

For further informations of the dual education in Germany, please see the class presentation or the following link:

- Federal Ministry of Education and Research: [The German Vocational Training System](#)

2. Introduction MLS

2.1 General

Our main target with the MLS System is to take on the following challenge:

Your digital assistant for vocational Training

Further, secondary targets:



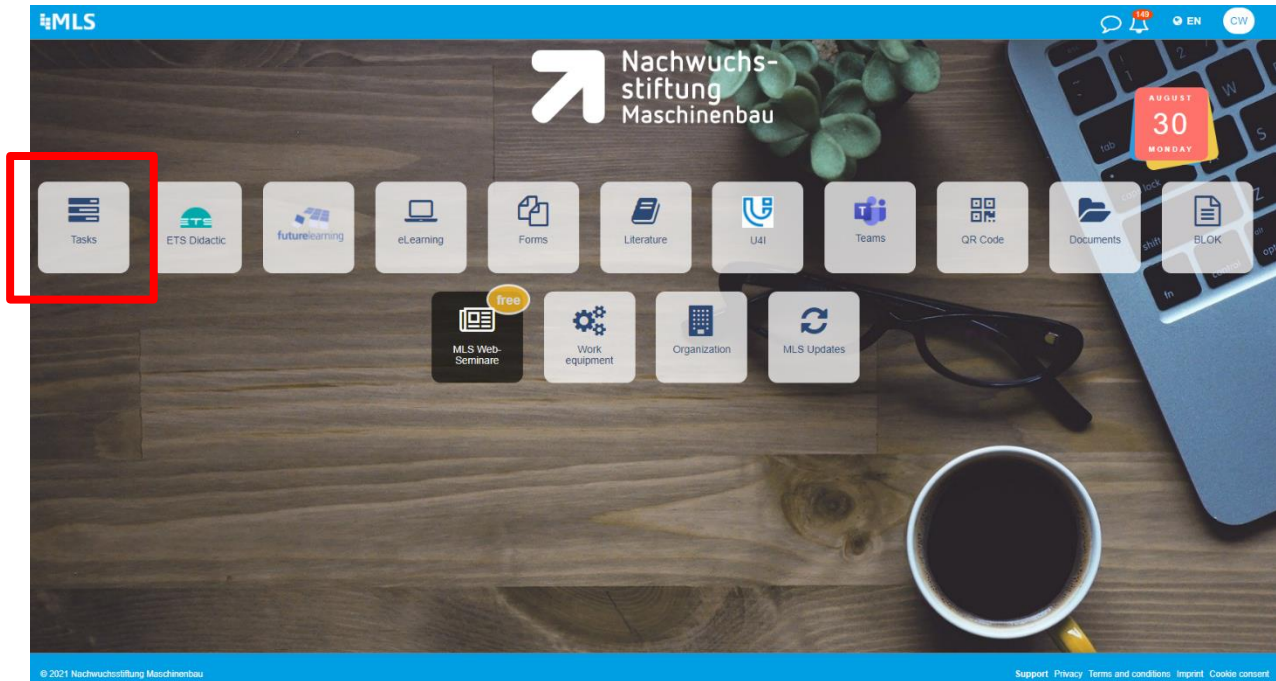
Picture 2: Targets of MLS

You can reach MLS under the following Link:

<https://mls.mobil-lernen.com/en/login>

Please get in contact with me (Christian Wiegmann) for further information or a demo-account.

Each company in MLS has their own task pool. Other companies aren't able to see the self-created tasks:



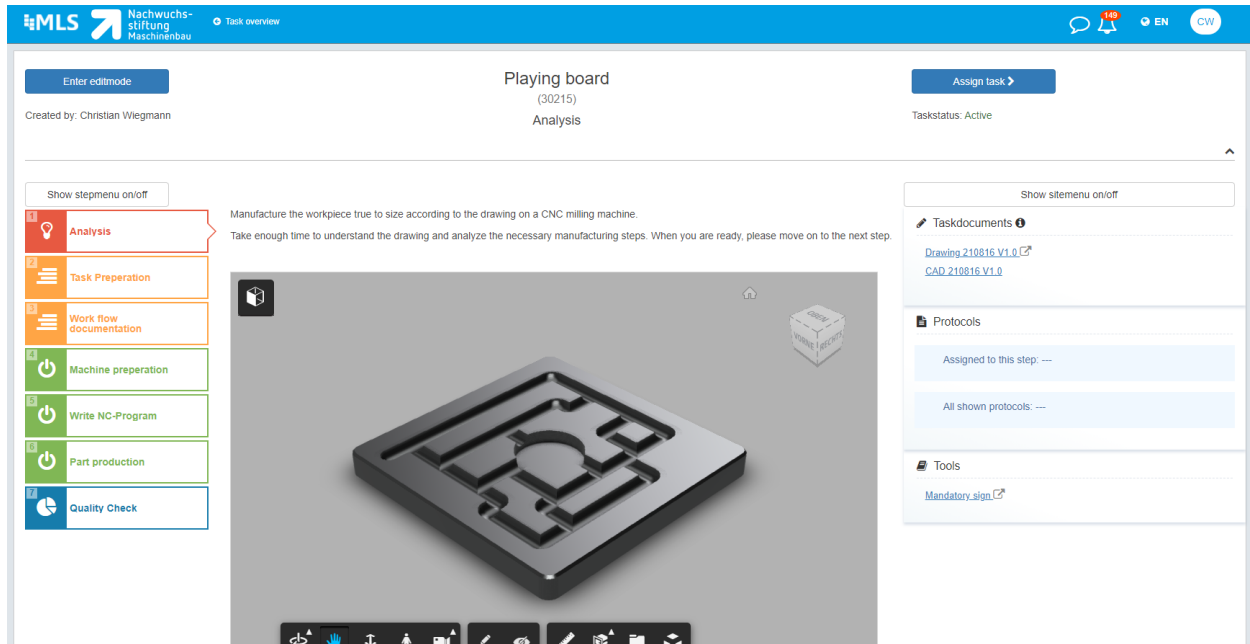
Picture 3: Dashboard MLS

The taskpool can consist the different typs of tasks:

- Standardtask from MLS
- Own created tasks
- External created content
- Task sharing with cooperation partners

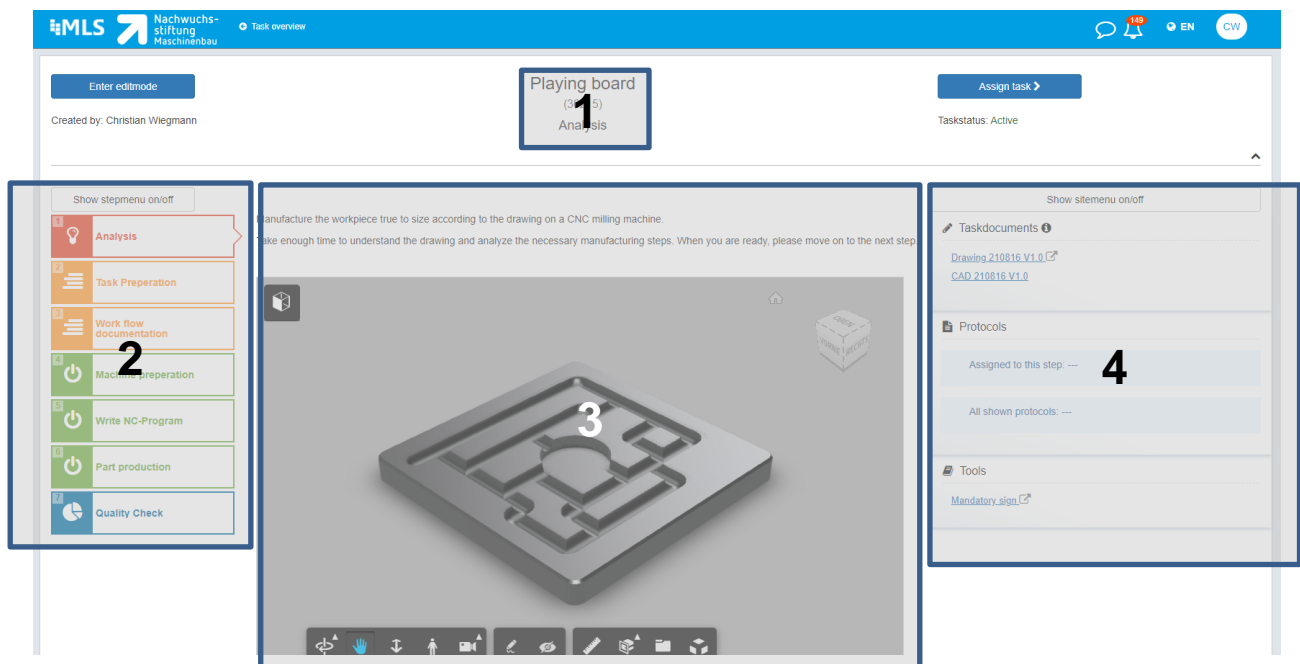
2.2 Task overview in interaction with the holistic learning approach

The following picture is the general overview of a task:



Picture 4: Task example in MLS

The different areas of a task are painted in the following screenshot:

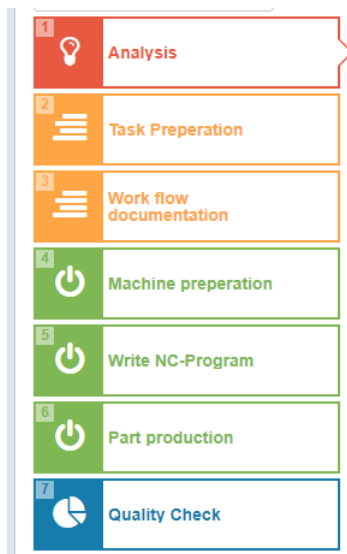


Picture 5: Different areas in a MLS task

Every task has the same structure in general:

- 1: Name of the task
- 2: On the left side the steps created for the holistic learning approach
- 3: In the middle a description, informations and instructions to fullfill this step
- 4: On the right side are further informations, hints or files, which are useful to fullfill this step

Each trainer has the possibility to create the task fitting matching the requirements of the step. Normally, we recommend the holistic learning approach:



Picture 6: Example for the steps in a task according to the holistic learning approach

The most important issue for the task is, to create it as good as possible, so that the apprentice can fullfil the requirements in self study.

The holistic learning approach is a good way to support this self study.

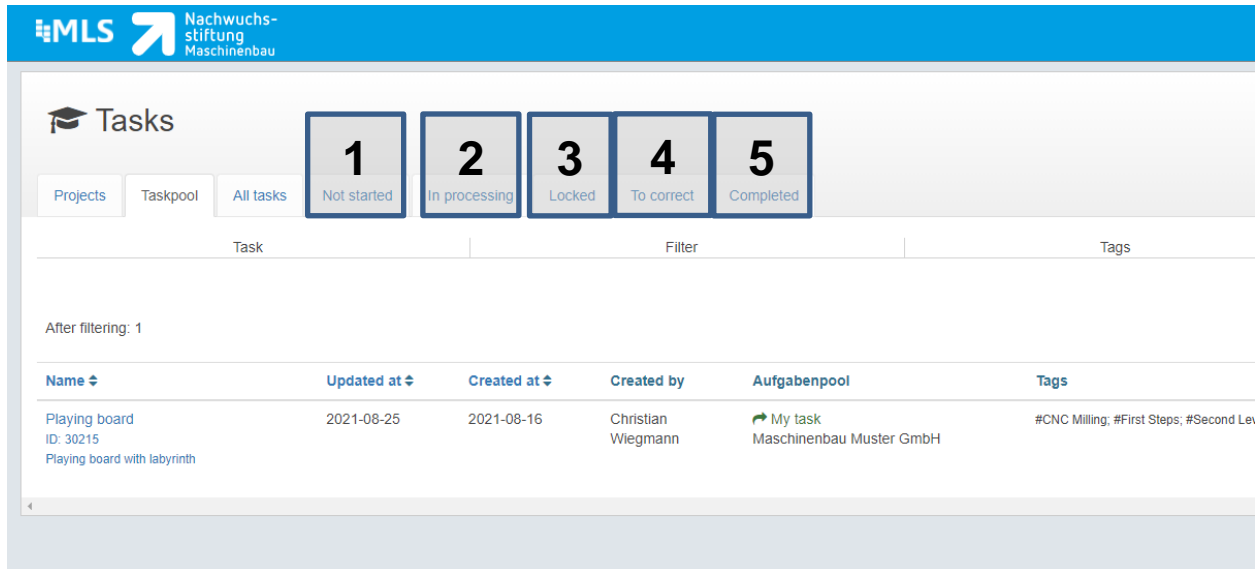
In the first step the apprentice should analyse the task and get an overview of the following steps. (See the red step).

He continues with the preparation of the task. For example he has to fill out different documents or prepare the tools. (Orange steps)

The green steps are the most important steps. During these he fulfills the task including the part production, for example (green steps)

The final step is the self evaluation. Here the apprentice has to rate the quality of the finished task (blue steps).

2.3 Taskhandling in MLS



Picture 7: Taskhandling in MLS

If the trainer assigns a task, he has the possibility to get a live status of the task's fulfillment. The following procedure is the basic function of the system:

1. Not started:

The overview of the assigned tasks that haven't been started yet

2. In processing:

The started but not finished tasks with the current status

3. Locked:

The locked tasks: The trainer has the possibility to implement stopps during the preparation of a task. Here an interview or a evaluation of the fulfilled steps can take place. Only after the confirmation of the trainer the apprentice can continue with the task preparation.

4. To correct:

The finished tasks of the apprentice. The trainer can give hints, commends or evaluate the finished task.

5. Completed:

The overview of all fulfilled tasks in this company. This archive of tasks gives a great overview of the strengths and weaknesses of the apprentice.

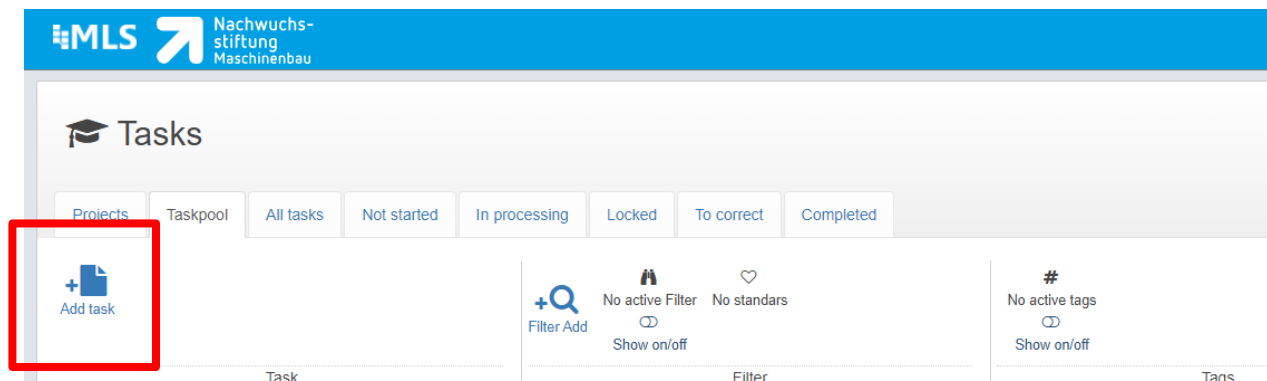
3. Taskbuilding in MLS

3.1 General

The MLS offers three different ways to fill the taskpool:

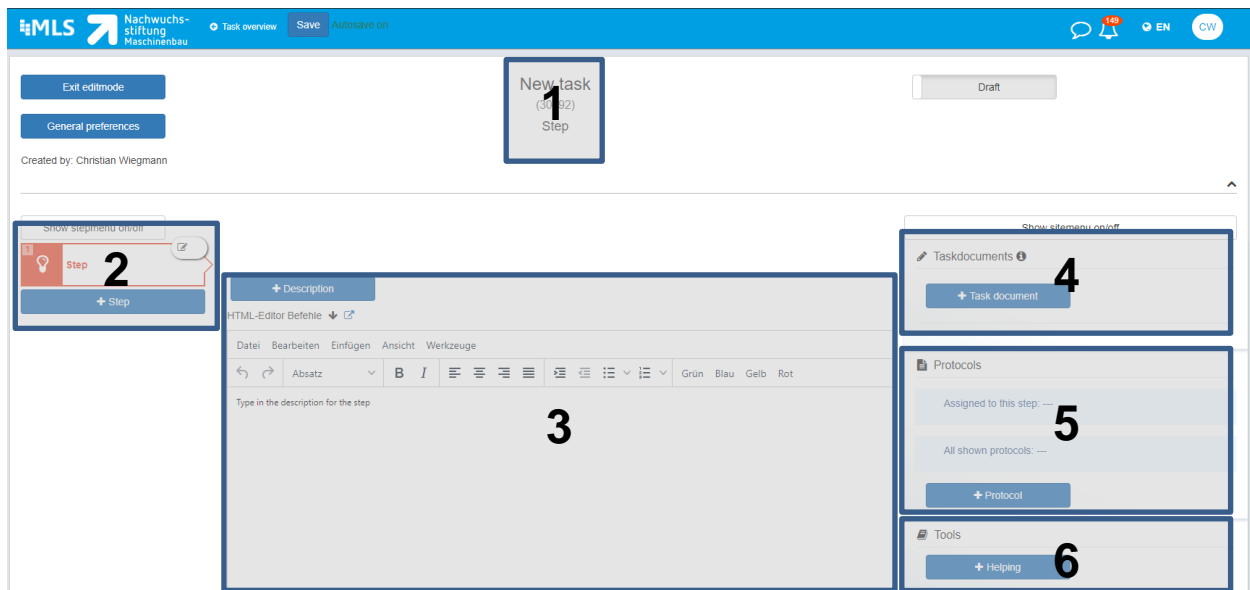
1. Use taskpools of our cooperation partners for a user fee
2. Share taskpools with other MLS users
3. Create your own tasks (explains in the following)

Each trainer has the possibility to create own tasks. Therefore we have the function “Add task”:



Picture 8: Adding a task in MLS

If you create a new task you have to implement different values. The following picture shows the most relevant topics:



Picture 9: Task design

1. Name the task
2. Create the different steps
3. Formulate the description of the steps
4. Add task documents
5. Create questions or checkpoints for each step (optional)
6. Add hints or further information for the step (optional)

In this class we create a short task with the name “Autodesk Fusion 360” including two steps: “3D-Modell and Drawing”

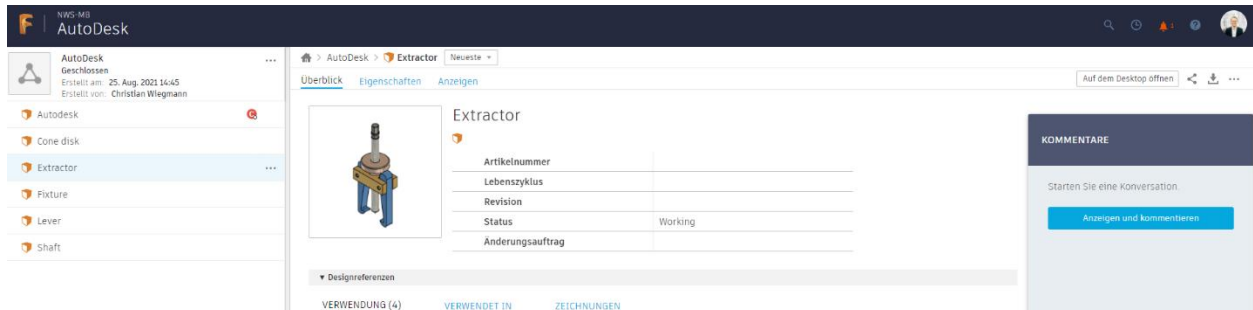
The screenshot shows the MLS task editor interface. At the top, there is a blue header bar with the MLS logo, the text 'Nachwuchsstiftung Maschinenbau', and buttons for 'Task overview', 'Save', and 'Autosave on'. Below the header, the task title 'Autodesk Fusion 360' is displayed, followed by '(30264)' and '3D-Model'. On the left side, there are buttons for 'Exit editmode' and 'General preferences'. Below these, it says 'Created by: Christian Wiegmann'. In the center, there is a 'Show stepmenu on/off' toggle. Below the toggle, there are two steps listed: '1 3D-Model' and '2 Drawing'. To the right of the steps, there is a '+ Description' button. Below the description button, there is a section for 'HTML-Editor Befehle' with a dropdown menu and a link icon. At the bottom, there is a toolbar with various editing tools, including 'Datei', 'Bearbeiten', 'Einfügen', 'Ansicht', and 'Werkzeuge'. The toolbar also includes icons for undo, redo, paragraph alignment, bold, italic, bulleted list, numbered list, and a 'Gr' button.

Picture 10: MLS task for the class example with the integration of Fusion 360

3.2 Implementation of Fusion 360 datas via iFrame

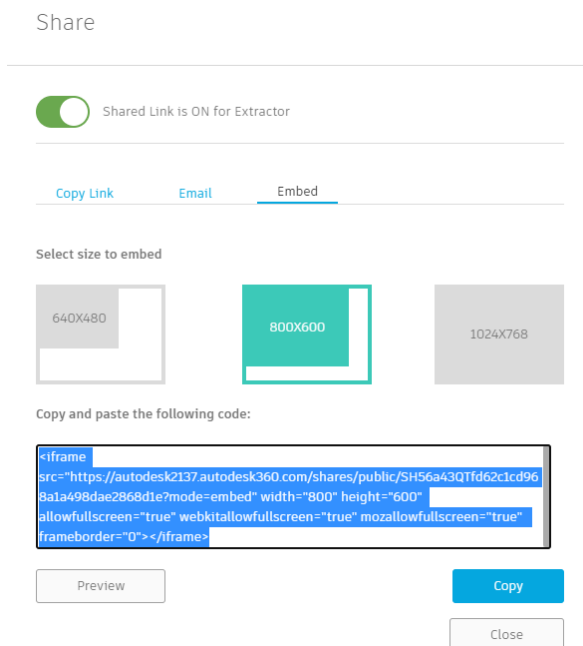
For each task, it is the most important issue to fill it with proper content. In the following I will present the integration and the handling of Fusion 360 datas in the MLS.

First, we have to create our model in Fusion 360. After we created a model in Fusion 360 we open it online:



Picture 11: Extractor online

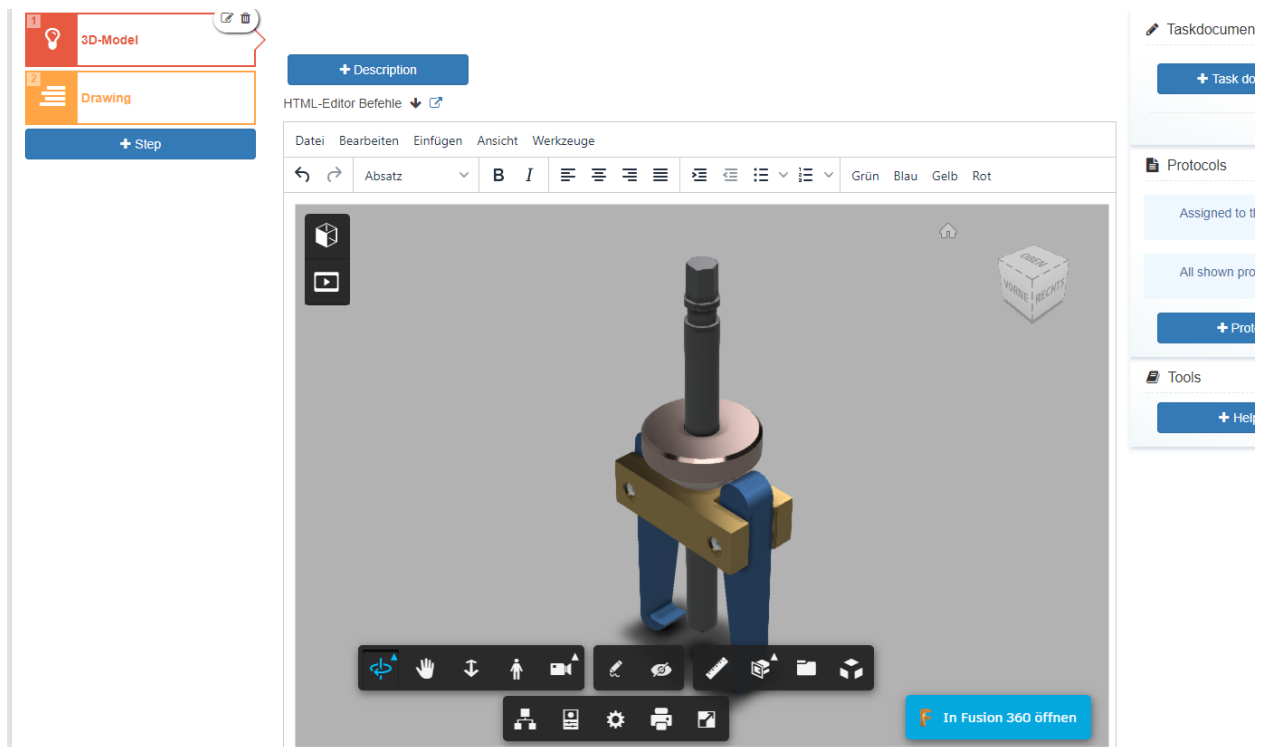
In the upper right corner we find the share-button. Here we can use the iFrame integration:



Picture 12: iFrame integration in the Fusion 360 web

To implend the datas from Fusion 360 we have to copy the generated link.

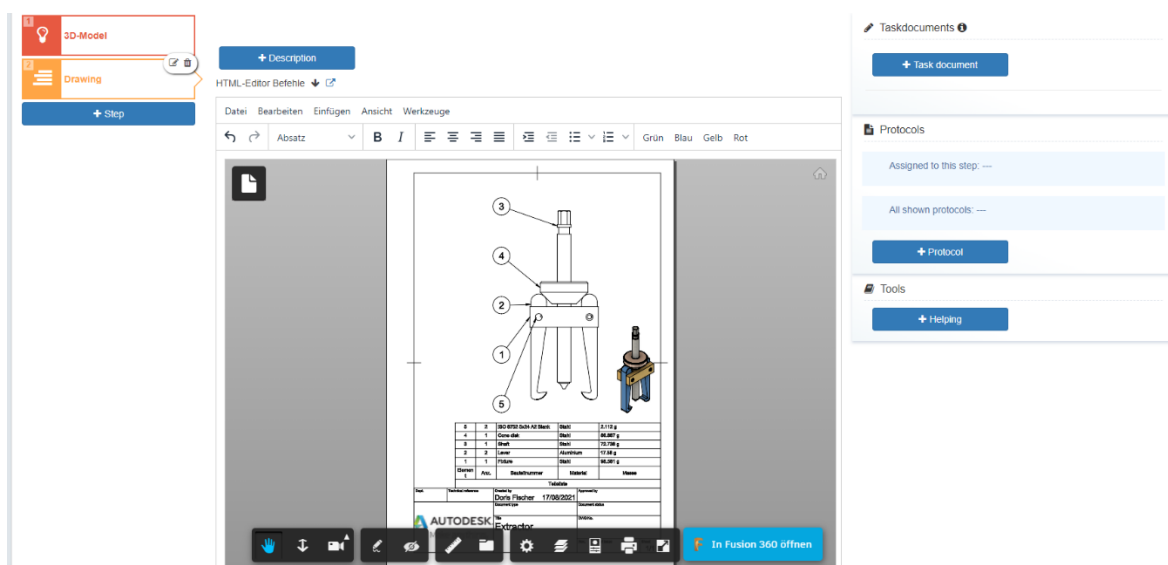
If we implement the copied link in the editor of MLS we see the embedded model of Fusion 360:



Picture 13: Embedded model of Fusion 360 in MLS

3.3 Advantages of the implementation via iFrame

Now, we implement the drawing of the extrator in the same way like the 3D-Model:



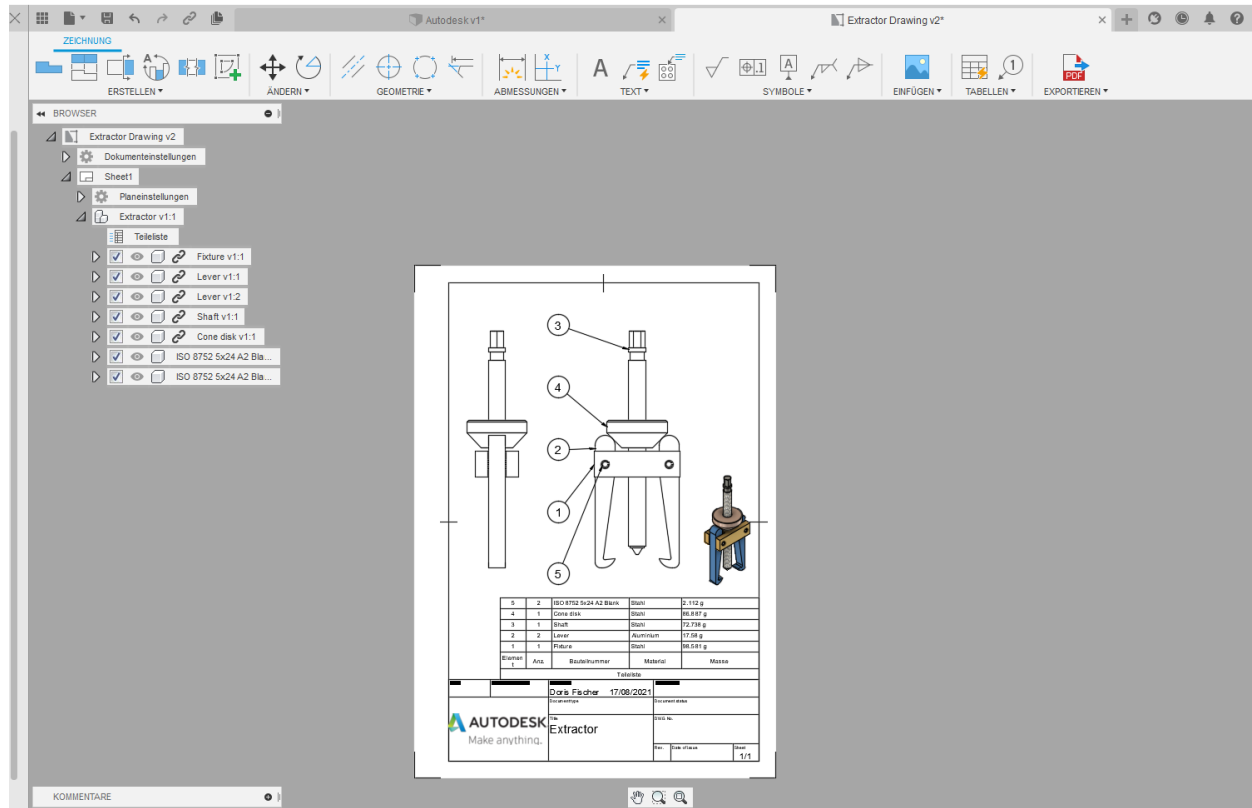
Picture 14: Embedded drawing of the extrator in MLS

The biggest advantage of the implementation via iFrame is the life actualization of the data. So, if we change the data in Fusion 360 we directly have the same changes in MLS. This has several advantages:

- We don't have to change the data twice: If we change the models in Fusion 360, we can be sure that the data in MLS is also changed
- Only one version: given that the data directly changes in MLS, we don't have different versions of the learning task in MLS
- Saves time: direct implementation of actual data

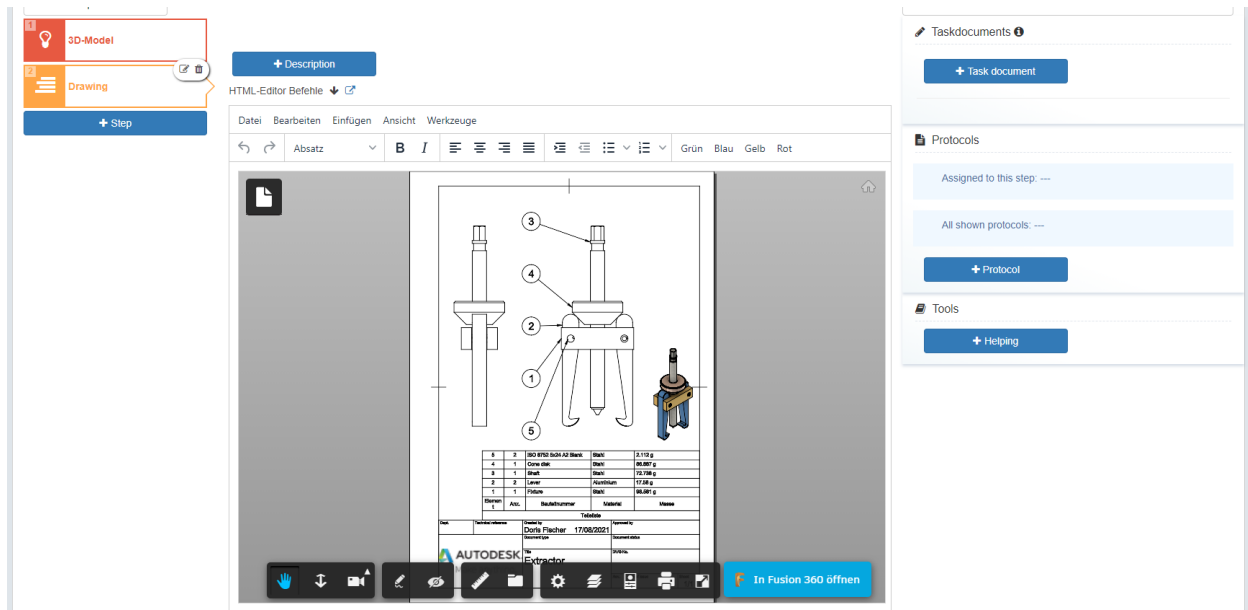
For a better understanding see the following procedure:

We add a second view of the extractor in Fusion 360 drawing:



Picture 15: Changes of the Fusion 360 drawing in the desktop-app

If we now reload the page in MLS we directly see the changed drawing in the task in MLS:



Picture 16: Life-changes of the MLS task after the changes of the drawing in Fusion 360

4. Summary and recommendations

TOP 1: Digitalization changes the way we educate and qualify young people

TOP 2: Future challenges require the leaders of digitization to work together

TOP 3: The cooperation between MLS und Fusion 360 rises the education on a higher level – not only in Germany