Conceptualization of a Platform to Generate Personalized Open Online Courses (POOCs)

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DigiFit4All

Introduction

- Online learning frequently used
- Different Forms:
  - Blended Learning
  - Video Conferencing
  - Learning Management Systems (LMS)
  - Massive Open Online Courses (MOOCs)
  - Personalized Open Online Courses (POOCs)
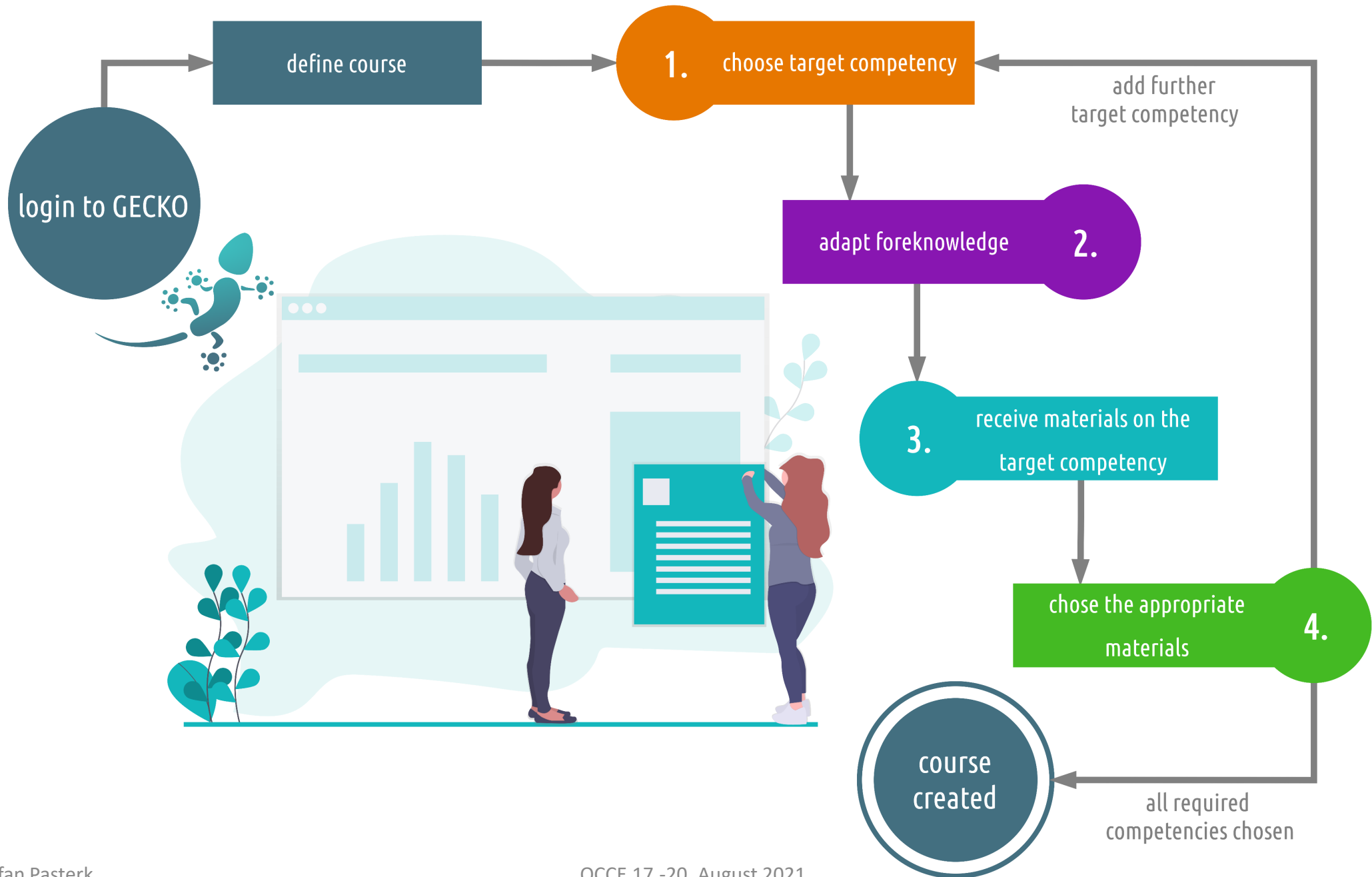
Components in POOCs

Component	Approach				
	Leung[1]	El Mawas[2]	Brinton[3]	Xi[4]	DF4A
Pre-test	Yes	Yes	No	No	Yes
Post-test	Yes	No	No	No	Yes
Learning paths	Yes	Yes	Yes	Yes	Yes
User behaviour	No	No	Yes	Yes	No
Repository	No	No	Yes	No	Yes
LMS integration	Yes	Yes	No	No	Yes
Exams	No	No	No	No	Yes

DigiFit4All: Overview

- Foster **digital** and **computer science** competencies
- Development of **personalized courses** (POOCs) in a customized form
  - **Resources** (OERs) are stored in the project repository
  - National and international **competency models** form the basis
  - Learning paths based on **graph model**

- **Different target groups:** pupils, teachers, students, administrative staff
- **Runtime:** May 2020 – April 2024

Workflow: Teacher

login to GECKO

define course

1. choose target competency

add further target competency

adapt foreknowledge 2.

3. receive materials on the target competency

chose the appropriate materials 4.

all required competencies chosen

course created

login to GECKO

GECKO (Graph-based Environment for Competency and Knowledge-Item Organization) [5]

- Platform for competency management and graph representation
- Contains national and international curricula, educational standards, and competency models
- Represented as graphs including competencies as nodes and their dependencies as edges

define course

1. choose target competency

ECKO

adapt foreknowledge

Teacher creates an empty course

Course includes metadata (e.g. name, creator, date, category)

Competencies can be filtered

Teacher selects competencies to reach with the learners in the course

3.

rece

t

adapt foreknowledge   2.

Prerequisites are calculated using graph model [5]

Learning paths to target competencies are generated [5]

receive materials on the

3.

target competency

3. receive materials on the target competency

4. chose the appropriate materials

Learning Objects
- Digital resources
- Set of assets (video, document, quiz, etc.)
- Stored online in repository
- Characteristics:
  - reusable
  - Independent

Teacher selects resources
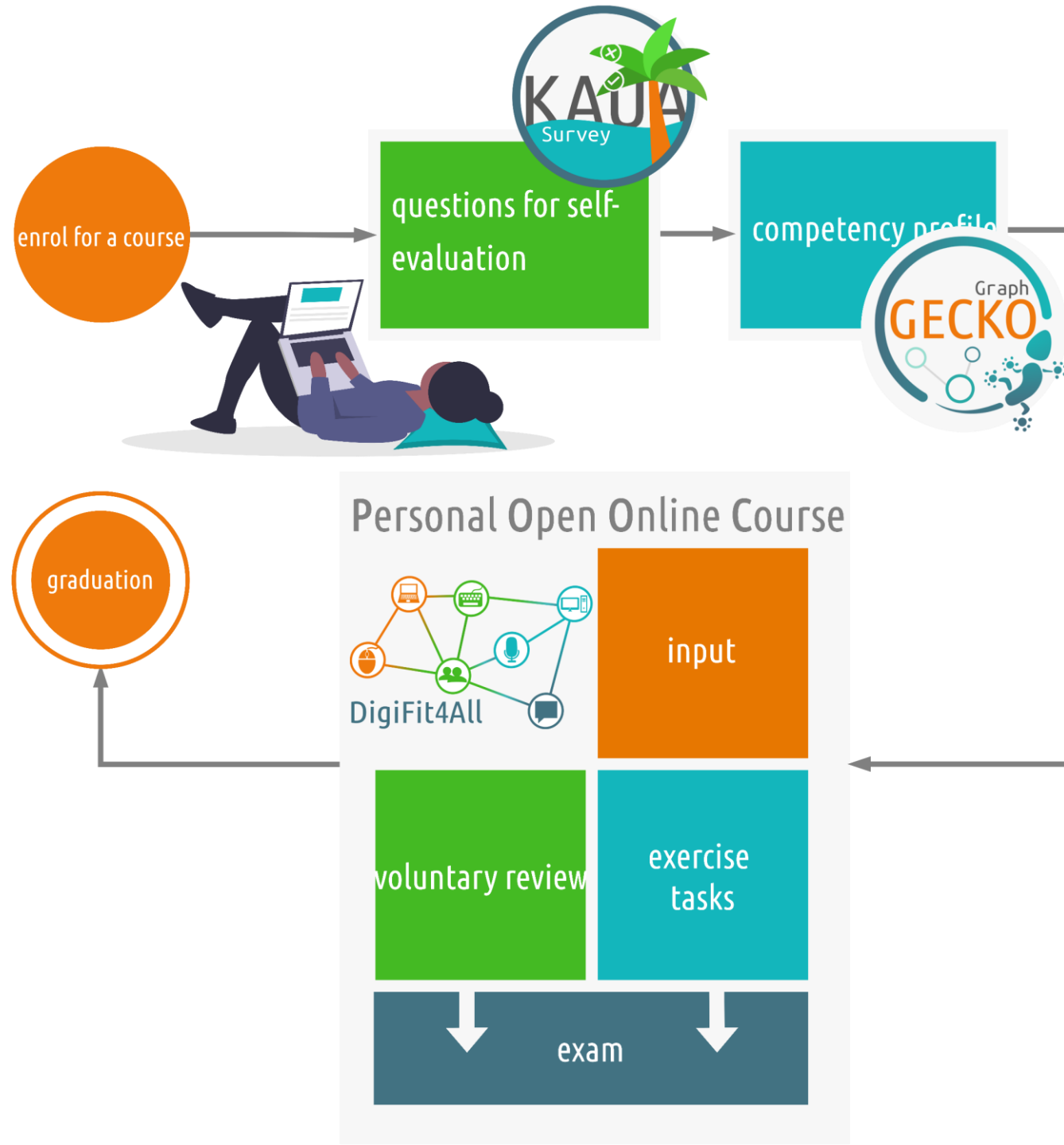
course created

all required competencies chosen

materials

course created

all required competencies chosen

Workflow: Learner

Personal Open Online Course

enrol for a course → questions for self-evaluation → competency profile

KAUA Survey

Graph GECKO

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input

voluntary review

exercise tasks

exam

graduation

questions for self-evaluation

(Self-) Assessment [6]
- Flexible and automized tests (pre- and post-test, optional exam)
  - Questions are connected to the competencies
  - Teacher can add/remove questions
- Use of the KAUA (Košice and Alpen-Adria University Assessment) platform
  - No personal data of participants is stored
  - Participants are recognized via a hash

Personal Open Online Course

Personal Open Online Course

DigiFit4All

input
voluntary review	exercise tasks

exam

Support for Learning Management Systems (LMS)
- Direct connection between GECKO, KAUA and LMS
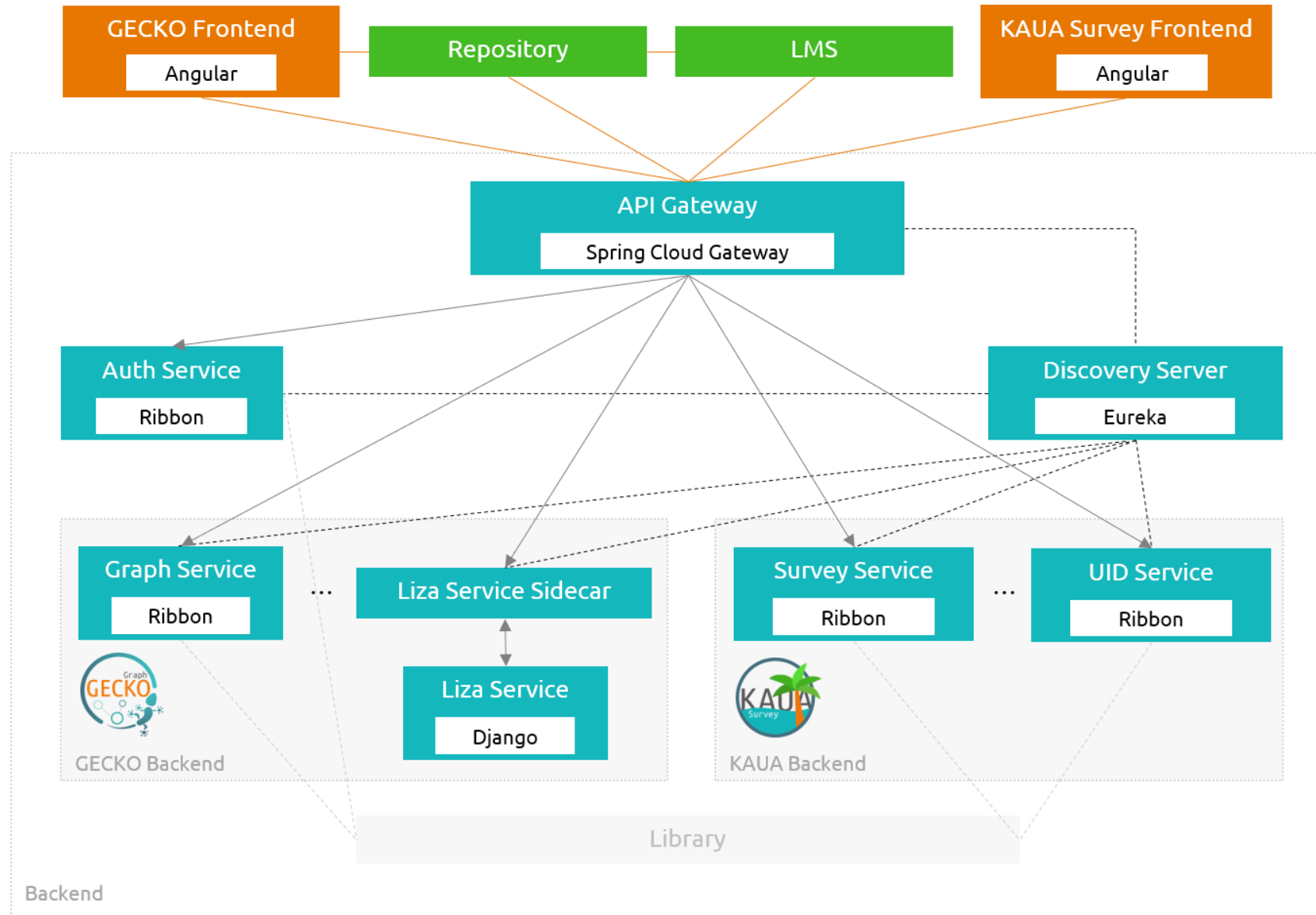- Import of data from repository by a plugin

graduation

Personal Open

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Architecture

GECKO Frontend
Angular

Repository

LMS

KAUA Survey Frontend
Angular

API Gateway
Spring Cloud Gateway

Auth Service
Ribbon

Discovery Server
Eureka

Graph Service
Ribbon

...

Liza Service Sidecar

Survey Service
Ribbon

...

UID Service
Ribbon

GECKO Graph

Liza Service
Django

KAUA Survey

GECKO Backend

KAUA Backend

Library

Backend

Summary

- POOCs include different components

- DigiFit4All
  - Foster **digital** and **computer science** competencies
  - **Graph representation** of national and international **competency models**
  - **Pre-tests** to personalize courses for learners
  - **Resources** (OERs) are stored in the project repository
  - **Target groups:** pupils, teachers, students, administrative staff
  - Microservice architecture for later addons

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https://www.digifit4all.at/

https://gecko.aau.at/

https://kaua.aau.at/

References

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