



TEASER

Teacher as Avatar

Teaching and learning scenario

Python Basics with AI Avatars

Guidance



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I. Master Data and Context

- **Scenario Title and Abstract:** The scenario is titled "**Python Basics with AI Avatars Guidance**". It provides a basic introduction to the world of programming for beginners in the IT and software development field. The core content includes teaching fundamental **Python concepts such as variables, loops, functions, and conditions**. The special feature of this scenario lies in the methodological combination: An **AI-generated avatar (Synthesia)** guides through the learning content, while the learners use the **Programiz Online Python Compiler** to test their codes and use **ChatGPT** as an interactive "buddy" for debugging and the development of learning strategies.
- **Professional field and target group:** This scenario is located in the professional field of **IT, software development and general digital skills** . The target group is divided into:
 - **Apprentices:** Programming beginners, VET learners at the beginning of their Python training, as well as people from unrelated fields such as business or finance who need to acquire basic IT skills.
 - **Teachers:** IT instructors and VET teachers who want to integrate innovative digital tools into their teaching. The scenario is designed to give learners without a deep technical background access to abstract coding concepts.
- **Learning objectives:** The competencies to be acquired are divided into three categories:
 - **Knowledge:** Understanding of basic Python syntax and logic (variables, data types, control structures such as loops and conditions) as well as the role of AI support in the modern programming process.
 - **Skills:** The ability to execute program code independently, identify errors in the code (debugging), adapt existing code to new requirements, and interact specifically with AI tools to support programming.
 - **Competencies:** Development of strategies for **independent problem solving** and iterative testing. Learners are enabled to systematically correct errors using AI-supported approaches and to develop a critical reflection on the possibilities and limits of AI in programming.

II. Educational Design

- **The "Educational Question":** The central pedagogical challenge in programming education is that beginners often have difficulty grasping **abstract coding concepts** and are quickly frustrated **when debugging**. The scenario addresses the specific question: **"How can AI-powered avatars in the LMS act as real-time companions to help learners troubleshoot Python programming?"**. The use of AI and avatars solves this problem by providing clear step-by-step explanations, reducing cognitive overload and making learners feel like they have a **"24/7 coding buddy"** by their side.
- **Didactic setting:** The scenario is embedded in the European competence frameworks **DigComp 2.2** and **DigCompEdu**, with particular support for problem-solving and digital content creation. In the **SAMR model**, the unit reaches the level of **"modification"** as AI-powered iterative troubleshooting and code optimization functionally changes and deepens the learning process. The teaching method follows the **4-phase model established in the project**:
 1. **Orientation: (5 min.)** An avatar introduces Python basics (variables, loops, functions).
 2. **Completion (8 mins):** Learners independently create a "Hello World" program in an online compiler.
 3. **Evaluation/Check (10 min.):** Active troubleshooting of faulty code snippets with the support of ChatGPT.
 4. **Conclusion (8-10 min.):** Joint reflection on the possibilities and limitations of AI in programming.
- **Role of the trainer/teacher:** In this scenario, the teacher acts primarily as a **facilitator and coach**. It takes a back seat as a knowledge broker, as the theoretical content is covered by the avatar and the AI. Responsibilities include:
 - **Introduction and guidance:** Set the framework for the session and guide learners in using the online compiler.
 - **Learning process monitoring:** Observe progress, take notes on interaction behavior with AI and provide support in the event of technical hurdles.
 - **Facilitation and clarification:** Lead the final discussion round to clear up misunderstandings and ensure that the pedagogical goals have been achieved.

III. Technological implementation

- **AI and avatar solution:** In this scenario, an **AI-generated avatar** is used, which primarily provides **linear instructional content** and walkthroughs of programming concepts. The avatar takes on the role of a **structured visual instructor** in the learning process, introducing the topics, demonstrating code examples and guiding the learners step by step through the exercises. This visual guidance complements the AI's text-based feedback and acts as a motivating element to reduce the cognitive load of learning abstract syntax rules. It mainly uses **2D avatars** created using specialized platforms to ensure consistent knowledge transfer without human intervention at each session.
- **Technical tools:** The technical infrastructure is based on a combination of web-based platforms and standard hardware:
 - **AI Avatar Tool: Synthesia** is used to quickly generate the video tutorials, converting text into lip-sync avatar speeches.
 - **Interactive AI (Assistant): ChatGPT** serves as a real-time companion for questions and answers (Q&A) as well as a crucial tool for **debugging** (debugging) in the program code.
 - **Programming tool:** The **Programiz Online Python Compiler** is used as an integrated development environment in the browser, allowing learners to execute and test code directly without having to install software locally.
 - **Learning Platform (LMS):** Content is integrated with a popular **LMS such as Learnpress** , which acts as a one-stop shop for videos, quizzes, and interactive paths.
 - **Hardware:** Performed on standard **laptops or PCs** with stable internet access.
- **Software-hopping approach:** The creation of the learning content follows the **low-threshold "software-hopping approach" established in the TEASER project**, which interlocks various tools with each other without any programming effort.
 1. **Content optimization:** First, technical scripts are created and linguistically refined by **ChatGPT** to ensure a didactically valuable approach.
 2. **Video production:** These optimized texts are imported into **Synthesia** to generate the avatar that explains the theoretical basics (such as variables and loops).
 3. **Interactive application:** The finished videos are combined in the LMS with the **Programiz Compiler** and specific **ChatGPT prompts** . This process allows instructors to create professional and interactive digital learning experiences even without in-depth multimedia skills.

IV. Detailed Lesson Plan

This lesson plan is designed to teach novice programmers basic Python concepts in an interactive, AI-powered environment.

1. Introduction and orientation

- **Duration:** 5 minutes.
- **Content:** Learners will be introduced to the importance of programming with **Python**, a language used by companies such as Google, Netflix, and NASA. Core concepts such as **variables** (as "labeled boxes"), **loops** for automation, **conditions** for logical decisions, and **functions** as reusable pieces of code are presented. In addition, the role of AI as a "24/7 coding buddy" is explained.
- **Activities:**
 - **Learners:** Viewing the avatar-based video tutorials and first interactions with ChatGPT.
 - **Teacher:** Gives an overview of the session, guides learners through the setting, and highlights the key points of the video tutorials.
- **Media:** **Synthesia avatar videos**, ChatGPT.

2. Execution of the task

- **Duration:** 8 minutes.
- **Contents:** Practical application of basic Python functions. The goal is to create and execute a first program that outputs a message on the screen.
- **Activities:**
 - **Learners:** Use the **Programiz Online Python Compiler** to output a message such as "Hello, Geo". They delete existing sample code and write their own commands based on the avatar instructions.
 - **Teacher:** Guides learners in interacting with the online compiler, monitors progress through note-taking, and moderates group sharing.
- **Media:** AI avatars, **Programiz Online Python compiler**.

3. Evaluation / Review

- **Duration:** 10 minutes.
- **Contents:** **Troubleshooting** and correction of common coding errors (bugs).
- **Activities:**
 - **Learners:** Complete the "**Fix the Code**" challenge. They analyze erroneous code snippets (e.g., misspellings such as `prnt` instead of `print`, or missing quotation marks). They use ChatGPT specifically for tips ("Why doesn't my code work?") and present their solutions.
 - **Teacher:** Provides feedback to fill knowledge gaps, reinforces the concepts learned, and performs an evaluation of the results.
- **Media:** ChatGPT, Programiz Compiler, AI Avatar.

4. Completion of the session

- **Duration:** 8–10 minutes.
- **Contents:** Summary of what has been learned and reflection on the use of AI in software development.
- **Activities:**
 - **Learners:** Summarize the learning outcomes and discuss the main challenges and the help provided by AI.
 - **Teacher:** Moderates the final discussion, addresses the limits of AI and the importance of human intervention, and clears up any final misunderstandings.
- **Media:** Group discussion, moderated by the teacher (facilitator).

V. Resources and collateral

1. Videos

The theoretical teaching is based on **Synthesia avatar videos**:

- **Phase 1: Unlock the Power of Python – Your First Steps into Coding**
 - *Content:* Definition of programming as a step-by-step instruction for computers. Introduction to Python as a beginner-friendly language used by Google, Netflix, and NASA.
 - *Concepts:* Explanation of **variables** (data that can change), **loops** (repetition of actions), **conditions** (control of logic), and **functions** (reusable pieces of code).
 - *AI role:* Introducing AI as a "**24/7 coding buddy**" that helps debug and learn.

- **Phase 2: Python Functions and Syntax Basics**
 - *Content:* Focus on **syntax** as the "grammar of the code".
 - *Practice:* Explanation of the `print()` function for displaying messages, using variables as "containers" for information, and using **comments (#)** for human readability.
 - *Instruction:* Prompt to open the **Programiz Online Compiler** and write a first program ("Hello, Geo").
- **Phase 3: Fix the Code**
 - *Content:* A coding challenge for troubleshooting.
 - *Examples:* Analysis of snippets with typos (e.g. `prnt` instead of `print`) or missing punctuation marks (quotation marks, brackets).
 - *Motivation:* Debugging is described as a way to **build** up "programming superpowers".

2. Interactive Components

The scenario integrates various tools for active, exploratory learning:

- **ChatGPT as a debugging assistant:** Learners are expressly encouraged to consult ChatGPT directly in the event of error messages (e.g. "Why doesn't my code work?"). The AI provides step-by-step instructions for troubleshooting.
- **AI-supported basics quiz:** After completing the tasks, a **4-question quiz** on the Python basics can be started.
 - *Feedback loop:* The AI not only outputs a score, but also provides **personal feedback** and individual tips for improvement.
- **Programiz Online Python Compiler:** A browser-based tool that allows code to be executed and tested instantly without local installation.

3. Media Portfolio

- **Avatar Videos:** A suite of linear instructional videos created with **Synthesia**.
- **YouTube Portfolio:** Direct links to the videos for each stage:
 - Phase 1: *Unlock the Power of Python*.
 - Phase 2: *Python Functions and Syntax Basics*.
 - Phase 3: *Fix the Code*.
- **Visual materials:** Screenshots of correct syntax and graphical representations of variables as "labeled boxes" to illustrate abstract concepts.