TEASER

Teacher as Avatar

Teaching and learning scenario

Interactive Avatar for Classroom Safety

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I. Master Data and Context

- **Scenario Title and Abstract:** The scenario is titled **"Interactive Avatar for Classroom Safety."** It aims to increase trainees' awareness and understanding of **safety measures in the classroom and workshops** through the use of modern technologies. Instead of passive safety instructions, learners use interactive AI avatars that can be accessed via QR codes directly on the respective devices (e.g. CNC machines or welding machines). The core content includes providing clear instructions, describing risks and discussing security solutions in a digital form that appeals to today's youth.
- **Professional field and target group:**
    - **Occupational field:** The scenario is **located across sectors** within vocational education and training (VET), with a specific focus on **mechatronics** and technical workshop occupations.
    - **Target group:** The learning unit is aimed at **trainees in vocational training programmes** as well as their trainers and teachers. It is particularly designed for young learners who have grown up with digital media and for whom traditional, purely theoretical safety instructions are often not sufficient.
- **Learning objectives:** The skills to be acquired are divided into three areas:
    - **Knowledge:** Learners can identify and describe in detail specific **safety measures for various teaching and workshop equipment**. They understand how AI-powered avatars work and their role in conveying information.
    - **Skills:** Participants are able **to communicate safety instructions clearly**. They have mastered the technical handling of QR codes and the interaction with digital avatars via mobile devices. In addition, they can precisely name risks to machines and discuss solutions.
    - **Competencies:** The trainees develop the competence to apply the safety knowledge they have acquired **independently in real work situations**. They demonstrate responsible behavior in dealing with machines and strengthen their **digital literacy** through the reflective use of AI tools in the learning process.

II. Educational Design

- **The "Educational Question":** The central pedagogical problem is that **traditional safety instructions are** often perceived by trainees as **passive, theoretical and not very motivating**. The specific educational question is therefore: **"How can trainees in workshops be instructed more effectively and attractively about safety measures on potentially dangerous machines in order to increase engagement and retention of content?"**. The use of AI avatars solves this problem by **providing the instructions** directly on the scene in a modern way that is attractive to today's youth and can be repeated at any time. This relieves staff of repetitive instructions and at the same time ensures consistent quality of information.

- **Didactic setting:** The scenario is theoretically embedded in the European competence framework **DigComp 2.2**, with a focus on promoting **digital literacy** and the responsible use of technology. Within the framework of the **SAMR model**, the stage of **"augmentation" is** reached: the conventional safety briefing is not only replaced by a digital medium, but functionally improved by the use of QR codes and mobile devices, as it gives learners **immediate, needs-based access** to information. The chosen teaching method combines practical workshop work with **digital interaction**. The learning process is structured in four phases: introduction (orientation), implementation of the task (scanning of the QR codes on equipment such as CNC machines or welding machines), evaluation through safety quizzes and a final reflection.

- **Role of the trainer/teacher:** In this scenario, the teacher transforms from the sole knowledge broker to **moderator, coach and pedagogical advisor**. While the avatar takes over the standardized safety instructions, the teacher has the following tasks:

    - **Moderation and instruction:** Introduction to the session and demonstration of the technical handling of the QR codes and avatars.

    - **Coaching:** Supporting learners in the practical implementation and clarification of technical questions that go beyond the standard instructions.

    - **Expert review:** Ensuring that the AI-generated content is scientifically correct and that the trainees are confident in mastering the measures in reality.

    - **Quality assurance:** Monitoring of interactions and leading the final discussion in order to accompany the transfer of knowledge into real workshop practice. It is explicitly emphasized that avatars do not replace the teacher, but act as **digital assistants** so that there is more time for the individual development of the students.

III. Technological implementation

- **AI and avatar solution:** In this scenario, **interactive digital avatars** are used, which can be in **both 2D and 3D form**. In the learning process, the avatar primarily functions as a **demonstrator for machine safety** and as a **digital assistant**. Its specific function is to convey **safety instructions** and explanations of potential risks in hazardous workplaces (e.g. CNC machines, welding machines or soldering irons) in a consistent and engaging way. As young people today grow up with screens, the avatar serves as a modern interface to complement traditional, often overly theoretical safety briefings with repeatable **and motivating interaction**.
- **Technical tools:** The technological implementation is based on an integrated chain of hardware and specialized software:
    - **AI avatar software:** HeyGen is primarily used to create the talking avatars**,** as well as additional tools such as **D-ID, Voki or Ready Player Me**. HeyGen makes it possible to generate lip-sync videos in over 40 languages from texts.
    - **Learning platforms:** Content is delivered via the **LMS Moodle** or **Microsoft Teams**, with the learning environment often dovetailed with a custom GPT that supports teachers in creating lesson plans according to the DigCompEdu framework.
    - **Hardware:** Learners use their **own mobile devices (smartphones or tablets)** to retrieve the information as needed.
    - **Trigger system:** Physical **QR codes** are attached directly to the respective machines. By scanning the code, the specific security video of the avatar is launched immediately on the student's device.
- **Software-hopping approach:** The creation of the content follows the low-threshold approach established in the TEASER project, in which different tools are combined without programming effort. This process usually involves the following steps:

1. **Text optimization:** The technically correct security texts are prepared by teachers (experts) and, if necessary, linguistically refined with **ChatGPT** or translated into different languages.

2. **Avatar generation:** The optimized text is fed into **HeyGen** to create a video with a talking avatar, allowing for fast and cost-effective production.

3. **Deployment and linking:** The finished video is uploaded to platforms such as **YouTube** (to use automatic subtitles) and **linked to a physical label that is attached to the machine** via a QR code generator.

4. **Interactive addition:** To secure results, ChatGPT is used to create additional **knowledge quizzes** based on the video transcripts , which are embedded in the LMS.

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IV. Detailed Lesson Plan

The scenario is designed as a structured teaching unit with a total duration of about **45 to 50 minutes** . The aim is to increase the safety awareness of trainees by integrating interactive avatars and QR codes into workshop environments.

1. Introduction and orientation

- **Duration:** 10 minutes.
- **Contents:** Identification and description of safety measures for equipment in the classroom or workshop. The aim is to improve the understanding of prevention measures and to promote engagement through technology integration.
- **Activities:**
    - **Learners:** Deal with the learning objectives and prepare for the use of digital tools.
    - **Teachers:** Introduce the session, guide learners in the use of QR codes and avatars, and encourage collaboration.
- **Media:** Learners' mobile devices (smartphones or tablets), QR code generators, interactive avatar software.

2. Execution of the task

- **Duration:** 15 minutes.
- **Content:** Practical understanding and application of security measures on devices as well as strengthening digital literacy through QR code interaction.
- **Activities:**
    - **Apprentices:** Scan QR codes attached directly to workshop equipment (e.g., CNC machines, welders, or soldering irons). They access safety instructions presented by an interactive avatar (e.g. wearing protective equipment, emergency stop functions).
    - **Teachers:** Demonstrate the scanning process and interaction with the avatar; they accompany the learners through the tasks to support them.
- **Media:** Avatar-based communication, QR codes on machines, avatar software (e.g. HeyGen, D-ID).

3. Evaluation / Review

- **Duration:** 15 minutes.
- **Contents:** Formative performance evaluation, self-reflection and review of the level of knowledge on the safety instructions.
- **Activities:**
    - **Learners:** Take an interactive safety quiz, fill out reflection forms on their confidence in the safety measures, and present results to the group. They give each other feedback.

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- **Teachers:** Moderate the quiz, clarify remaining questions and evaluate group presentations as well as individual contributions in terms of clarity and accuracy.

- **Media:** Interactive platforms (e.g., Kahoot!, Google Forms), whiteboard, assessment tools.

4. Completion of the session

- **Duration:** 5 to 10 minutes.
- **Contents:** Summary of the most important safety precautions and linking the learning content with real application scenarios in laboratory or workshop practice.
- **Activities:**
  - **Apprentices:** Summarize the safety measures and discuss in a final round how the knowledge gained can be applied in everyday working life.
  - **Teachers:** Lead the final discussion, give constructive feedback on the students' reflections and promote the transfer of knowledge into real practice.
- **Media:** reflection handouts, collaborative platforms (e.g., Padlet), QR code summary video of the avatar.

V. Resources and collateral

1. Videos

AI-generated avatar videos serve as the basis for work. These provide precise instructions for different workshop areas:

- **Video: CNC machine**
  - *Core content:* Instructions on wearing personal protective equipment (safety goggles, hearing protection, safety shoes).
  - *Safety rules:* prohibition of gloves during operation; Checking the guards and the emergency stop switch before take-off; Keeping the work area clean without using your hands for metal shavings.
- **Video: Electrical Engineering / Lathe**
  - *Core content:* Warning against operation with wet hands or in humid environment.
  - *Maintenance:* Regular inspection of cables and connectors; Ensuring grounding; Disconnection from the power grid before maintenance.
- **Video: FabLab Environment**
  - *Core content:* General respectful handling of equipment.
  - *Code of conduct:* No installation of unauthorized software; prohibition of eating and drinking at the machines; Properly leaving the cables and components at the end of the session.

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2. Interactive Components

The interactivity is realized by linking physical triggers and digital exam formats:

- **QR code trigger system:** Physical QR codes are attached to the potentially dangerous machines (e.g. welding machines, CNC). Scanning with mobile devices gives learners immediate access to the avatar's specific security instructions.
- **Knowledge quizzes and feedback loops:** Interactive quiz platforms such as **Kahoot!** or **Google Forms** . These include multiple-choice questions about the avatar's instructions and give learners instant feedback on their level of knowledge.
- **Custom GPT for teachers:** A purpose-built **AI agent (GPT)** helps teachers efficiently create lesson plans according to the DigComp 2.2 framework and check the pedagogical consistency of safety briefings.

3. Media Portfolio

The portfolio includes the visual and audiovisual tools necessary for the implementation of the learning unit:

- **HeyGen Avatar Suite:** The videos of the talking avatars were created with the web application **HeyGen** . This tool enables lip-sync video generation in over 40 languages (including Slovenian and English), which has been proven to increase learners' curiosity and engagement.
- **YouTube repository:** The videos are uploaded to a dedicated **teaser YouTube channel** . This allows the use of automatic subtitles in different languages to increase accessibility.
- **Integration platforms:** The learning content and quizzes are embedded in the **LMS Moodle** or **Microsoft Teams** , ensuring a structured learning path and easy documentation of the results.
- **Hardware basis:** The learners use their **own smartphones or tablets** to carry out the simulations directly at the point of need (the machine).

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