



Practice in 3D engineering design software systems

Project Nr. 2022-1-FR01-KA220-VET-000086996





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Subject(s):

Practice in 3D engineering design software systems

Grade(s):

10th -11th grade (2nd and 3rd high school year), Higher VET education

Observations:

- Some students are very active, talented, willing to learn independently and motivated to complete the tasks assigned to them. The majority of students are average in ability and, considering their age group, are less proactive and not always motivated.
- Special educational needs: 2-3 students (behavioural disorder and/or lower learning and/or understanding ability than average).
- Digital technology/applications: e-learning courses and video learning materials (OER) are used to meet the learning needs of SEN students too and are used to support inclusion and equal opportunity too.
- The concentration level of the students is low. The digital tool could be used for increasing the learning motivation of the students.
- Students' prior knowledge on the topic: students have had different activities on the main topic during the current school year. But it will be assessed at the beginning of the lesson in the classroom.

Learning objective(s):

- Prepare students for the practical application of the Solide Egde 3D engineering design software.
- To develop the basic theoretical and practical knowledge required to use the 3D engineering design software.
- To learn to use the Solide Egde 3D engineering design software and to learn to use it with teacher/company trainer support.



Expected results:

- Assess and refresh prior knowledge required to learn new material.
- Introduction to and practice of modelling in Solide Edge engineering design software
- Understanding the operation and use of the slicing software and experimenting on a practical example.
- Learners become familiar with the typical configuration required to create output files
- Transferring output files to 3D printers.
- Learn about real business applications with the help of video lessons.
- Understanding the curricular connection with the other courses of the academic year.

Content of the course:

3D Modeling, is a method used to create computer models of real-world objects for applications in machine engineering. At the heart of “Practice in 3D engineering design software systems” course is applied geometry where complex geometrical models are created by manipulating and combining basic shapes such as cubes, rectangular prisms, cylinders, spheres, and cones. In this course students learn CAD/CAM engineering software through hands-on practice. While building 2D and 3D models, they improve their geometry skills and develop strong spatial reasoning skills (ability to “think in the 3D space”). Upon completing the course, students are ready for a smooth transition to using professional CAD software such as Solide Edge engineering design software.

How will I motivate students?

Learner motivation is essentially achieved by using digital learning tools. The learning motivation of the students is based on the use of inspirational video, digital knowledge competition (Kahoot), the learner understands the meaning of the lesson/learnt material by linking the learning to real life implementation (enhance retention + enhance transparency - OER video simulation).





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Structure of the learning unit

Length of the topic: One 135-minute lesson.

Teaching methods:

Using flipped classroom techniques - video intro of the topic - to generate preliminary interest in the topic, pre-knowledge assessment (diagnostic knowledge assessment) by digital tools at the lesson, hands-on learning in the classroom, virtual experiential learning by video (allowing students to see real-life applications of what they have learned).

Learning unit:

1 lesson: 3 study hours - 135 minutes - + 30 minutes of home learning before the contact lesson.

Before the lesson – flipped classroom approach:

1. In connection with the preview of the summary OER video, the students' attention for the 3D design could be gained <https://www.youtube.com/watch?v=8YiecvO-MeI&t=5s> (Hungarian speakers).
2. Preparing one-minute inspirational speech on a topic of most interest to them (without using any digital tools).

Lesson:

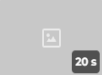
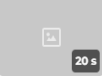
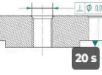
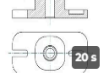
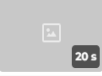
1. In advance, the students were asked to give a one-minute inspirational speech on a topic of most interest to them. This can be combined with the English lesson, so that the subject connections can be made and CLIL language teaching implemented. If a video (Tik-Tok type) is made with the learners for the one-minute speech, the learners would be engaged in the digital content creation.
2. Knowledge competition - Kahoot for pre-knowledge assessment at the beginning of the lesson (stimulate/recall of the prior learning):
<https://create.kahoot.it/share/rajzi-alapok/a8ea2d5c-b36d-44da-9de4-66b1b837c1fc>
(Hungarian speakers)



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Questions (12) Afficher les réponses

1 - Quiz Melyik illesztést jelenti a következő: 50H7/g6	 20 s
2 - Quiz Mi a neve a képen látható rajzjelnek? Ø	 20 s
3 - Quiz Melyik helyzetűrés látható a képen?	 20 s
4 - Quiz Melyik metszetfajta látható a képen?	 20 s
5 - Quiz Milyen típusú vonallal jelöljük a szimmetriatengelyt?	 20 s

3. Learning by doing step by step:

1st step: Teacher's and video presentations,

<https://www.youtube.com/watch?v=a4Bd199QkXI&t=26s>

<https://www.youtube.com/watch?v=KJ7g1ZXAVz0&t=5s>

<https://www.youtube.com/watch?v=A6WZBc2OPBA>

<https://www.youtube.com/watch?v=1ipQELDv94A>

2nd step: guided/moderated practice (doing together with the teachers);

3rd step: individual small job - use of software individually. Group discussion/group work in triads about the experiences of using the Solide Edge engineering design software.

- ### 4. Group evaluation and feedback - Each student's performance is evaluated and personalised feedback is given. (in the case of more time - double lessons - this can be supplemented or replaced by a short individual presentation of the students. Alternatively, it can be integrated into CLIL language lessons using a flipped classroom approach: learners have to make a short individual presentation at home on the tasks they have done in the professional subject lesson using MS PowerPoint or Canva and give a presentation in the language lesson in the language they have chosen. The aim of the CLIL language lesson is to develop an appropriate professional vocabulary and to give a presentation in a professional foreign language.).

Self-learning Open Educational Resource:

<https://www.youtube.com/playlist?list=PL9r-PqhPPGxgue4lSkwausk2J3TKFzoe5>



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5. Demonstrate the implementation/practical use of what has been learnt. The objective is to demonstrate the practical use of the application in a real-world business environment (video case study) - (enhance retention + enhance transparency - OER video simulation/case study).
<https://www.youtube.com/watch?v=6BvGbGKGQhI>
<https://www.youtube.com/watch?v=4jbn0ah3u9E>
6. Summary of the lesson with students – it can be replaced by a digital EdTech tool (Mentimeter, WorkCloud, Slack or any relevant tools).
7. English Lessons - CLIL-Content and Language Integrated Learning
At the same time, in English lessons, the students could make a Kahoot activity from the vocabulary of the video in three small groups to develop related professional vocabulary.

Explain why you chose the digital tools:

The concrete pedagogical benefits of using digital tools in class:

- Development of the learning motivation of the students by inspirational video lessons;
- Kahoot, thanks to its competitive nature and the creation of a playful competition between learners, makes knowledge assessment much more interesting and enjoyable for learners than traditional knowledge assessment. However, it assesses students' knowledge just as effectively as traditional tests or knowledge assessment techniques.
- The use of video lessons in the classroom instead of face to face lectures involves the students in creating their own flexible, personalised learning path. This creates greater engagement and learning experience
- Demonstration of learned concepts in a real-life corporate environment with short OER video simulations shows the meaning of learning for learners, which is essential to maintain and increase motivation to learn (enhance retention + enhance transparency by OER video simulation)



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Implementation of specific digital tools and connection to the model of digital enhancement of the traditional contact lessons

- Generate preliminary interest in the topic (first step of the model: gain learners' attention and interest) – watching a motivation video lesson at home before the contact lesson in the school.
- Prior knowledge assessment using a digital tool in the classroom. Aim is to assess the level of the required prior knowledge; to make the link with the prior learning (second step of the model: stimulate/recall of the prior learning). Tool: Kahoot (done by teacher)
- Learning by doing/hands-on learning and inquiry learning (Teacher presentation, guided practice; shared use of software; individual use of software) - (Third step of the model: Practice with different software/platform)
- Demonstrate the implementation/practical use of what has been learnt. Objective is to demonstrate the practical use of the application in a real-world business environment (video case study) - (Fifth step of the model: enhance retention + enhance transparency - OER video simulation/case study)

Learning unit created by:

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