ERGODESIGN

Improving digital skills for Ergonomics and Bioengineering Innovations for inclusive Health Care

Project number: 2021-1-PL01-KA220-HED-000031182

Key Aspects of the ErgoDesign course

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Relations

- ErgoDesign e-learning Training Materials in English
- 01-06-2023 - 31-05-2024

- DONE
  - Specialized software/digital tools for design in the Health Care sector dynamic toolkit
  - Course Design Principles and ErgoDesign Curriculum

- PARALEL
  - Collaborative platform for training and practical activities
  - Project meetings Varna, Poznan and Kosice.

- NEXT:
  - Handbook and e-learning course for replicating the ErgoDesign Course 01-03-2024 - 30-11-2024
  - October 2024 National Multiplier Events

Key features of the learning materials (PR4)

clear division of topics (see curriculum structure)

all materials must be in English

various media (video lectures; texts; infographics; PowerPoint slides)

embedded quick tests and quizzes ensuring learners pay attention, tests to verify learning effects related to the contents of each module

the course will embed practical exercises to be conducted autonomously or in group by the students on the Collaborative Platform (PR3)

Length of at least 25 hours corresponding to at least 3 ECTS (including also the individual study and the individual work)

interim/intermediate and final assessments/tests to verify the achievement of general learning outcomes expected

Number of pilot testers: 100 (average 20 from each University)

Specific questionnaire for evaluating the e-learning course in terms of content and teaching methods

After having designed the first version of the Training materials and having uploaded them into the Collaborative platform (PR3), the University partners will pilot the training courses with their students

Once they will be validated, the partners will include them on the collaborative platform final version, develop a Training Manual and prepare also an e-learning course for presenting to the target groups how to implement the course

The training materials (already uploaded in the collaborative platform), the Training Manual and the e-learning course for trainers will be available for any other Universities or organizations interested in replicating the ErgoDesign training course for university students, SMEs, Health Care institutions

Question 1: the course will be included into an already existing one or you are going to organize a specific elective course?

Answer 1:

Question 2: Which criteria to adopt for selecting the students for the elective course? (20 per country, in total 100)

Answer 2:

Question 3: the pilot is foreseen in January – March 2024. Is it coherent with your university's plans/semesters?

Answer 3:

Question 5: the peer review of the materials should be before recording the video lectures?

Suggestions:

Question 6: Structure of the course: videos? lenght in minutes? Slides?How many for each module? Additional training materials?

Answer 6:

Primary Target group:

- Mechanical Engineering University Students
- These are undergraduate or graduate students studying mechanical engineering or a related field.
- They have a basic understanding of engineering principles and concepts.
- They are interested in expanding their knowledge and skills in the field of 3D printing of implants.
- They may have some background knowledge in additive manufacturing or 3D printing technologies.
- They are motivated to learn and apply the principles of 3D printing in the context of implant manufacturing.

Secondary Target group:

- University Students, Educators and others
- These are university students and instructors from various disciplines, not limited to mechanical engineering.
- They have a general interest in 3D printing and its applications in the medical field.
- They may have varying levels of prior knowledge about 3D printing and implant manufacturing.
- They are looking to gain insights into the 3D printing process specifically related to implants.
- They may have a desire to explore interdisciplinary approaches to implant design and production.

Workplan for PR4:

- Preparation of the Action Plan and assessment materials: June 23;
- Individual development of training materials and practical exercises: Jul 23–Oct 23;

- PROJECT MEETING?

- Collective revision of training materials and validation: Nov 23–Dec 23;
- Piloting the e-learning training courses and exercises in the 5 countries: Jan 24–Mar 24;
- Assessment of students' learning outcomes: Jan 24–Mar 24;

- PROJECT MEETING?

- Interviewing partners' trainers for getting qualitative information: Mar 24–Apr 24;
- Materials' improvement, validation and release: Apr 24–May 24

Practical essence

- Always clarify the importance of the course content
- Maintain clarity on progress
- Focus on practicality
- Provide clear tasks
- Utilize visual aids
- Maintain personal presence
- Include motivational comments and closing remarks
- Keep videos concise and well-presented
- Maintain a steady and noise-free recording

Appropriate instructional strategies

- For each theoretical content section, whether it is a written material, a video, or a link, it is crucial to clearly define the tasks and responsibilities of the students. When determining the tasks, the emphasis should be on the outcome of the activity, which should align with the defined competencies and their level of achievement for the topic. Here are some examples of tasks:
  - Read the following text and take note of the different names of biomaterials so that you can recall their names and application areas later.
  - Watch the video and identify the steps to follow during the design process.
  - Visit the provided website and evaluate the popularity of 3D printed implants based on the information found.
- The above examples actively engage students in the learning process, focus on acquiring specific skills, and determine the level of achievement required. For instance, in the first example, students are expected to memorize information for future recall, while in the second and third examples, they are required to analyze and evaluate information. By providing clear and specific tasks, students can actively participate in the learning material and develop their competencies accordingly.

During modules

- Explain the solution method.
- Highlight the key points and provide examples.
- Provide a framework for independent exploration of the presented details.
- Assign tasks that require students to independently process the details.

Topics

- Introduction: The benefits of implantology in the health care system, management of patience and production process (Soft skills + management + ergonomics)
  Case study and testimonials
- Introduction of the biomaterials and biocompatible materials
  Degradation of the biocompatible and biomaterials (corrosion, fatigue, ageing, etc.)
- Processing technologies of the biomaterials and biocompatible materials
  Selection of materials as a function of the application.
- 3D printing of the metals, ceramics and polymers
  3D printing powders and filaments in practise
- Anatomy of the implantology, geometry, sizes and general and special examples
  Human anatomy example in dental implant
- Material selection for implant (use the knowledge of the biomaterials and biocompatible materials and their processing technologies) as a function of the anatomy of the application
  Case studies of various applications
- Human implant compatibility test methods and surgery in implantology.
  Risk assessment of the implant loss (healing factors)
- Databases, programming, AI
  Programming example in practice
- Telemedicine system, medical informatics
  Medical informatics application in practice
- 3D scanning, process and device
  Design requirements of the implant based on a 3D scanned image
- Medical Imaging (CT/MRI/USG)
  Design requirements of the implant based on an other medical image (CT/MRI/USG)
- Application of the 3D images for designing as a function of the processing technology (digital tools for designing)
  Application of the virtual 3D image in the designing example
- Medical equipment, hospital equipment
  Application of the virtual 3D image in the designing example
- Integrating exercise

During modules

- Explain the solution method.
- Highlight the key points and provide examples.
- Provide a framework for independent exploration of the presented details.
- Assign tasks that require students to independently process the details.

Example of table of contents of the Topic Document

- Introduction to the *modul*
- *Interesting video with a problem (video)*
- *Some teory (Page)*
- *More and more teory (Pages)*
- *Some data (File)*
- *Some web info (URL)*
- *Some activity (Submission)*
- *Feedback to „Some activity" (Page)*
- *Self assesment (Quiz)*
- *Feedback (Questionnaire)* – Pilot only

Introduction to the topic

Welcome to the topic introduction of our eLearning course on [TOPIC]. In this module, we will provide you with a comprehensive overview of the learning outcomes, competencies, and time and technology requirements for successfully completing this course. By the end of this module, you will understand what you can achieve, the skills you will acquire, and the resources you need. Let's dive in!

Learning Outcomes: Upon completing this course, you can expect to achieve the following learning outcomes:

- [Learning Outcome 1]: Describe the specific knowledge or skills participants will acquire during the course.
- [Learning Outcome 2]: Explain another specific knowledge or skill participants will gain.
- [Learning Outcome 3]: Highlight a third specific knowledge or skill participants will develop.
- These learning outcomes have been carefully designed to ensure you acquire the necessary expertise in [TOPIC], enabling you to apply your newfound knowledge in practical scenarios.

Competencies: Throughout this course, you will develop the following competencies:

- [Competency 1]: Identify and analyse key concepts related to [TOPIC].
- [Competency 2]: Apply critical thinking skills to solve problems within the context of [TOPIC].
- [Competency 3]: Demonstrate effective communication of ideas and concepts related to [TOPIC].

These competencies are essential for mastering the subject matter and becoming proficient in [TOPIC].

Time Requirements: The time required to complete this course will vary depending on your learning pace. On average,

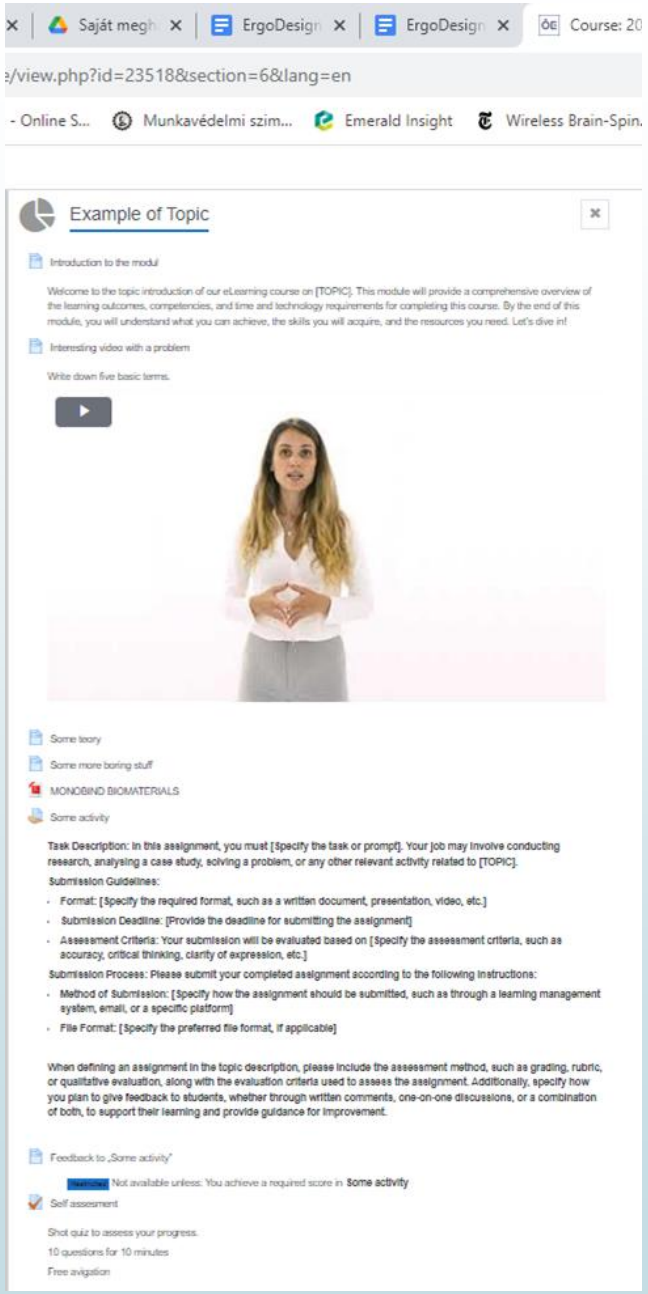
learners typically spend [estimated time] hours to complete all the modules and associated activities. However, please note that this is just an approximation, and you may choose to allocate more or less time based on your personal schedule and learning preferences.

Technology Requirements: To fully engage with this eLearning course, you will need the following technology:

- Reliable internet access to access course materials and resources.
- A desktop computer, laptop, or tablet with up-to-date web browsing capabilities.
- A compatible web browser such as Google Chrome, Mozilla Firefox, or Safari.
- Basic computer skills to navigate the eLearning platform and interact with the course content.
- Ensuring that your technology meets these requirements is essential to optimise your learning experience.

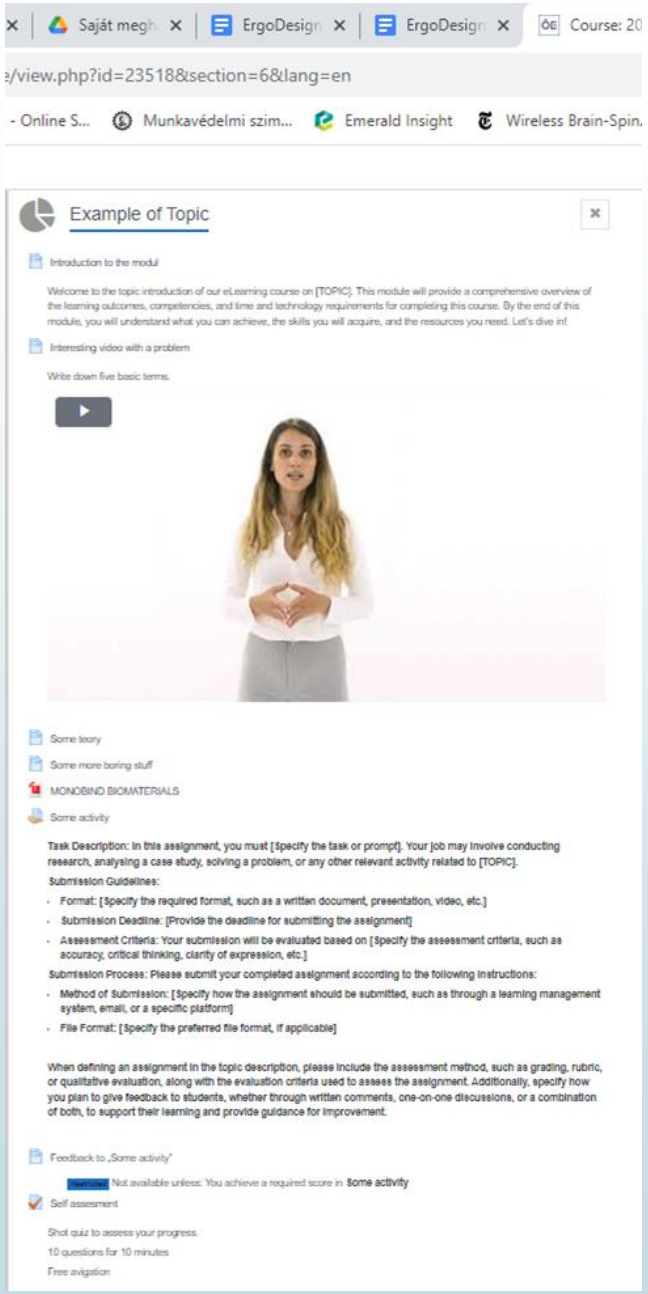
Determining the Type of Activity or Resource

- Page: A standalone page with relevant information and resources.
- File: An attached file for learners to download and access.
- URL: A web link directing learners to an external website or resource.
- Forum: A discussion forum where learners can engage in conversations.
- Assignment: A task or project that learners need to complete.
- Activity: An interactive exercise or task for learners.
- Questionnaire: A set of questions for learners to answer.
- Checklist: A list of items for learners to complete or follow.
- External Programs and Applications: Utilizing external software or tools.
- Book: Set of Resources together.
- Videos: Video content for learners to watch.
- h5P Video with questions
- Self-Check Test: An interactive assessment using the h5P platform.



Page

- Content Outline: This page covers the following key points:
- Introduction to [TOPIC]
- Overview of the main concepts and principles
- In-depth exploration of subtopics, including:
  - Subtopic 1: [Brief description]
    - [Provide a brief description of the subtopic]
    - [Include links to external resources or YouTube videos related to the subtopic]
  - Subtopic 2: [Brief description]
    - [Provide a brief description of the subtopic]
    - [Include links to external resources or YouTube videos related to the subtopic]
- Conclusion and summary of key takeaways



Video

Instruction to Students: Please oversee the video to understand better [TOPIC]. Take notes and pay attention to the fundamental concepts discussed.

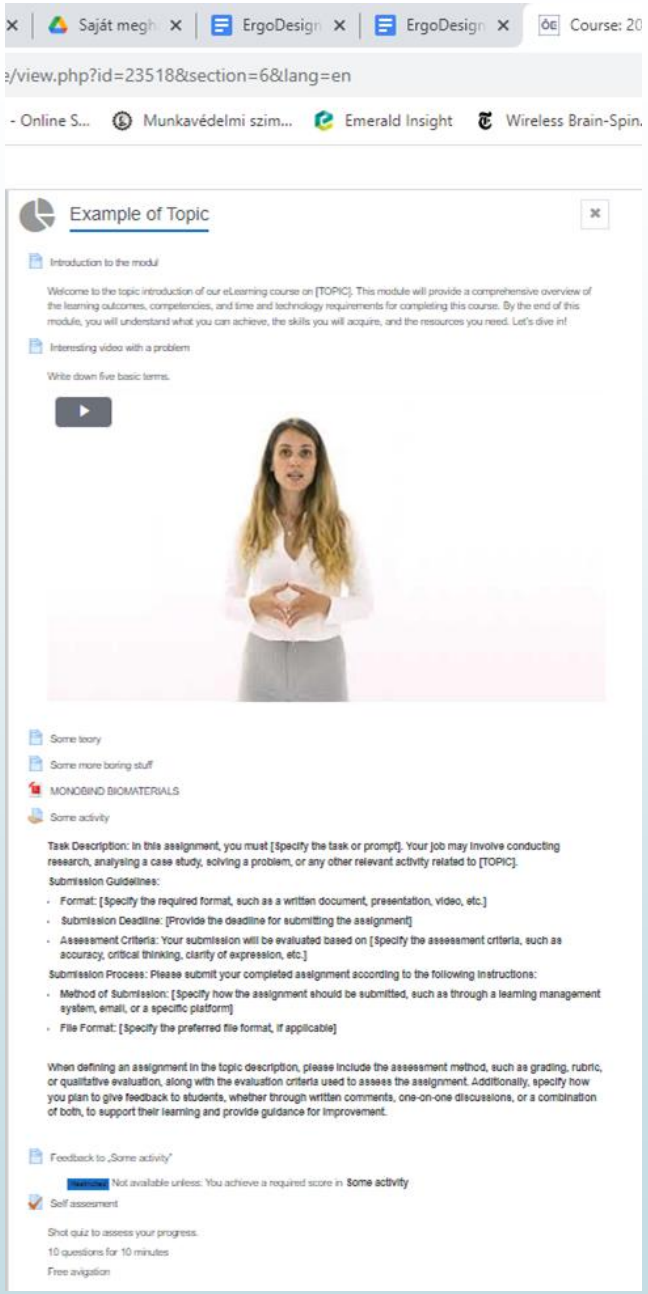
Video Details:

- Video Type: [Specify the type of video, such as a lecture, tutorial, demonstration, etc.]
- Video Length: [Provide the duration of the video according to the planned length]

Content Outline: The video covers the following topics:

- Introduction to [TOPIC]
- Explanation of core concepts and principles
- Demonstration of practical examples or applications
- Analysis of case studies or real-life scenarios
- Summary and key takeaways

After watching the video, reflect on the content and relate it to the module's learning objectives. Feel free to review the video multiple times if needed.



Assignment

Task Description: In this assignment, you must [Specify the task or prompt]. Your job may involve conducting research, analysing a case study, solving a problem, or any other relevant activity related to [TOPIC].

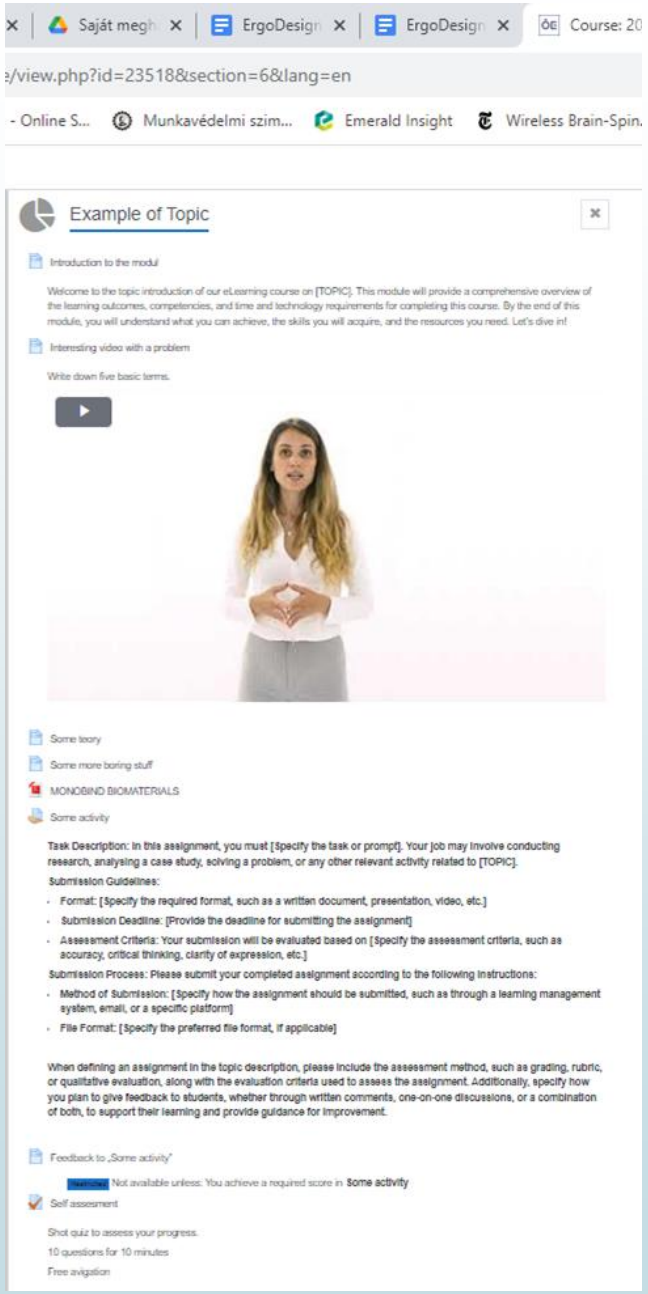
Submission Guidelines:

- Format: [Specify the required format, such as a written document, presentation, video, etc.]
- Submission Deadline: [Provide the deadline for submitting the assignment]
- Assessment Criteria: Your submission will be evaluated based on [Specify the assessment criteria, such as accuracy, critical thinking, clarity of expression, etc.]

Submission Process: Please submit your completed assignment according to the following instructions:

- Method of Submission: [Specify how the assignment should be submitted, such as through a learning management system, email, or a specific platform]
- File Format: [Specify the preferred file format, if applicable]

When defining an assignment in the topic description, please include the assessment method, such as grading, rubric, or qualitative evaluation, along with the evaluation criteria used to assess the assignment. Additionally, specify how you plan to give feedback to students, whether through written comments, one-on-one discussions, or a combination of both, to support their learning and provide guidance for improvement.



Checklist activity example

OP X-ray Analysis

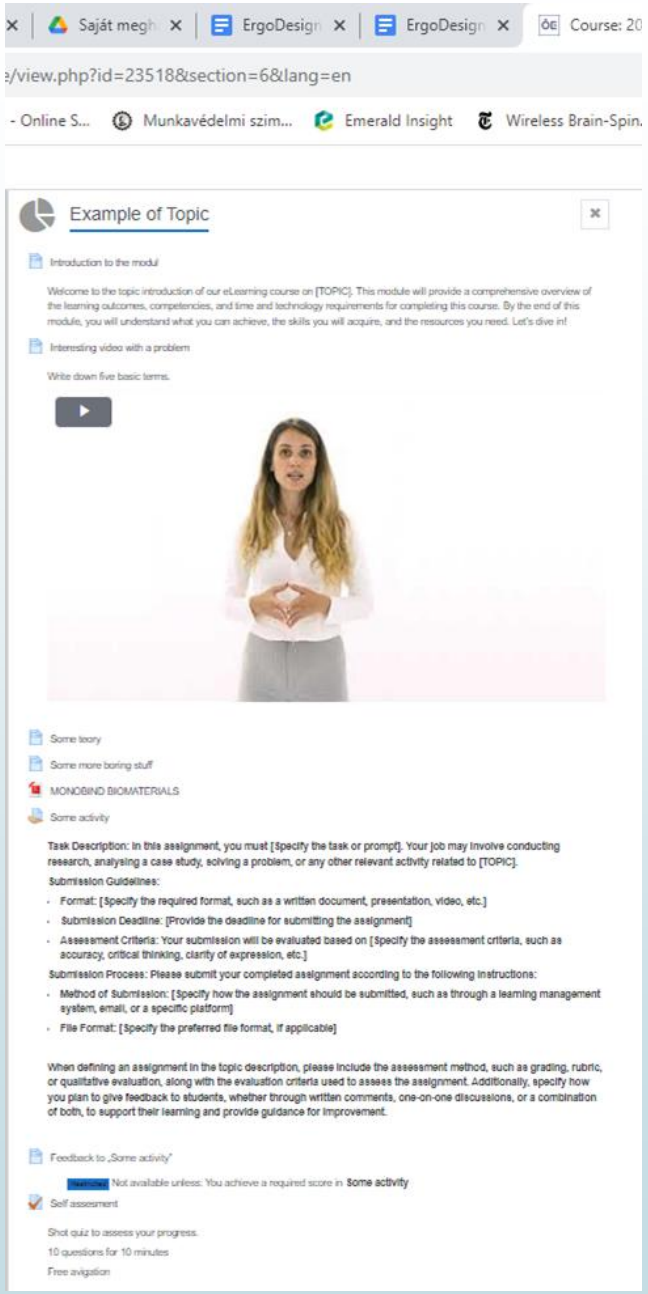
In this task, you will perform an analysis of an OP X-ray.

- *Step 1: Open the following image in an image editor:*

[Insert the URL of the image: https://www.researchgate.net/profile/Cosimo-Nardi/publication/354170590/figure/fig1/AS:1061455478681600@1630082115585/Panoramic-radiography-carried-out-perfectly-The-dark-space-between-the-two-dental-arches_W640.jpg]

- *Step 2: Identify the teeth and mark the upper left canine.*
- *Step 3: Identify the location of missing teeth.*
- *Step 4: Identify the decayed teeth.*
- *Step 5: Identify areas where the upper and lower dental arches do not align properly.*
- *Step 6: Make a recommendation for restoring chewing ability.*

You will find the correct solution on the following page.



Timeline

June 2023:

- PR4/A1: Preparation of the training material, elaboration Action Plan, and assessment materials (June 23)

July - August 2023:

- PR4/A2: Individual development of training materials and practical exercises

VARNA meeting we discuss outlines & wireframes

September – October 2023

- PR4/A2: Individual development of training materials and practical exercises

November - December 2023:

- PR4/A3: Collective revision of training materials and validation

Timeline

January - mid March 2024:

- PR4/A4: Piloting the e-learning training courses and exercises in the 5 countries
- PR4/A5: Assessment of students' learning outcomes (January)

Mid March – Mid April 2024:

- PR4/A6: Interviewing partners' trainers for getting qualitative information

Mid April – Mid May 2024:

- PR4/A7: Materials' improvement, validation

30 May release