

# DigiFit4All - Advantages and Challenges of Competency-Based and Personalized Open Online Courses (POOCs)

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**Abstract.** Over the past decades, Massive Open Online Courses or short MOOCs have become increasingly popular. Although they offer many benefits, some challenges have emerged over time. Mass courses are needed to address increased demands, diversity, and heterogeneity among learners. Therefore, the DigiFit4All project was initiated to develop Personalized Open Online Courses (POOCs) based on competency models. It also includes creating course materials related to digital skills and informatics. This poster provides an overview of the DigiFit4All project, highlights relevant points, and illustrates some advantages and challenges associated with POOCs.

**Keywords:** Personalized Open Online Courses · Digital Skills · Competency based

## 1 Introduction

Since their introduction in 2008 by George Siemens and Stephen Downes, Massive Open Online Courses (MOOCs) have significantly impacted the educational landscape. [1] They rapidly gained popularity as an effective alternative to traditional classroom-based learning. The New York Times called 2012 the 'Year of the MOOC' because of all the hype around MOOC platforms. [2] However, challenges related to learner diversity and individual needs began to surface as their use grew. This led to the development of Competency-based and Personalized Open Online Courses (POOCs). This paper will explore the benefits and challenges of competency-based and individualized open online courses, focusing on the DigiFit4All<sup>1</sup> project, which uses the *GECKO*<sup>2</sup> and *KAUA*<sup>3</sup> platforms developed at the University of Klagenfurt to personalize the courses.

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<sup>1</sup> <https://www.digifit4all.at/>

<sup>2</sup> <https://gecko.aau.at>

<sup>3</sup> <https://kaua.aau.at>

## 1.1 The DigiFit4All Project

The DigiFit4All project started in 2020 as a collaboration between the University of Klagenfurt, Vienna University of Technology<sup>4</sup>, Johannes Kepler University Linz<sup>5</sup>, and Danube University Krems<sup>6</sup>. The project aims to provide competency-based and personalized open online courses for Austrian universities' pupils, students, teachers, and administrative staff. The focus also includes providing materials related to digital skills and information technology tailored to the individual needs of each participant. [3, 4]

## 1.2 Platforms Used in the Project

In DigiFit4All, several platforms are used to enable the creation of POOCs. The GECKO (Graph-based Environment for Competency and Knowledge-Item Organization) platform was developed to collect and analyze curricula, educational standards, and competency models [5]. It has been adapted for the DigiFit4All project and extended to include several functions like connecting learning objects and competencies or creating courses based on selected competencies. GECKO enables the collection, management, and creation of competency models and the calculation of learning paths within these models. These learning paths serve as the foundation for generating personalized online courses. KAUA (Košice and Alpen-Adria University Assessment) is an online platform for anonymized long-term surveys [6]. In DigiFit4All it is used for pre- and post-tests for participants to enable individualization and assessment. Finally, POOCs created in GECKO are exported to the LMS Moodle, where learners can complete the course.

## 1.3 Workflows for Teachers and Learners

Teachers log in to set up or modify a course in the GECKO platform. They pick the skills they want pupils or students to learn, choose any needed prerequisites, and select teaching materials. They can also create exams and add their assessments. Finally, they import everything into the course. The workflow for learners is to log in through their institution's learning management system (in case of the project Moodle), and start with a pre-test to create a personalized learning profile. This profile customizes the course content to focus on areas needing more help. After studying the materials, students take a post-test to check their progress, which does not impact their final grade. [3]

## 2 Advantages

Competency-based and personalized open online courses offer many benefits. Personalized Open Online Courses (POOCs) are an extension of traditional

<sup>4</sup> <https://www.tuwien.at/>

<sup>5</sup> <https://www.jku.at/>

<sup>6</sup> <https://www.donau-uni.ac.at/de.html>

MOOCs, offering flexible, globally accessible learning tailored to individual students' unique needs, paces, and styles. [7] These courses use adaptive learning paths to help students focus on their strengths and address weaknesses, enhancing motivation and engagement by making learning relevant to their interests and goals. POOCs break down geographical and time barriers, providing flexible access to education from anywhere. They can serve many students simultaneously without compromising quality, incorporating instant feedback to improve learning effectiveness. By reducing the need for physical infrastructure, POOCs lower education costs and are especially beneficial for non-traditional students, such as working professionals, parents, and those with learning disabilities. [8] For teachers POOCs and primarily DigiFit4All provide additional advantages. They can use the materials for their students and take on the role of coaches. This gives them the time to support students with problems and to accompany them more intensively in the learning process. Interviews with participating teachers show that selecting competencies to create a course is very useful.

### 3 Challenges

Competency-based and personalized open online courses face several challenges. Customizing learning paths requires complex and expensive technology. Accessibility can be an issue, particularly for those with poor internet access. Students need technical proficiency and reliable internet access, which can disadvantage those without these resources. Additionally, the limited interaction and support in POOCs may make learning more difficult, as these courses often lack the face-to-face engagement and networking opportunities found in traditional programs. The self-paced nature of POOCs requires high levels of self-motivation and discipline from students, as the lack of structure can reduce engagement. [8] Two significant challenges were examined and dealt with through master's theses.

#### 3.1 Security in a Web-based System

Reliable and scalable technology is essential for a good user experience, and data privacy is crucial given the handling of sensitive information. The main actions to ensure the security of the DigiFit4All project are based on given standards for secure software development. In the first step, 34 actions were identified and prioritized, including password confirmation and reset via e-mail, automatic account logout, or password strength display. [7]

#### 3.2 Quality Assurance of Course Material

Quality assurance is needed to ensure learning goals are clearly defined and effectively taught. By selecting learning goals from the collection in GECKO, users or course developers don't need to determine their own goals. The material created during the project is evaluated according to a specially defined quality model, including 17 prioritized criteria grouped into content, didactic design,

accessibility, and usability. Experts used these criteria in several iterations to show which aspects of the created material had to be improved or revised. It showed that the DigiFit4All material has its strength in content and accessibility, whereas the didactic design needed some adjustment. [9]

## 4 Conclusion

The DigiFit4All project aims to deliver competency-based and personalized open online courses (POOCs) tailored to the needs of learners. The GECKO platform, central to this project, helps create and manage personalized learning paths by allowing educators to design and adjust courses based on specific competencies. POOCs extend the benefits of traditional MOOCs by offering flexible, globally accessible learning that adapts to individual needs, breaks down geographical barriers, and lowers costs. However, challenges include the complexity and cost of technology, ensuring quality, maintaining student motivation, and addressing accessibility and technical issues.

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