DIGITAL SOVEREIGNTY OF OLDER CITIZENS FOR A SELF-DETERMINED USE OF PERSONAL HEALTH RECORDS: E-LEARNING DESIGN AND STUDY RESULTS FROM THE EPA-COACH PROJECT.

EDEN Digital Learning Europe Annual Conference in Dublin (EDEN 2023)

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The ePA-Coach project aims to foster the digital sovereignty of older citizens in the context of EHR/PHR and to deliver an interactive learning application that allows senior learners to acquire digital competencies relevant to digital sovereignty in using PHR.

ePA: Electronic Health Records

In Germany, health insurance funds are required to provide policy-holders with PHR (in German: **elektronische Patientenakte, ePA**).

Electronic Health Records (EHR) and **Personal Health Records (PHR)** aim to enhance digital health services.

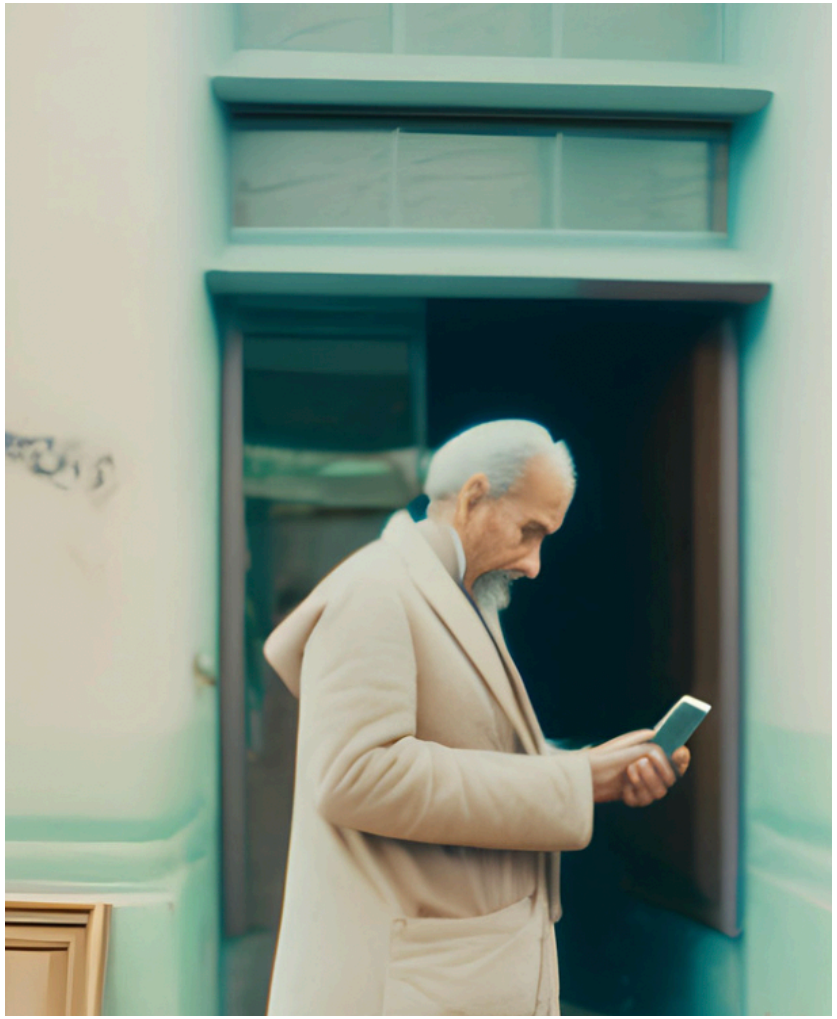
- **EHR** has been used to increase the quality of healthcare and serve as digital repository with patients' information controlled by health organisations (e.g. hospitals, clinics).
- **PHR** has been used to enable citizens to store and manage their own health-related data and serve as health records controlled by the patient (Roehrs, 2017).

Equal participation in the healthcare system

For older citizens using PHR may be a barrier to equal participation in the healthcare system (Gellner et al. 2021).

The study by Taha et al. (2013) showed that both middle-aged (40-59 yrs) and older adults (60-85 yrs) **experience difficulties in using PHR**, such as managing common health tasks, reviewing and interpreting lab results.

Studies have shown that the use of the **PHR** requires a **set of competencies** ti use PHR (general capability to use digital technologies, and specific skills in the management of digital medical records according to regulations within a given national healthcare system) (Day et al., 2012).



Digital Literacy of older citizens

Promoting digital literacy and digital sovereignty of older citizens has entered policy-agendas in Europe. In 2022 the Council of Europe published **“The Digital Era? Also my Era!”**, calling for **promoting digital literacy among senior citizens** to ensure their equal access to digital services (Hermans, 2022).

Empowerment in using technologies

Digital citizenship has emphasised individual choices and rights to participate in society, addressing the question of

“How the digital facilitates new forms of participation?”

(Pangrazio & Sefton-Green, 2021, p. 18).

According to the European **“DigComp” framework “engaging in online citizenship”** means

“to participate in society through online engagement, to seek opportunities for self-development and empowerment in using technologies and digital environments, to be aware of the potential of technologies for citizen participation”

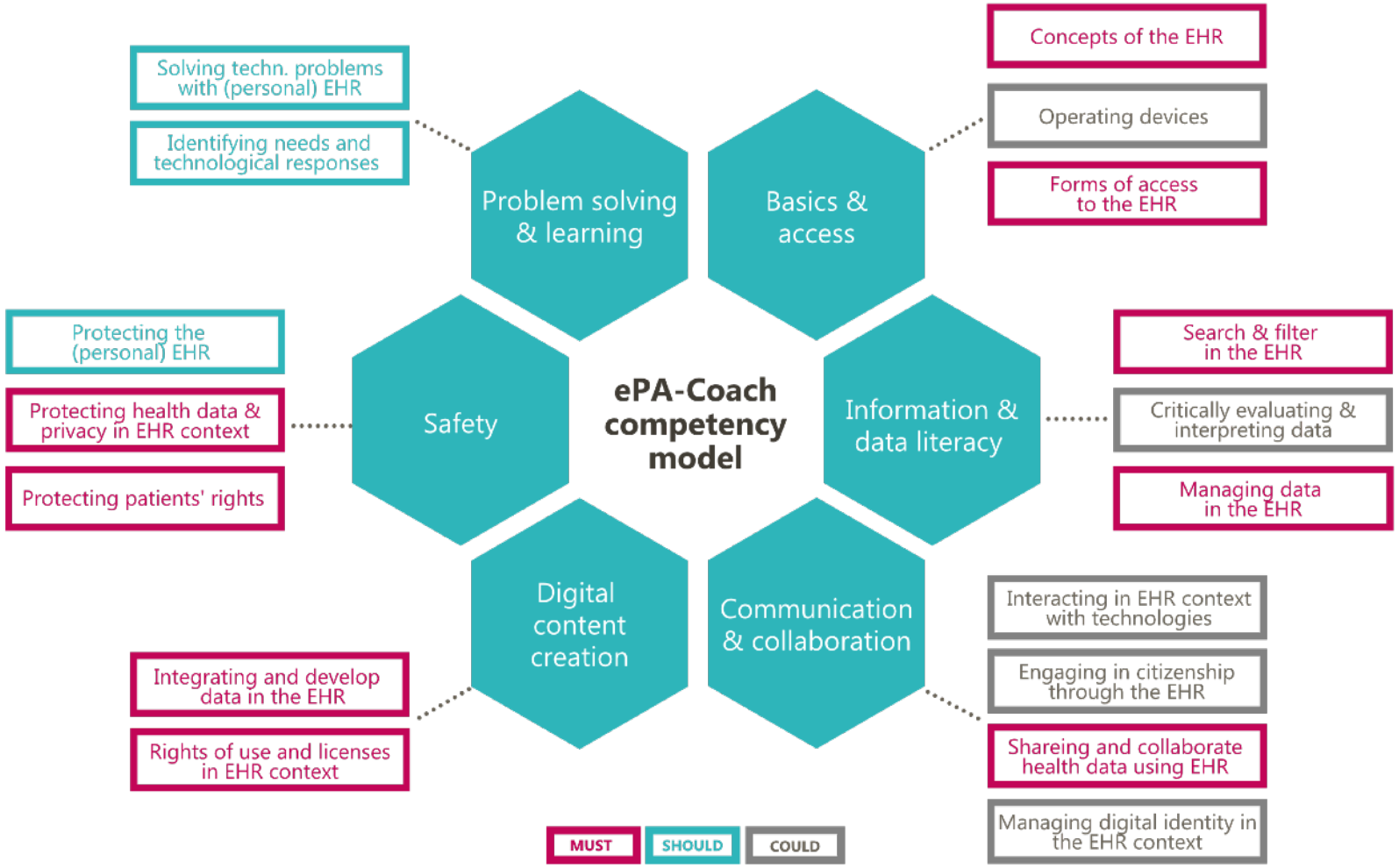
(Ferrari 2013, p. 5)

ePA-Coach: Project aims

The **ePA-Coach project** aims to

- promote *informational autonomy and digital sovereignty of senior citizens*
- develop *a coaching-based e-learning application for older adults* to enhance their *digital literacy* as an enabler for effective use of PHR.
- support older adults in *learning how to operate their own PHR in a self-determined way*
- provide an *engaging learning experience* based on the eight motivational drives specified in the Octalysis gamification/motivational framework.

ePA-Coach Framework for Digital Sovereignty



The digital competence framework in the ePA-Coach project is based on the European “DigComp” framework (Vuorikari et al, 2022).

The ePA-Coach framework was adapted to the use of PHR by older citizens:

(1) Basics & access (basic knowledge about PHR, registration, authorisation);
(2) Handling of information & data (managing data, searching, filtering, deleting);
(3) Communication & collaboration (exchanging health data, allowing and revoking access, authorising);
(4) Digital content creation (adding data and information to PHR);
(5) Safety (understanding PHR terms of use, declaration of consent, termination, revoking termination)..

Digital Competencies at 3 Levels

	Level 1 **Beginner**	Level 2 **Advanced**	Level 3 **Expert**
Complexity Level	low, basic and easy tasks	higher, clearly defined tasks	highest, best practices for given tasks
Autonomy Level	independent, with guidance if needed	independent, with minimum guidance	guiding others, adapting to others‘ needs
Cognitive Level	remembering	understanding	application

Each competence area includes several competencies subdivided into three levels: (1) Beginner; (2) Advanced; (3) Expert differentiated into complexity, autonomy, and cognitive levels (Figure 1). A detailed overview of the ePA-Coach competence framework was described by Gellner, Kaiser & Buchem (2021).

ePA-Coach E-Learning Application

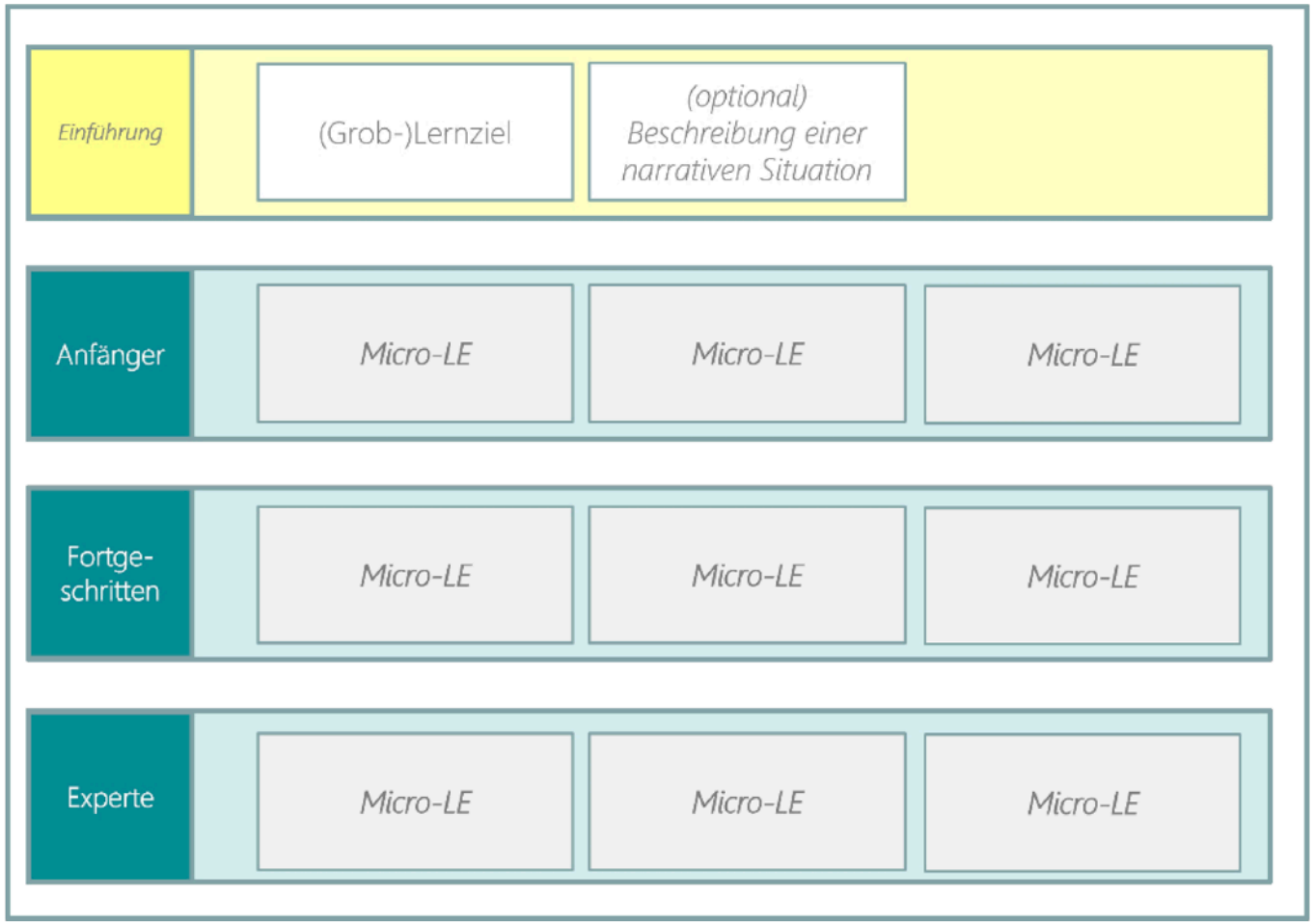
The ePA-Coach application consists of **28 learning units,** i.e. 12 beginner units, 11 advanced units, and 5 expert units.

All units are designed as **micro-learning units** with micro-contents (Buchem & Hamelmann, 2010).

Learners can freely choose what they want to learn next.

The choice is only limited in that, within a competence area, all learning units of a competence level must first be completed in order to unlock the next level.

Micro-Learning Units at 3 Levels



The units are **scaffolded** as the learner becomes increasingly confident in using PHR:

- beginner units offer more theoretical information and tasks in the form of single/multiple choice, true/false, fill the blanks to sort the paragraphs questions,
- advanced units offer more complex and application-oriented exercises, for example in the form of embedded click dummies, which are used to practice real-life challenges related to the use of PHR. Similarly,.
- expert units offer complex tasks with no help beyond the description of the scenario. Also, it is possible for the learner to take the wrong path.

ITERATIVE DESIGN WITH STUDIES

- Iterative design & testing applied to the development of the ePA-Coach e-learning application.
- Findings from two exploratory studies (currently final evaluation taking place).
- The recruitment of participants undertaken by the project partner Charité – Berlin University of Medicine, using an internal subject database, and with the help of stakeholders such as Berlin Senior Citizens' University and LMU Munich.

TWO EXPLORATORY STUDIES

- The **first** study was conducted in May 2022 with **41** senior citizens, aged 66 to 93 years old (average 76 years).
- The study helped to gain insights into the **assessment of the core drives from the Octalysis framework** by Chou (2019).

- The **second** study was conducted June to October 2022 with in **46** senior citizens aged 65 to 88 years (average 73 years).
- This study provided insights into the perception of the **ePA-Coach e-learning design**, which was iterated taking into account results from the first evaluation.

Results from both studies were described in detail by Gellner & Buchem (2022) and Buchem et al. (2023).

OCTALYSIS FRAMEWORK

The Octalysis Gamification framework supports learning designers in creating engaging experiences by proposing game techniques focusing on the eight motivational core drives.

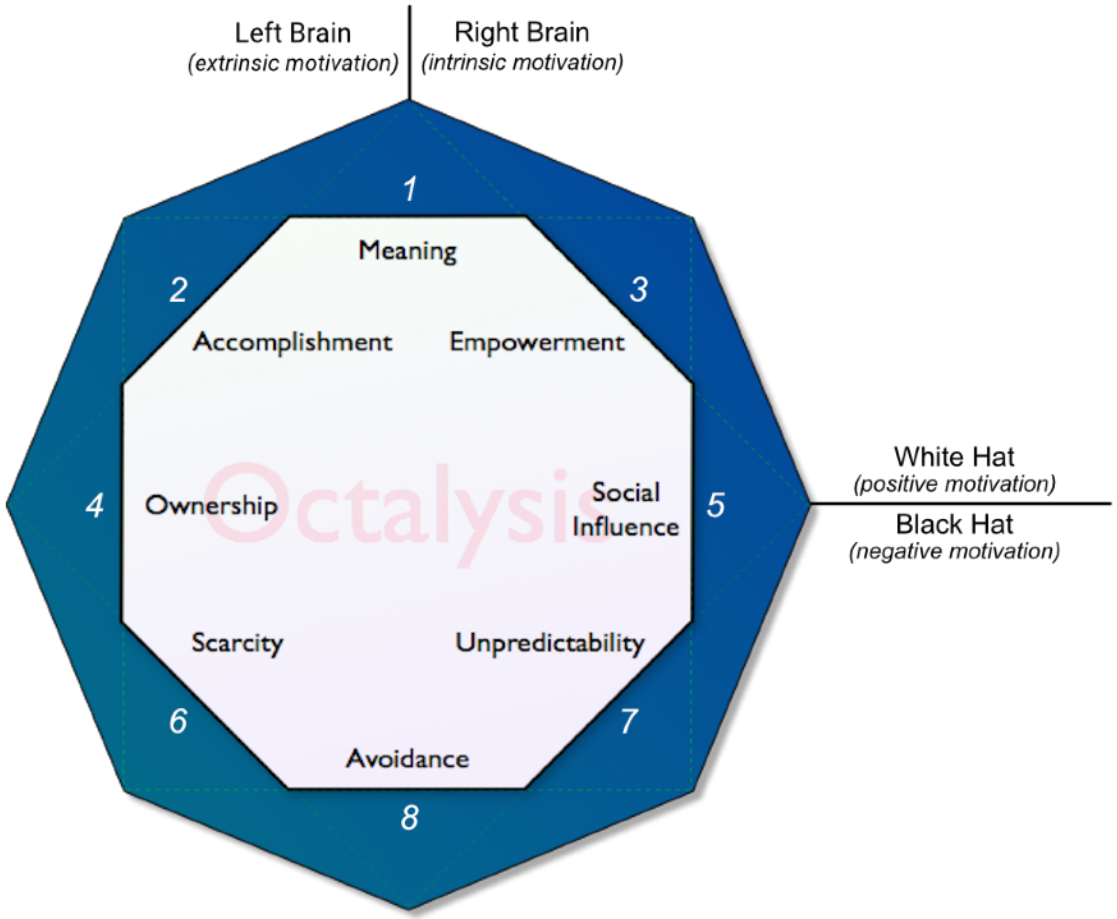
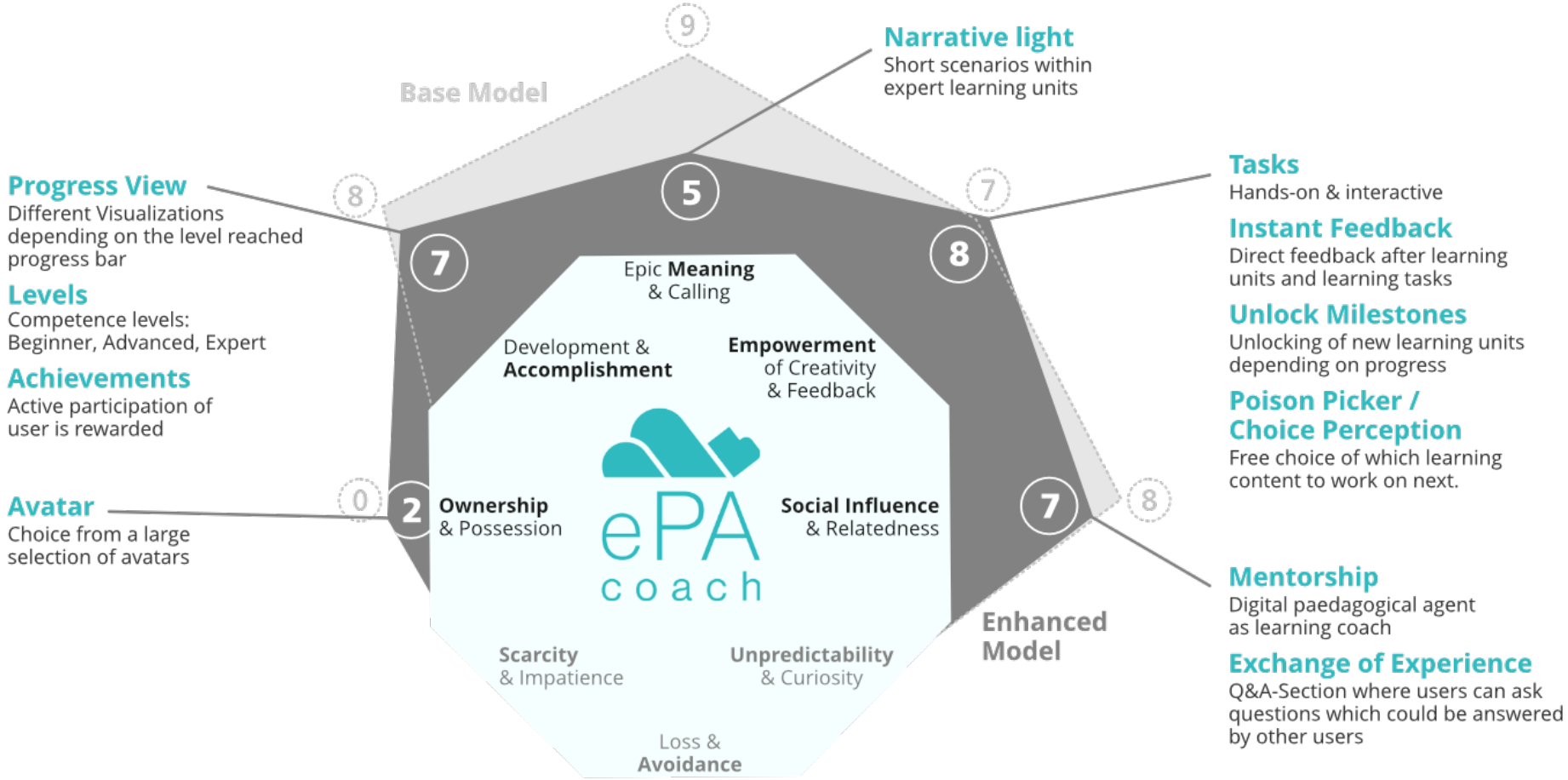


Figure: Octalysis Framework

Results from the first study

The adapted Octalysis model with the modified core drives and the respective game techniques:



Results from the second study

Octalysis Core Drives

Development & Accomplishment

Empowerment

Ownership & Possession

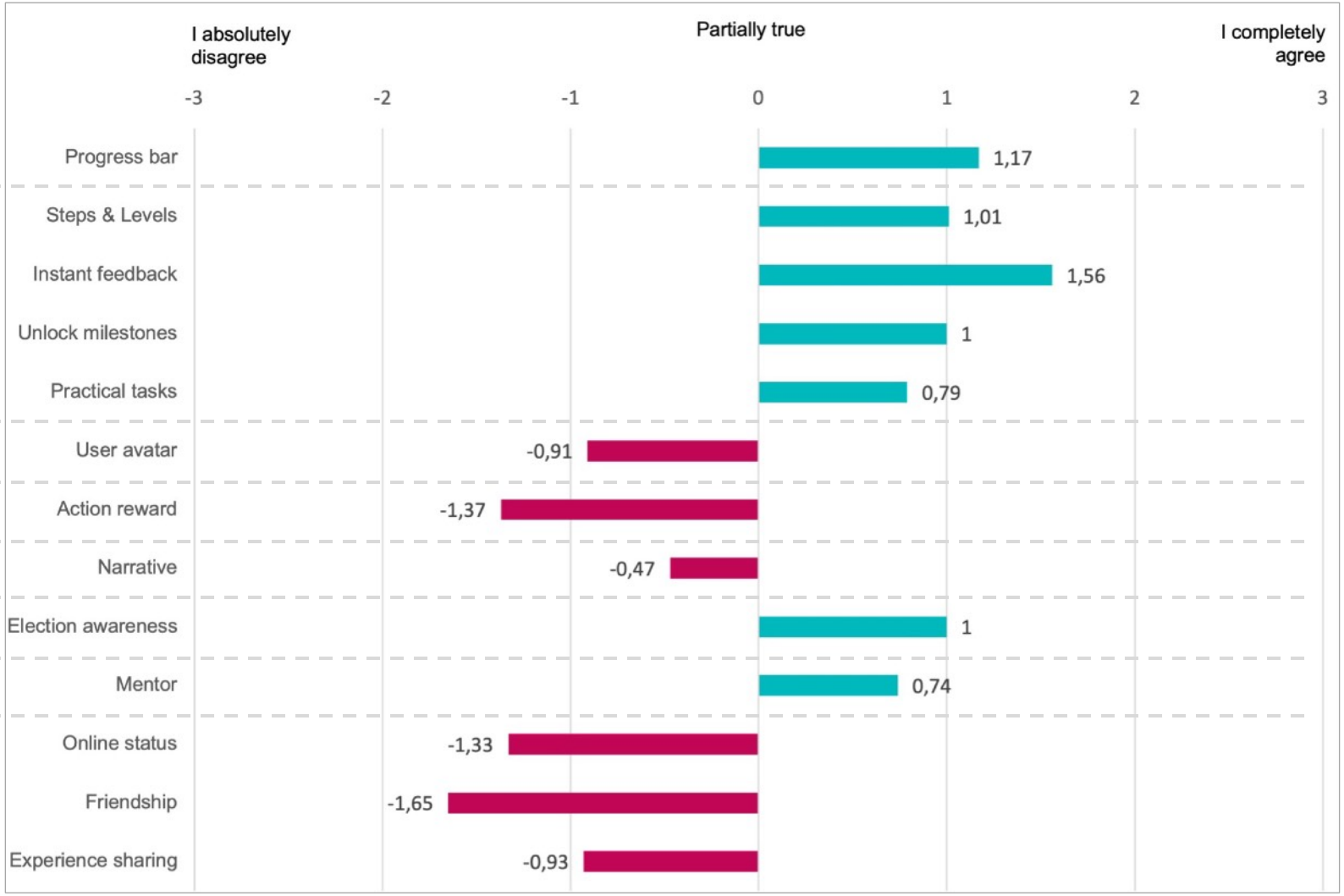
Accomplishment

Epic Meaning & Calling

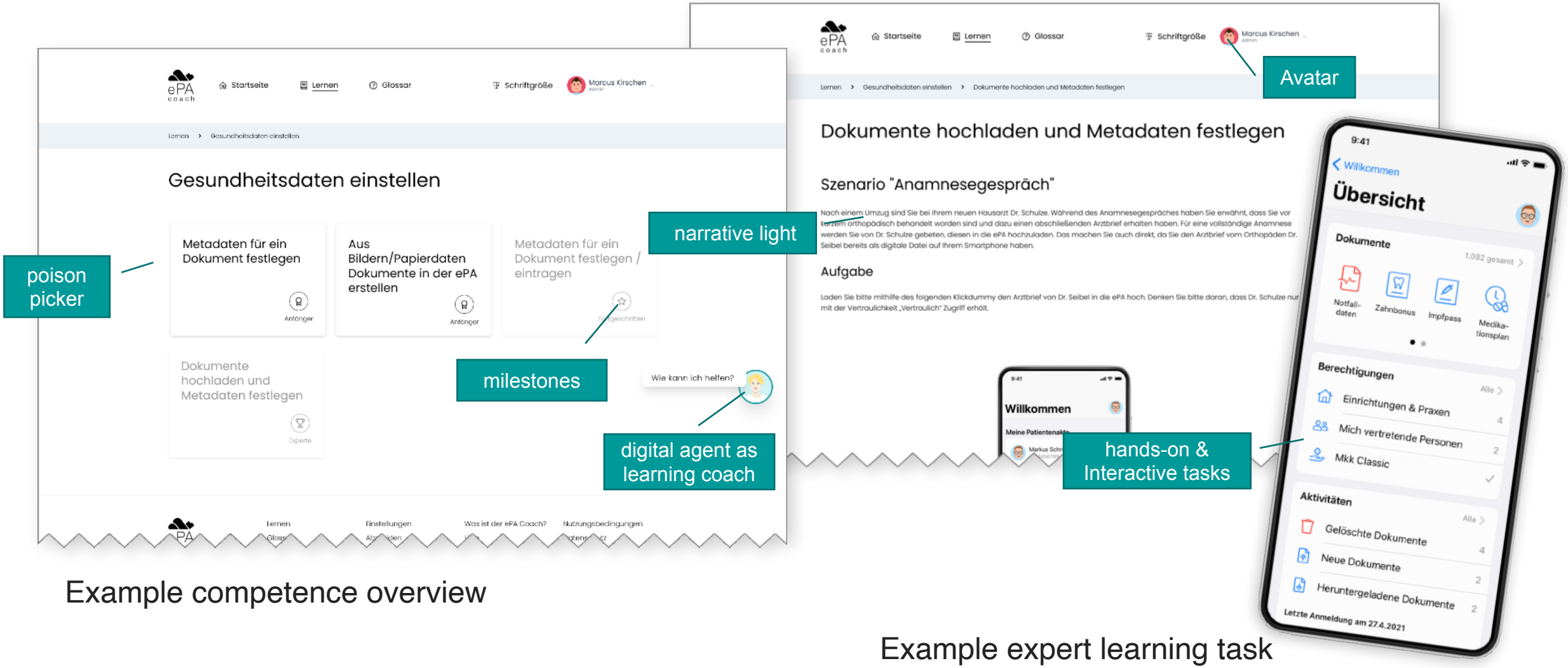
Unpredictability

Social Influence & Relatedness

Social Influence & Relatedness



Implementation of gamification elements



Example competence overview

Example expert learning task

CONCLUSIONS

The results from two exploratory studies with older citizens revealed strong preferences for design elements related to digital sovereignty.

Especially, the results indicate that senior learners tend to value elements that enhance their individual digital sovereignty related to making choices, controlling and monitoring progress, and receiving instant feedback as opposed to social aspects related to friends, status, sharing or even mentoring.

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This presentation was produced as part of the project ePA-Coach: Digital sovereignty in the context of the electronic health record, founded by the Federal Ministry of Education and Research under the program Human-technology interaction for digital sovereignty. For more information, please visit https://technik-zum-menschen-bringen.de/projekte/epa-coach