

D2.2: Report on user and stakeholder needs and expectations

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Abstract

This document describes the Council of Coaches initial approach to stakeholder engagement as well as the initial results of individual stakeholder interviews and a group stakeholder engagement session. The interim conclusions, which will be further elaborated on in D2.3, show that the Council of Coaches “product” is expected to contribute to (a) health education, (b) providing reminders, (c) motivation, (d) social support, and (e) health monitoring.



Corrections

- v1.0.1 Fixed a textual error in §4.3 (page 21).
- v1.0.2 Correctly applied EU logo on header page.
Changed UPMC to Sorbonne University (SU).
Textual errors and incorrect references fixed (numerous).

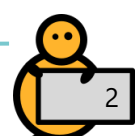


Table of Contents

- 1 Introduction7
- 2 Objectives8
- 3 Responsible Design Methods9
 - 3.1 Stakeholder identification method9
 - 3.2 Interview setup 11
 - 3.3 Workshop setup 12
- 4 Responsible Design Results 13
 - 4.1 Interview results 13
 - 4.1.1 Stakeholder 1: The psychologist with an expertise in lifestyle diseases e.g. smoking. 13
 - 4.1.2 Stakeholder 2: Policymaker with experience within the field of technology development. 14
 - 4.1.3 Stakeholder 3: Experienced within the field of mobile-health (mHealth) solutions. 14
 - 4.2 Workshop results 15
 - 4.2.1 Stakeholder Group Discussion 1 19
 - 4.2.2 Stakeholder Group Discussion 2 20
 - 4.3 Interim Conclusions and Observations 20
- 5 Council of Coaches Service Model 22
 - 5.1 End-user definition 22
 - 5.2 Methods 22
 - 5.3 Results 25
 - 5.4 Interim conclusions 29
- 6 Preliminary Conclusions 30
- 7 Bibliography 31



List of figures

Figure 1: Global design and requirements elicitation process in the Council of Coaches project focusing on a simultaneous market pull and technology push strategy.8

Figure 2: Development scenarios for the Council of Coaches: Dimensions of implementation and design. 19

Figure 3: Input for the Council of Coaches service model from Interviewee 1. 26

Figure 4: Input for the Council of Coaches service model from Interviewee 2. 27

Figure 5: Input for the Council of Coaches service model from Interviewee 3. 28



List of tables

Table 1: Stakeholder identification chart.....9

Table 2: Stakeholder workshop results..... 15

Table 3: Service model interview setup..... 23

Table 4: Stakeholder interviewees’ demographics 25



Symbols, abbreviations and acronyms

ARI	Age Related Impairments
CMC	Centre for Monitoring and Coaching
COPD	Chronic Obstructive Pulmonary Disease
COUCH	Council of Coaches
CP	Chronic Pain
D	Deliverable
DBT	Danish Board of Technology Foundation
DT2	Diabetes Type 2
EC	European Commission
GP	General Practitioner
ISPRINT	Innovation Sprint
M	Month
MDD	Multi Disciplinary Deliberation
Mins	Minutes
MS	Milestone
RRD	Roessingh Research and Development
RRI	Responsible Research and Innovation
SU	Sorbonne University
UDun	University of Dundee
UPV	Universitat Politècnica de València
UT	University of Twente
WP	Work Package

1 Introduction

The European Project Council of Coaches introduces a council of virtual coaches to support chronic illness patients and older adults in achieving a healthy lifestyle. This innovative health technology enables multi-party interaction between the virtual coaches and the user, to support the user with their health goals and questions.

This document describes the initial methods and first results of the stakeholder engagement process adopted in the project in the first six months. In this first phase of the project, stakeholder engagement through individual interviews and a stakeholder engagement workshop represents a part of the general *user requirements engineering* strategy. A second part of this process will involve potential end-users of the project. This will be documented in a follow-up deliverable, D2.3: Initial user requirements.

The process of engaging stakeholders and end-users does not end where technical developments start – but instead it will be pursued throughout the course of the project. It will be documented in a series of three future deliverables where the focus will lie on the testing of prototypes and collection of feedback to steer the further development. This process will be documented in deliverables D2.4 – D2.6, delivered in M12, M18 and M24 of the project respectively.



2 Objectives

Months 6 of the Council of Coaches project (February 2018), marks the first crucial milestone in the project’s lifespan. In this phase of the project, initial designs of the four main technical components have been delivered, and an initial user- and stakeholder analysis has been performed.

The results of this phase of the project have been documented in the following series of five deliverables:

- D2.2: Report on user and stakeholder needs and expectations (*this deliverable*) [**Stakeholder Analysis**]
- D3.1: Initial coaching strategies and knowledge base [**Shared Knowledge Base**]
- D4.1: State-of-the-art, requirement analysis and initial specification of the Holistic Behaviour Analysis Framework [**Behaviour Analysis Framework**]
- D5.1: Dialogue and Argumentation Framework Design [**Dialogue Framework**]
- D6.1: Requirements and Concepts for Interaction Mobile and Web [**HCI Design**]

The overall strategy for the user-centred design and innovation process in the project is an iterative approach with rapid development and evaluation of the three main prototypes and a final technical demonstrator. We strongly believe that the most valuable user input can be obtained from the evaluation of *working prototypes*. Therefore, the first prototype deliverable is scheduled for an early release in the project on M9 (May, 2018), allowing us to start the process of collecting specific feedback from our users.

In order to achieve the delivery of a first prototype in M9, and due to the innovative nature of the project, multiple design and requirements elicitation trajectories are initiated simultaneously. Broadly speaking, the project initiates a “technology push” and “market pull” strategy simultaneously, as depicted in Figure 1.

This deliverable depicts the initial efforts in the Stakeholder Analysis. The user Requirements will be extended and further reported on in D2.3. As such, the objectives that are set out to be achieved in this document are as follows:

Objective 1: To describe the methods to be used in the process of stakeholder analysis in the first phase of the project.

Objective 2: To report on initial outcomes of the stakeholder analysis by presenting and discussing results of individual stakeholder interviews and a first stakeholder workshop that was held in January 2018.

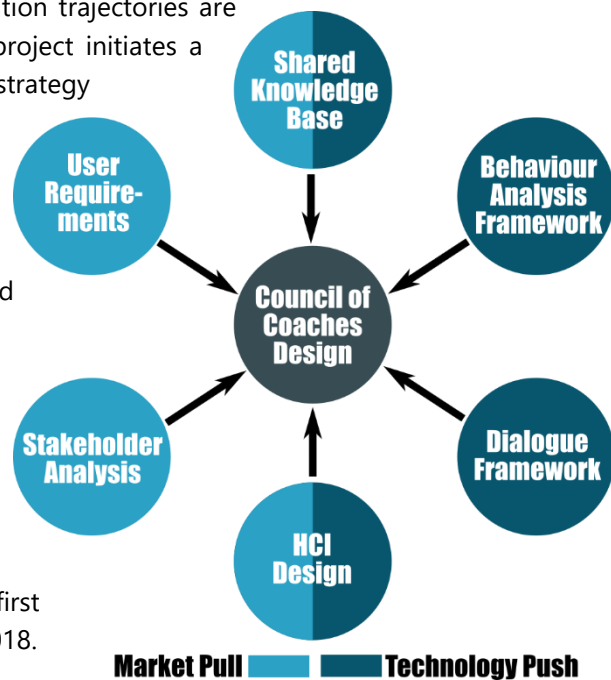


Figure 1: Global design and requirements elicitation process in the Council of Coaches project focusing on a simultaneous market pull and technology push strategy.

3 Responsible Design Methods

When a responsible design is to be conducted, it is of great importance to include a wide spectrum of people and organisations that have specific knowledge and experiences within the field of the new technology. This section will describe COUCH's methodology for the activities with stakeholders in order to conduct a responsible design of the Council of Coaches. Lastly, it will report on the results from the stakeholder involvement and their attitude towards RRI-issues related to the technology.

3.1 Stakeholder identification method

In order to align COUCH with the societal demands and values, the consortium inquired advices and attitudes toward the technology from different stakeholders. The consortium works with the stakeholder understanding, of it being all the persons or organizations that have a task or role in relation with, or are affected by, the eHealth intervention (Mitchell, Agle, & Wood, 1997).

Initially the stakeholder groups were identified through stakeholder mapping and brainstorming on the fields of virtual and traditional coaching, eHealth and mHealth.

The stakeholder identification was done by the consortium with a chart for everyone in the project to fill out (see Table 1). Eventually the chart would give us an idea of the most relevant stakeholders to bring in for the later workshops and interviews.

Second and third step were conducted simultaneously by all consortium members. The second step was generating an understanding of the different stakeholder groups' interests on the field and how they are related to COUCH. Meanwhile, the third step was to identify specific actors within the different stakeholder groups. Actors could be associations, universities, individuals, companies, etc. The findings of an interest within a stakeholder group could lead to the finding of a new actor. And the finding of a new actor could sometimes contribute to a more detailed interest description.

In the end, the findings were discussed and re-evaluated and the actors were contacted.

Table 1: Stakeholder identification chart.

Stakeholder group	Interests	Actors
Civil Society	Citizens and CSOs represent societal needs in more or less organised forms. They will be interested to be included in the identification and assessment of risks and benefits, of conflicting values and interests, etc.	<ul style="list-style-type: none"> ▪ The Danish Cancer Society ▪ The Danish Diabetes Association ▪ Health Insurance Denmark ▪ Statistics Denmark ▪ Pension Denmark
Patient Organizations	Patient organisations help patients by providing information about living with their conditions, raise awareness about screening and prevention, and offer a number of support tools. Their interest in COUCH is linked to assisting developing a tool their members can benefit from.	<ul style="list-style-type: none"> ▪ Faks (Foreningen Af Kroniske Smertepatienter.) ▪ Pain Alliance Europe (PAE) ▪ Fibromyalgie en Samenleving (F.E.S.) ▪ Dutch National Diabetes patient organization ▪ Forbrugerrådet Tænk ▪ An actual patient ▪ A close family member of a patient

Clusters	Would be interested in eHealth and mHealth knowledge and development	<ul style="list-style-type: none"> ▪ Copenhagen Health Innovation ▪ Copenhagen Healthtech Cluster ▪ Copenhagen Center for Health Technology – CACHET ▪ Healthcare DENMARK ▪ Vitaal Twente ▪ Health Innovation Park
Health authorities	Have an interested in influencing development within eHealth and mHealth	<ul style="list-style-type: none"> ▪ The Danish Medical Association ▪ The Danish Regions ▪ Dutch ministry of health ▪ Praktiserende Laegers Organisation – PLO
Governance	Government agencies have an interest in promoting public health and establishing good frameworks for the health services. Their interest in COUCH is related to promoting good public health solutions and frameworks	<ul style="list-style-type: none"> ▪ Danish Health Authority ▪ Afdeling for Velfærdsinnovation, Sundheds- og Omsorgsforvaltningen hos Københavns Kommune ▪ KL Local Government Denmark ▪ Dutch Institute for public health and the environment (RIVM) ▪ Municipal Health services
Health professionals	mHealth and eHealth professionals hold practical knowledge relevant to the early development of the prototype. We assume their interest to be in the knowledge exchange during the multi stakeholder engagement process, which they themselves can benefit from.	<ul style="list-style-type: none"> ▪ Pediatrician and medical director of Gelderse Vallei Hospital in Ede ▪ Physical therapists ▪ General Practitioner (reponsible for multi-disciplinary strategy for a patient) ▪ Dietician (specialised in Diabetes) ▪ Endocrinologist ▪ Informal caregiver ▪ Community nurse ▪ Hospital management ▪ Care Facility (GP's, specialists, etc...) ▪ Rehabilitation Center - Project Manager
Industry	Industry actors will have an interest in exploiting the outcome of the demonstration project	<ul style="list-style-type: none"> ▪ Novo Nordic ▪ International Industry Society in Advanced Rehabilitation Technology ▪ Virtualware Labs ▪ Motekforce Link ▪ Siemens health ▪ CUP 2000 S.P.A. ▪ Me.Te.Da. s.r.l. ▪ Monsenso ▪ Contexta Network Solutions ▪ imec The Netherlands ▪ WeLL Living Lab ▪ Developes of chain information systems

		<ul style="list-style-type: none"> ▪ Game developers
Policy makers	Health policy makers at all levels have an important role to play developing health systems and promoting public health. Their interest in COUCH is influence new eHealth and mHealth devices to fit their values.	<ul style="list-style-type: none"> ▪ ENVI Committee EP ▪ EU Commission Digital Single Market or DG Health and Food Safety ▪ Technology Strategy Board, UK Government ▪ The Norwegian Board of Technology ▪ Municipalities
Research	Research on the effect and use of eHealth and mHealth is still in its nascent phase. Researcher will be interested in studying the development and pilots of the prototypes.	<ul style="list-style-type: none"> ▪ VIVE – The Danish Centre of Social Science Research ▪ KU Leuven ▪ University of Dundee ▪ Northeastern University of Boston ▪ Ruhr-University of Bochum ▪ Dutch Diabetes Research Foundation ▪ University of Uppsala ▪ The Journal of mHealth
Consortium	In the stakeholder workshops, the consortium will be represented by RDD; DBT and possibly iSPRINT. They will secure, stakeholder input to be shared among the consortium and incorporated into the prototypes.	<ul style="list-style-type: none"> ▪ RDD ▪ DBT ▪ iSPRINT
International organisations	Organisations such as the WHO both hold important knowledge and has great agenda-setting power. Organisations are assumed to be interested in providing input to state-of-the-art mHealth and eHealth solutions	<ul style="list-style-type: none"> ▪ World Health Organization (WHO)

3.2 Interview setup

We predicted early that many of the invited stakeholders wouldn't have time for getting involved in the stakeholder workshop, so we prepared an interview guide for those who would only be able to do a small interview instead of a four-hour workshop.

The interview design was made very similar to the topics of discussion in the workshop. The interview itself was defined as semi-structured, but with only five to six broad questions to give space for their very personal, experience-based knowledge formulated in their own way. This way we could control the subject of conversation, but still leave room for personal insights and experiences (Brinkmann & Tanggaard, 2015). The informants/stakeholders were picked out to secure the responsible design by helping to identify RRI-issues related to COUCH and give their perspective on a responsible design of

Council of Coaches. Therefore, it was also important to give them room for their own stories and experiences, and let them frame these stories as they wanted. To facilitate such interviews, DBT took the character of a more listening, empathic interviewer instead of frequently asking new questions and directing the conversation away from the stakeholders' idea of what is important.

3.3 Workshop setup

To gather a broader stakeholder perspective, we invited different stakeholders (within the actor-list of our stakeholder identification chart) to a workshop in Copenhagen. The stakeholder workshop as a methodical approach is drawing on the ideas of a co-design approach where designers, developers and other people not trained in design are working together in the design development process (Sanders & Stappers, 2008).

Three stakeholders with different backgrounds attended. The day started with an introduction from the Danish Board of Technology with more details about the Council of Coaches technology, was described in the invitation-flyer. Then we introduced our perception of the stakeholder engagement, as something that creates concrete issue-awareness from an expert's point of view.

After the introduction speech, a presentation was made, introducing what an RRI-issue is and how we can act on these issues. Furthermore a few different views upon responsibility and the term RRI were introduced. This was to make sure that the stakeholder could talk freely from within their own field of expertise on RRI-issues related to a technology that might seem complex and far away from their own disciplines.

The stakeholders were then divided into pairs where each stakeholder would team up with a consortium member. Here the assignment was to identify RRI-issues, talk about how and why it was an issue and, if possible, talk about how the issue could be addressed and by whom. The results were discussed in plenum which gave everybody the opportunity to dig deeper into the issues and talk about possible solutions.

In the second half of the workshop, the focus was more specific. We addressed two issues:

1) whether it should be implemented as an obligatory health-tool by the government and the healthcare system (push) or as a voluntary tool for the citizens to use without obligations to third parties (pull) and 2) whether the coaching style should be persuasive to help the user reach specific goals or reflective to help the user to reflect on specific feelings and behaviour. The idea was that the groups should come up with specific scenarios related to the different strategies. These two issues were discussed in two different groups after which the answers were discussed in plenum.

The stakeholder workshop produced two different kinds of data. During the RRI-issue identification the issues were written down by the different stakeholders on RRI-templates (A4 sheets), which were stored and analysed. Furthermore, the discussions in plenum were all recorded.

4 Responsible Design Results

The stakeholder mapping led to a long list of relevant actors. If the consortium members had any connections to people from the actor-categories, e.g. if anybody knew a person from the World Health Organization, those people would be contacted. If that was not the case, we picked randomly.

Three persons from three different actor groups eventually attended the workshop. Many people gave travelling distance or time constraints as a reason for not attending.

Additionally, three stakeholders showed interest in the project, but could not attend the workshop. We scheduled interviews with those actors, whereof two were conducted by phone and one in a face to face meeting.

Due to anonymity, the following sections won't address any of the stakeholders by name. The interviewed stakeholders will have their background described, but we have tried to avoid any risk of tracking. The participants of the workshop also have their background described, but we have made it impossible to track down a statement to a specific stakeholder.

4.1 Interview results

Three interviews were conducted with the following stakeholders:

- A psychologist (with an expertise in health coaching)
- A policy maker with a technological expertise
- A first-mover within the field of mHealth

The following section will go through the results of the stakeholder interviews with each stakeholder at a time.

4.1.1 Stakeholder 1: The psychologist with an expertise in lifestyle diseases e.g. smoking.

Stakeholder1 was positive towards Council of Coaches as a healthcare tool, but had some very specific requirements for the product before he/she would be supportive about the project.

The first requirement: The coach has to listen, be empathic and show that it supports the patient before starting to push the patient towards a "better" lifestyle. While listening, the virtual coaches have to detect the level of motivation that the patient is at, for changing his/her lifestyle. The coach should understand the reason for e.g. smoking, drinking, not exercising, etc. (by understanding the motivation level) and should start building an empathic thrust-relationship to the patient by telling that it understands, and that it can be hard to change, etc. Slowly thereafter the coach can carefully work towards open reflections (talks with the patient) that suggest behaviour change. As Stakeholder1 explains it, that is because the open, empathic and clever reflection from the coach will strengthen the motivation towards behaviour change and make them ready for the small "nudges" towards change.

A mistake that is easily made, according to Stakeholder1, is to start pushing too hard when the patient is not ready for it motivational-wise. What happens is that the patient pushes the "help" away as it gives the patient a bad conscience and it is too hard to live up to.

The second requirement was that the app shall not conflict with the independence of the patient. The patient shall not be made dependent on the app as the primary source to a healthier lifestyle, but learn from it and adapt the knowledge from the app. Stakeholder1 added that learning happens better if the new knowledge is relatable to the lifeworld of oneself. If the app can use the knowledge gathered from when it listens to the patient, to make references and examples to the patient's own relational mind, that would be a great way to ensure learning and thereby independence.

When asked about his/her thoughts on how the app should be implemented, Stakeholder1 had some clear opinions. It would clearly be more effective to push it out than using pull-strategies, but if the technology should be responsible, it had to be verified by experts within the same fields of the virtual coaches. Furthermore, it shall only be implemented with push-strategies if it makes sense for the personnel (doctors, psychiatrists, etc.) to recommend it and use it. They will need a workshop or a small course, teaching them about the system behind the app, how it's used, and how they shall convey the app to their patients.

4.1.2 Stakeholder 2: Policymaker with experience within the field of technology development.

Stakeholder2 was, like stakeholder1, concerned about the issue of overreliance and the addicting effect the technology could have where the patient wouldn't listen to or trust his/her own intuitions and judgement. In the technology design there must be integrated ways to ensure that the autonomy of the patient is not decreasing from the use of the app and that the patient won't become dumber. Stakeholder2 also meant we should think about a design that won't make people become addicted to the product.

Stakeholder2 meant that the product shall be certified in various ways, and that the certifications from the national (the country of the stakeholder) medical board are not strict enough. It is too easy to develop "solutions" that don't represent the patients and has way too many uncertainties.

A solution could be an international label for responsible healthcare with some strict requirements for the product to live up to in order to obtain the label. At least stricter than those from the doctor board from his/her country.

The last concern from Stakeholder2 was about privacy and use of data. There should be an explicit statement of how the technology collects data, what the data is used for, and who gets access to the data.

4.1.3 Stakeholder 3: Experienced within the field of mobile-health (mHealth) solutions.

Regarding implementation, Stakeholder3 sees a potential for especially the countryside where there are few doctors and long distances between doctors and patients. That could be a selling point as the app would then serve as a tool to make life easier for those who don't want to travel long distances to get a few advices from a doctor or coach.

When asked about whether the app should be persuasive or facilitate reflection from the patient, stakeholder3 talked from the perspective of Duolingo, which he/she liked a lot. Duolingo is a language school app that reminds you to use it for three days in a row. After the third day it stops sending notifications. That way the user won't feel bad about not using the app, which otherwise could be an ethical issue and also an issue related to ensuring independency from the patient. Also, stakeholder3 added, these reminders can be extremely annoying.

Stakeholder3 again talks from a Duolingo-perspective when he says that the app should avoid all kind of negative messages that makes the patient doubt himself or could in any other way reinforce a negative experience for the user. Duolingo does never say things like: "yet another failed language class". And in the same way, the coaches should not say: "*name of patient*, now you skipped your daily jog two times this week".

4.2 Workshop results

This section will firstly go through the RRI-issues that were identified by the different stakeholders and the arguments from the following plenary discussion. Secondly it will go through the dimensions of persuasive vs. reflective and push vs. pull discussions. The section doesn't distinguish between what was written down and talked about in the small groups and what was discussed in plenary. Instead it distinguishes between the different issues brought to the table and tries, to describe all that was talked about in the most objective way possible.

The stakeholder organisations that had representatives taking part in the workshop were:

- Danske Regioner (Danish Regions)
- Forbrugerrådet Tænk (Danish Consumer Council)
- VIVE – The Danish Center for Social Science Research

Furthermore, six consortium members were present.

- The Danish Board of Technology with 3 members
- Roessingh Research and Development with 2 members
- University of Dundee with 1 member

The stakeholders taking part in the interviews were:

- A psychologist
- Policymaker with experience within the field of technology development
- An mHealth expert

Table 2: Stakeholder workshop results.

ISSUE #1	Human-robot-interaction
What is the issue?	The issue of what can be solved through the system of Council of Coaches, and what should be in the hands of human experts. An example here is the issue of something drastic (e.g. suicidal thoughts) detected by the Virtual Coaches - Should they notify anybody from the real world or deal with it themselves as virtual coaches?
How do we address it?	Think about the technology as a supplement to human treatment. Let real experts deal with the big problems (if information is being shared between virtual coaches and real coaches then the patient has to know before). Also, there are rules for the real big problems, so if a patient tells the app that he/she want to commit suicide, the app is bound to act upon it and report it to the real world.
ISSUE #2	Not everybody might be able to use Council of Coaches (digital divide)
What is the issue?	Maybe they don't feel comfortable using modern technology or they just don't have a smartphone and/or computer. This could create a big risk of individuals being "forgotten" in the healthcare system.
How do we address it?	Motivation and voluntariness as a starting point for the implementation. Don't force anybody to it, and always be aware that there are people who are not using Council of Coaches.
ISSUE #3	Data and privacy issues
What is the issue?	<ul style="list-style-type: none"> ▪ Who has access to the data on the patient generated by Council of Coaches?

	<ul style="list-style-type: none"> ▪ How will the data be used? ▪ Does the patient have access to his/her data (and will they be able to understand it)? ▪ Can the patient delete info that was already given to the coaches or simply delete a whole conversation with the coach?
How do we address it?	<ul style="list-style-type: none"> ▪ No clear ideas yet. But the patient should always know the answer to the questions. ▪ Regarding the last issue, we can look at a real-life scenario. When somebody tells you something, they can't just delete it. ▪ But then again nobody records what you say and stores it as data (or do they...?).
ISSUE #4	Health and eHealth literacy
What is the issue?	<ul style="list-style-type: none"> ▪ Do other adults understand that they are interacting with technology and not a real person? ▪ Do they understand the consequences of use? ▪ How do you decide who is given access to the technology and who is not? ▪ Problem with button knowledge and information skills? Older people can have a problem understanding what the different buttons do on a computer or a smartphone. Therefore, they have a hard time navigating the software. However, they are good at knowing what kind of knowledge is trustworthy and professional and what information they should check up on. In opposition stands the younger generations, who have a harder time telling what's good and bad information but are very experienced in knowing which buttons to push. We are exchanging one problem for the other.
How do we address it?	<ul style="list-style-type: none"> ▪ The app should let the user know that the coaches are robots. ▪ A potential in how the technology can be presented – it should be possible for Council of Coaches to read the advices out loud for those who prefer that. ▪ It has a high potential for being an educational app that teaches the patient. ▪ One could say that Council of Coaches will be able to easier manipulate the new generations, but one could also say that it serves as a filter for all the untrue information that is to find online and only presents reliable information. Here again, the solution could be an educational approach.
ISSUE #5	Bring in the user perspective very early in the development.
What is the issue?	<ul style="list-style-type: none"> ▪ Bring in the voice of the actual patient? ▪ Will people actually use the technology? ▪ There is an issue in the early user perspective, as if we only study those who want to think along which is often the resourceful ones, then we might miss out on the not so resourceful ones. ▪ The well-educated patients might already know what the coaches will say. So, the ones that might benefit the most from the technology, the not so educated ones, are also the ones that might not be able to use it. ▪ What are the realistic expectations about who will and can use

	the Council of Coaches?
How do we address it?	<p>Can we use the 80/20 rule for health, where we ignore the smaller number and make health-technologies for the majority? One stakeholder is concerned, as we need ways to support everybody. Another stakeholder means that the 80/20 rule would improve the quality of the app.</p> <p>Maybe we should just face the fact that it can't be for everybody, and then focus hard on how to develop Council of Coaches for the people who can actually use it and will gain something from it.</p>
ISSUE #6	What are the underlying values of the coaches?
What is the issue?	<p>On which basis do the coaches give their advice and what does Council of Coaches want to achieve with the coaching?</p> <ul style="list-style-type: none"> ▪ Should these values be made explicit to the patient and how? ▪ Where is the line between manipulation and not making the underlying values transparent?
How do we address it?	<ul style="list-style-type: none"> ▪ One stakeholder thinks that the underlying values should be explicit, but doesn't know how. ▪ Maybe there should be a meta-reflection coach that could say "you are only saying that, because you want this and that!" ▪ Technically speaking, you should be able to delete the advices by tapping the small red cross and get new advices. In that way you can choose the advices given to you?
ISSUE #7	Internal ranking between the advices made by the coaches
What is the issue?	<p>What is the right advice to give?</p> <ul style="list-style-type: none"> ▪ How do we make sure that the patient uses the different advices in a right way, when their advices point in different directions? ▪ Which advice is the most important? E.g. should we tell the patient to stop smoking or start exercising first? ▪ How do the coaches know what to recommend when there is no common solution and it depends on the patient, what he is motivated for and when?
How do we address it?	<ul style="list-style-type: none"> ▪ When discussing how this issue could be solved, the workshop participants talked about political correctness as something that should not necessarily be strived for. A politically correct way of talking about smoking would be to always talk about smoking as something bad that should never be done at any occasion. Something that the coach should always advice against. But maybe it is better be more relaxed about it, so that the patient is not terrified of the coaches and feels bad about him- or herself. ▪ You can never make a fat, smoking, alcoholic patient quit smoking, start exercising, become healthy eating, and not drink alcohol at the same time. You need to look at the motivation. What is he motivated for, and then start there. Maybe he is not motivated to stop drinking, but he would like to start exercise, so let's start there. ▪ Maybe five beers a day makes the patient happy. Council of Coaches should be aware that its' recommendations have a risk

	of minimizing happiness.
ISSUE #8	How to get the user to act?
What is the issue?	The user may get an advice and then shut down the computer and do something completely different – how do we make sure that doesn't happen? Knowledge alone is not enough. We all know it is bad for your health to smoke, but a lot of people still do it.
How do we address it?	The app needs a lot of different target groups. Each approach would be coupled to a target group. This means the app doesn't use the same approach with all patients.
ISSUE #9	We need to look at the consumers/patients' needs!
What is the issue?	<ul style="list-style-type: none"> ▪ Is it must have or just nice to have, because nice to have won't make a big difference? ▪ Many patients want to speak with a real person, to feel the care of a real person and for the love of small conversations that can be a rare joy, when the patient is no longer able to work and lives alone.
How do we address it?	<ul style="list-style-type: none"> ▪ Look at what is covered already: How can we add value in a novel way? ▪ Maybe the system should be able to facilitate meetings with other patients. This is also based on the fact that we know loneliness is a huge issue and, in many cases, leads to an early death. It could also be done through online platforms where the patients can talk with each other. ▪ The app should maybe be one out of many solutions. One stakeholder is nervous about this app as a standalone solution, because who will actually follow up on how the patient acts upon the advice?

These were the RRI-issues that were written down and the following plenary discussions of them.

4.2.1 Stakeholder Group Discussion 1

Next on the program was a discussion whether the coaching style should be persuasive or reflective and whether the implementation strategy of the app should be push- or pull based. Figure 2 was used to explain the different dimensions of implementation and design.

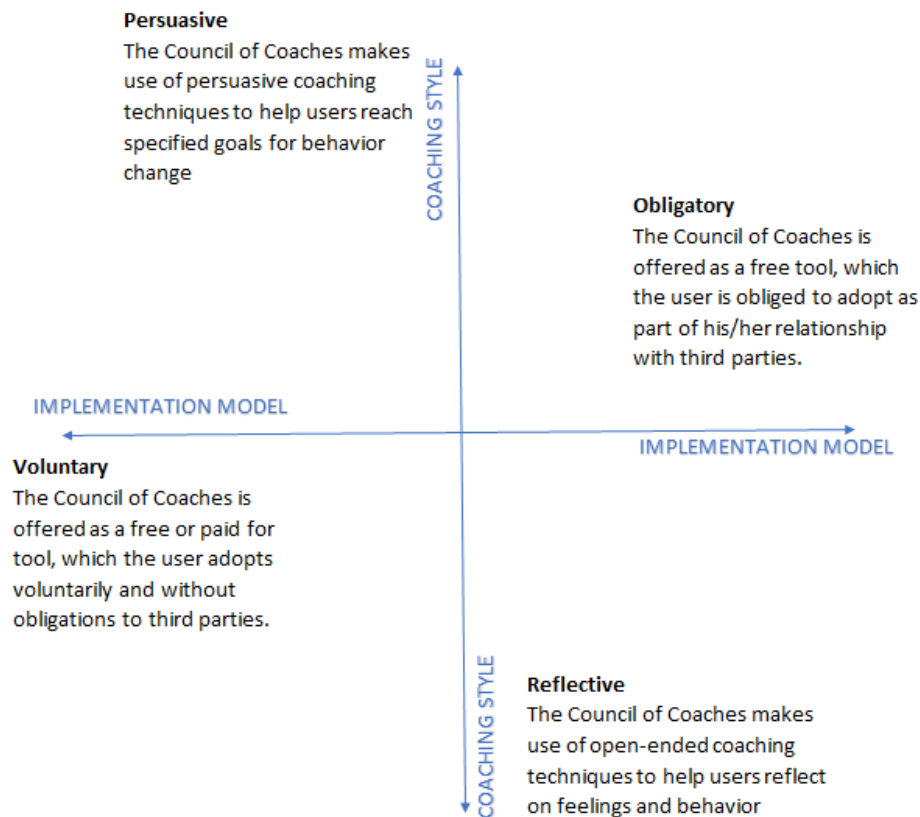


Figure 2: Development scenarios for the Council of Coaches: Dimensions of implementation and design.

Stakeholder group 1 didn't make any scenarios and had a hard time finding any solutions in the very ends of the dimensions. That being said they put a few issues on the table

Stakeholder group 1: Stakeholder group 1 can conclude that these dimensions don't really work. The vertical scale should be flexible in different implementation scenarios and should be adapted to the specific user, as users have different needs and have different ways of using and accepting the advices of experts.

The need of flexibility came up in the discussion upon the other dimension as well in stakeholdergroup1. The implementation scenario should/could be dependent on the patient journey. E.g. with chronic pain treatment the obligatory implementation could be feasible, because there is a tight control of treatment in this disease-category, so it could work in this tightly controlled setting. Whereas with age-related impairments it would not work – it would simply be counter-productive because "if you tell an old person that he/she should do something in a specific way, then he won't do it" (quote during the discussion).

There was also talk about Council of Coaches as an intervention method and what it means to consider it like this:

As Council of Coaches is an open-ended system with meandering types of conversations, the question arises if we can even compare different instances of this intervention? Would we be able to look at the discussions Council of Coaches facilitates and only the discussions (not the content of the discussions)?

Then we could compare what happens to the people who have these discussions compared to other groups that don't have the meetings. This way Council of Coaches could actually test what impact the product will have long before the product has been developed. It will be hard to analyse the data, but the analyses could be feasible.

The discussion of stakeholder group 1 ended in China: In China, they have an incentive system that doesn't count how many you cure, but count how many that, under your responsibility, remain healthy this year. Then you get money based on your number of healthy patients. Elements of this system is somehow creeping into Council of Coaches as well. Traditionally, in Denmark there is a disease-focussed system, where the issue doesn't get solved before it's an actual issue. But in the connection of a more prevention-oriented type of thinking there could be a use for the Council of Coaches.

4.2.2 Stakeholder Group Discussion 2

Stakeholder group 2 had a few scenario-discussions.

Talking about implementation style, Stakeholder group 2 identified different ways of pushing Council of Coaches on to the market. A way to do this could be as a recommendation for using Council of Coaches from the general practitioner (GP) to the patient or even as an integration of Council of Coaches as a tool in the GP's daily work routines. It could also be an incentive system from the insurance companies where you could get a discount on your insurance if you use Council of Coaches. On the other hand, if it is going to be primarily pull-based, stakeholdergroup1 would fear that it will just become another strange app that the citizen won't download and can't see the use of.

Stakeholder group 2 also talked about what it means to interrupt the counselling in the process, which could be another negative effect of a completely pull-based approach. Maybe it can have a harmful effect or lead to very wrong health decisions from the patient if he/she closes the app before the council is done speaking and the patient only listens to half of the dialogue between the coaches. That is a risk if the app is completely voluntary. But that can maybe be prevented by a more push-based approach where you have an action-authority (GP, physiologist, insurance company, etc.) following up on your use of the app.

On the vertical scale, the Stakeholder group 2 didn't have anything that could be generally said, as it all depends on the patient. But how to approach the patient's "needs" should be carefully considered. If a person never wants to get up from bed due to depression, then the only way to treat him is to do everything you can to get him out of bed. This could lead to a very persuasive approach instead of a reflective approach. In the same way the Council of Coaches should know when to be persuasive due to a patients' need of e.g. changing lifestyle.

4.3 Interim Conclusions and Observations

The stakeholder involvement has given us a longer list of responsibility insights from experts within the broad field that the Council of Coaches covers. There are different RRI-issues that are very explicit and should be taken into account in the responsible development of Council of Coaches. These explicit issues are listed below:

- The Council of Coaches shall be able to identify the level of motivation that the patient is at and adapt the coaching to that level.
- The Council of Coaches shall never make the patient feel bad about him/her, as Council of Coaches then isn't advising into the right motivational level. Use empathy and open reflections.
- The Council of Coaches shall make the use of data transparent to the patient. The patient should have a clear idea of everything that can be done with his/her data.

Council of Coaches

- Not everybody might be able to use Council of Coaches which can lead to certain social groups being forgotten in the healthcare system or marginalized. Be very aware of which people that can use Council of Coaches and which people that can't!
- Be aware of the patient's needs! Don't try to solve a big problem through Council of Coaches when Council of Coaches isn't necessary.
- The app has both the potential of becoming an educating tool and a tool that makes people dumber and uncritical. Make sure it comes out as an educational health tool in the end!

The stakeholders are to some degree unsure of how the implementation strategies should look like, but there is a general agreement in the argument, that people won't use the technology if the implementation is strongly pull-based and to no degree recommended or pushed out by experts. That being said, it should make sense for personnel to use it and to recommend it.

Whether the coaching strategy should be persuasive or reflective depends on the patients need. The coaching strategy should therefore be flexible both due to the course and development of the patient's disease and due to the level of motivation.

5 Council of Coaches Service Model

The Council of coaches is, at the moment of writing, a technological innovation without a service model. In other words, it is unclear who will use the technology exactly, with what goal, and during which parts of the different patient journeys of people with age-related impairments, diabetes type 2, and chronic pain, or indeed a different target user group altogether. For the design of the technology, it is imperative to know the different goals that must be served, and the different demands that the designated context of use will pose. Consulting stakeholders, and developing a service model for the technology is therefore an important first step in developing a valuable and durable eHealth technology (Van Velsen, Wentzel, & Van Gemert-Pijnen, 2012).

5.1 End-user definition

The goal of the Council of Coaches project is to design, develop and evaluate a highly innovative virtual coaching platform in which multiple virtual expert coaches are able to work together to coach the user towards healthy behaviour. On a higher level, the aim is to develop an Open Agent Platform in which services can be developed employing a multi-agent dialogue system for many different purposes. The Open Agent Platform is envisioned to be an open technology platform in which third party developers can design, develop and integrate their own interpretations of digital advisors or coaches. Because of this, the “target” audience for the final Council of Coaches “product” is completely open, however, for the scope of the project, we focus on a set of three groups of end-users:

- End-User Group 1: Older adults, aged 55 and above, that are faced with one or more physical, cognitive, mental or social impairments related to their stage of life (age-related impairments).
- End-User Group 2: Older adults, aged 55 and above, suffering from chronic pain (and possible other age-related impairments).
- End-User Group 3: Older adults, aged 55 and above, suffering from Diabetes Type 2 (and possible other age-related impairments).

5.2 Methods

In order to develop an initial service model and set of functional requirements for the Council of Coaches technology, we interviewed different stakeholders. Stakeholders are all persons or organisations who have a task or role in relation with, or are affected by, the eHealth intervention (Mitchell, Agle, & Wood, 1997). Therefore, this group is far bigger and more diverse than just end-users, who are the people that will use the technology directly.

Each interview was adapted to one of the three Council of Coaches conditions (age-related impairments (ARI), chronic pain (CP), Diabetes Type 2 (DT2)) as a case. This case was selected by the interviewer, based on the interviewee’s expertise. We targeted a maximum time of 90 minutes per interview, in which we wanted to assess:

- Interviewee demographics;
- The care professionals that are involved, or should be involved in the care of a person in one of the three targeted patient groups;
- The way in which different care professionals discuss about and with a patient;
- Where and how virtual coaches can play a role in the patient journey of persons with ARI, CP or DT2.

Next, we used the interviews as a preparation for the RRI-stakeholder meeting (see Section 4.2), by asking some targeted questions. This will be used to fine-tune the health information behaviour study (as will be described in D2.3), by questioning participants about barriers that play a role in looking for

and digesting health information among the target patient groups. See Table 3 for the complete interview guide.

Each interview was transcribed and analysed, whereby analysis focused on answering each interview question. So, for each question, relevant themes were deducted from the interview data, similar answers/themes were grouped, and the number of times they were mentioned were calculated.

Table 3: Service model interview setup.

What	How	Time
Introduction	Introduce interviewer Explain goal of the interview Ask for permission for audio recording	5 mins
Demographics	Questions: <ul style="list-style-type: none"> ▪ Age ▪ Profession ▪ Years of experience in this profession ▪ How do you use eHealth in your current work? ▪ What is your relation to [ARI/CP/DT2]? 	5 mins
Relevant care professionals	Questions: <ul style="list-style-type: none"> ▪ Which care professionals are involved in the care for a person with [ARI/CP/DT2]? ▪ What are the responsibilities of these professionals with regard to the care for a person with [ARI/CP/DT2]? ▪ Which care professionals are not involved in the care for a person with [ARI/CP/DT2], but, according to you, should be? Why? 	7 mins
Multi-disciplinary deliberation (MDD)	Questions: <ul style="list-style-type: none"> ▪ Do you attend MDD's for patients with [ARI/CP/DT2]? <ul style="list-style-type: none"> ○ If so: ▪ Who else is at the table? ▪ What do you discuss? ▪ If disagreements occur, what are they about mostly and which professionals do they involve? How do you solve these disagreements? ▪ Do you ever miss certain patient information during these MDD's, or could they improve by having a specific type of patient information? 	10 mins
Introduction of virtual coach concept	Explanation of what a virtual coach is and how they can be used.	5 mins
Mapping virtual coaches in the care and cure path	1. Show interviewee the care and cure path for [ARI/CP/DT2]. 2. Ask the interviewee where they think virtual coaches can/should play a role in care and/or	25 mins

	<p>cure, and mark these places with an x in the part of the care and cure path that says "1. Role of virtual coaches"</p> <ol style="list-style-type: none"> 3. Per mark of x, ask what the virtual coaches should do. 4. Please indicate where you think that the virtual coaches should also interact with or inform healthcare professionals. Ask interviewee to draw lines and then ask them to explain each line. For this you can use the part in the care and cure path that says "2. Care professionals" <p>Question at the end:</p> <ul style="list-style-type: none"> ▪ Which virtual coaches do you think we should develop for this case? E.g., a physical activity coach, a spiritual coach, etc. 	
Information behaviour	<p>Questions:</p> <ul style="list-style-type: none"> ▪ In which situations in daily life do patients with [ARI/CP/DT2] mostly need information about their health? ▪ Which steps do these patients normally take to find this information? ▪ Which factors affect finding this information? ▪ What are potential barriers that might hinder finding this information? 	15 mins
RRI	<p>Questions:</p> <ul style="list-style-type: none"> ▪ On the overall, where do you see the main contributions to your professional practice from a tool like the Council of Coaches? ▪ In terms of your professional ethics, are there issues that jump out at you as problematic in some way, which developers, implementers or professional users of the tool would need to take into account? ▪ For instance: the coaches could be designed to have a highly persuasive style of coaching – doing whatever it takes to help the user reach pre-set goals – or they could be designed to have a more open-ended reflexive approach – where the aim is to help the user consider different options. Which would you prefer and how does care and ethics play into it? ▪ Another instance: the Council of Coaches could be implemented as a completely voluntary tool that users take up and use as they like, or it could be implemented in a more mandatory fashion, e.g. as part of a pre-defined program of health management. 	15 mins

	Which would you prefer and how does care and ethics play into it?	
Conclusion	<p>Thank interviewee.</p> <p>Discuss next steps (how we will analyse the data, what we will use it for: service model design, functional requirements).</p> <p>Ask interviewee if s/he has any questions.</p>	3 mins

5.3 Results

At the moment of writing, three interviews were completed with another two interviews planned (with an ergo-therapist and a social worker, both related to chronic pain treatment). In the coming months, these new interviews, will be supplemented with the first three interviews to be able to draw the final conclusions. Table 4 displays the main characteristics of the three interviewees.

Table 4: Stakeholder interviewees' demographics.

#	Profession	Age	Focus of interview
1	Information specialist at a rehabilitation centre	49	Chronic pain
2	Community nurse	47	Age-related impairments
3	Physiotherapist	41	Age-related impairments

The different professions involved in chronic pain were physical therapists, ergo-therapists, social workers, psychologist, activity therapists, pedagogical workers, movement teachers, and rehabilitation physicians. In principle, the rehabilitation physician is the person in charge, but depending on the individual patient a different professional (e.g., the social worker) can be the most important person for deciding upon the proper course of treatment.

For age-related impairments, these professionals are the general practitioner, community nurse (college level), the community sick nurse (vocational level), physical therapists, ergo-therapists, and the specialists that are related to specific diseases (and that mostly work in hospitals). For community-dwelling older adults, the responsible actor is the general practitioner, or, when the older adult sees multiple specialists, one specialist acts as the main responsible party. In many cases, older adults have many comorbidities, and thus, a wide range of care professionals. Interviewee 3 was specialised in treating older adults with COPD. For this patient group, additional professionals were the community lung nurse and the lung physician.

Multi-disciplinary deliberations are held once a week for chronic pain, while the patient discusses his/her personal progress with all caregivers once every six weeks. Disagreements among professionals for chronic pain mostly tend to focus on the physical/mental burden a patient can take on at a given time, whereby the voice of the psychologist and social worker are most important, as the treatment of chronic pain lies predominantly on the cognitive domain. When a patient is involved in the discussions, the care team chooses a conversation leader among themselves that lead the conversation (this choice is based on the individual patient: what aspect is most important in his/her treatment, what type of person can s/he communicate best with).

For age-related impairments, the main deliberation is either between the general practitioner and the community nurse. Or between the hospital and the community nurse. Main disagreements that arise

here focus on the readiness of a patient to be discharged from the hospital, whereby the hospital thinks the patient can save him/herself, but where the community nurse thinks this is an irresponsible decision. When it comes to older adults with COPD, there is no multi-disciplinary deliberation, which leads to problems when the older adult becomes ill. In this case, no caregiver notices and the patient is 'off the radar' in a time where s/he needs care the most. It turns out that most interdisciplinary communication hinges on good personal relationships among caregivers.

Missing information. Care professionals involved in chronic pain treatment expressed that they missed information about auxiliary treatment that the patient seeks or takes (e.g., manual therapy) or status information from professionals that were absent at the time of a deliberation. For older adults, most problems with missing information concerned a lack of a central overview of the medication a person is taking (different medication prescribed by the GP or by a specialist, who do not update each other).

When we asked the interviewees about the role virtual coaches can play in the patient's journey, they gave different input for a **Council of Coaches service model**.

Figure 3 displays the input of interviewee 1, where the green text displays the possible input from the virtual coaches, the 2nd row depicts the patient's life events, and the third row adds the patient's medical events.

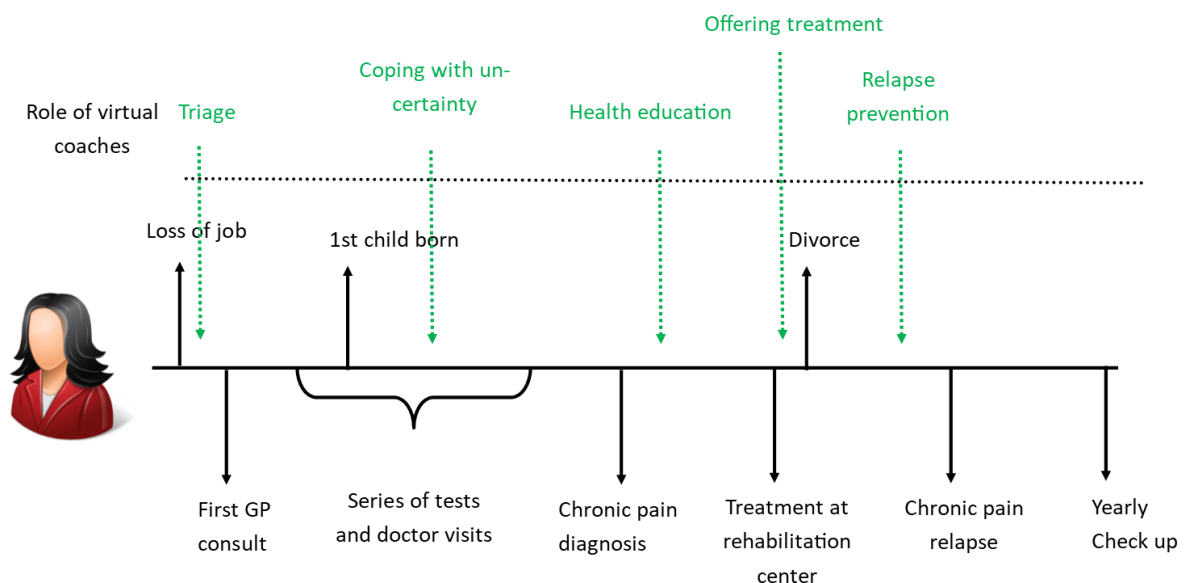


Figure 3: Input for the Council of Coaches service model from Interviewee 1.

Before the diagnosis of chronic pain, virtual coaches could offer triage services to a client, informing him/her when (not) to seek professional care. During the period in which diagnostics are performed (and which can be quite lengthy for the case of chronic pain), virtual coaches should offer support in coping with uncertainty and ambiguity. Once the diagnosis is made, virtual coaches can aid in health education (educating the client about what chronic pain actually is) and should support them in practical matters (e.g. should the client continue working?). When treatment for chronic pain commences in a rehabilitation center, virtual coaches could offer parts of the treatment that can be done at home (physical exercises, psychological exercises). When treatment in the rehabilitation center is concluded, virtual coaches should offer relapse prevention. This includes educating clients about noticing signs of relapse (e.g., noticing new types of pain, change in mood) and application of the right strategies (e.g., breathing exercises). An additional remark that was made is that the coaches also need to be absent at periods of time. Treatment of chronic pain is aimed at making the patient independent

of support. So, the coaches should indicate that they are absent at certain times to educate the client in becoming self-reliant.

Figure 4 displays the input of interviewee 2, for the patient journey of a person with age-related impairments. After breaking a hip and recovering from pneumonia, virtual coaches can support the rehabilitation process by offering social support for doing their exercise regime (e.g., motivating them to continue their exercises). When mild cognitive impairments play a role, an important role can be to aid a client in keeping a daily rhythm (e.g., eating on time). Moreover, when medication needs to be taken, virtual coaches can remind clients to do so (by using connected, smart pill dispensers). The virtual coaches can remind people to do so. The interviewee stated explicitly that the virtual coaches should not mingle themselves in diagnosis and triage. For older adults, these concepts are very complicated (due to their comorbidities) that it is best left to real-life professionals. In all, the coaches should support the client in becoming self-reliant, by motivating and rewarding them.

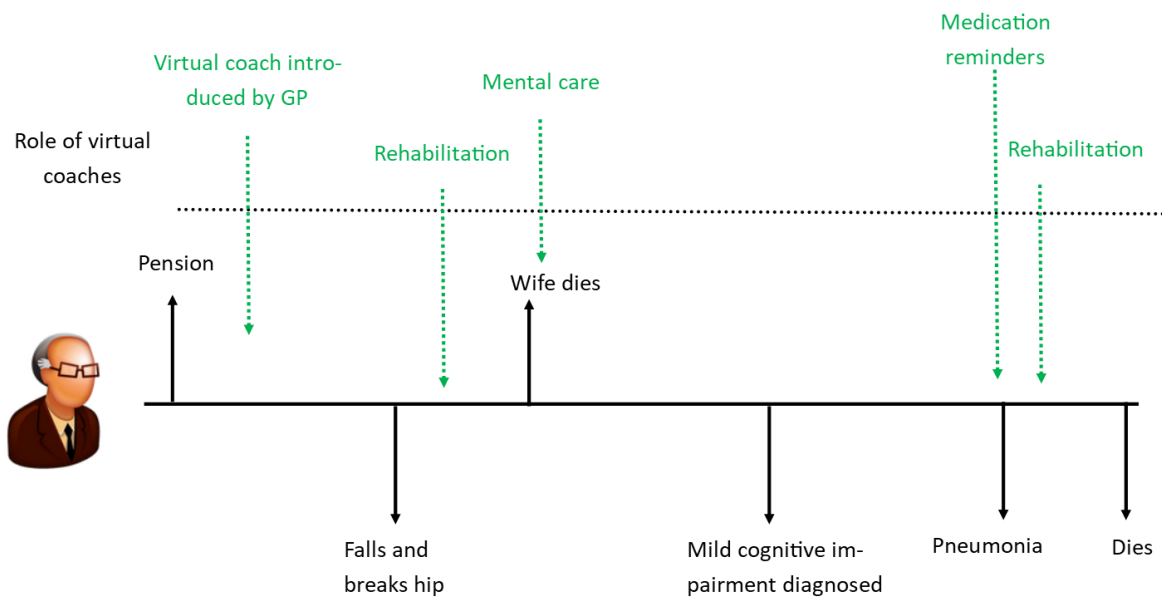


Figure 4: Input for the Council of Coaches service model from Interviewee 2.

Figure 5 displays the input of interviewee 3. According to the interviewee, a person should receive assistance of virtual coaches before something is actually wrong. This introduction should be simple and brief. Once a diagnosis is made, the coaches should provide health education, since "most people do not know what their diagnosis entails and most care professionals do not take the time to explain things properly". A very important point here, according to interviewee 3, is that the client is educated in where they can go for different types of care, related to their condition. Thorough education is especially important for patients with COPD, as they might have low literacy. Once people enter a physical training program, the virtual coaches should remind them and motivate them to do their exercises, or to be physically active. For the case of COPD patients, regular refreshment courses on how to properly inhale their medication would be very worthwhile. With respect to COPD exacerbations, the virtual coaches should have a monitoring role, whereby they detect exacerbations (using simple questionnaires) and monitor the (lack of) effect of interventions (e.g. antibiotics or prednisolone).

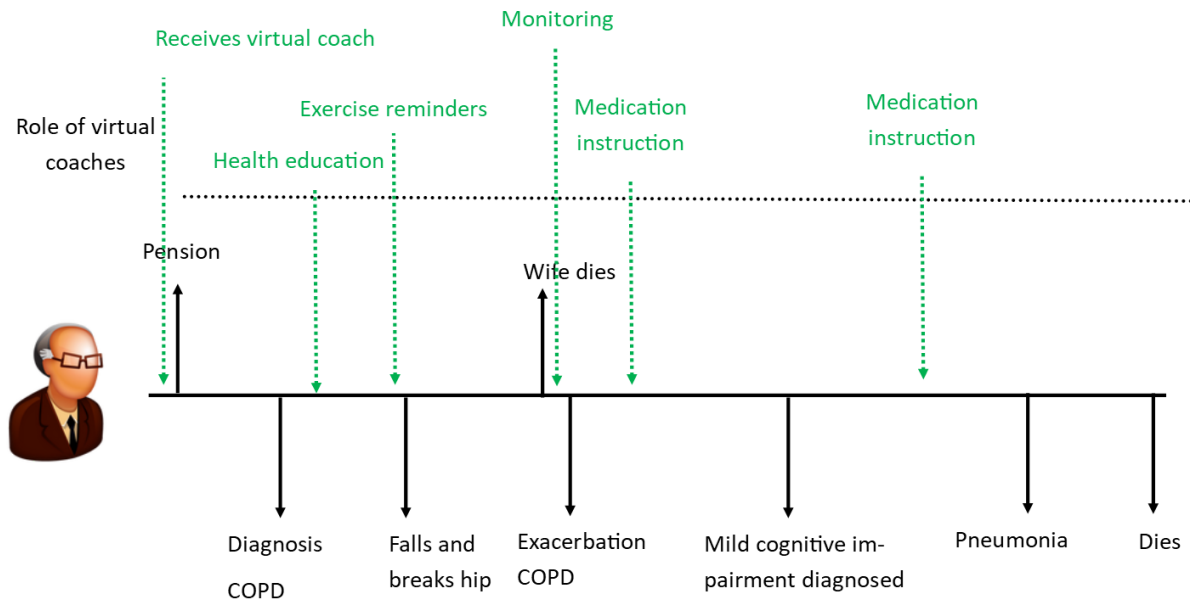


Figure 5: Input for the Council of Coaches service model from Interviewee 3.

The **types of virtual coaches that need to be included in the Council of Coaches** were, according to interviewee 1 for chronic pain:

- A physical therapy coach;
- A psychosocial coach;
- An occupational therapy coach;
- A doctor coach;

According to interviewee 2, for age-related impairments, the following coaches need to be included:

- A buddy or peer (for moral support);
- A general practitioner coach;
- A community nurse coach;

The interviewee thought that the virtual coaches should be a digital version of the real-life care professionals that a client visits.

Finally, according to interviewee 3, for age-related impairments (with a focus on patients with COPD), the following coaches need to be included:

- A general practitioner coach;
- A physical therapy coach;
- A community nurse coach;
- A nurse professional (from the hospital) coach;

Both interviewee 2 and interviewee 3 thought the virtual coaches should resemble the professionals they interact with in real life, but in their professional role, not in person.

5.4 Interim conclusions

The stakeholder interviews have taught us that the Council of Coaches technology can and should fulfil the following tasks: Health education, providing reminders, motivating clients to adhere to medication or training regimes, social support, and health monitoring. The overarching theme is that clients should be made self-reliant, and should not become dependent on professional care or technological services. This was made most explicit by interviewee 1, who stated that, for chronic pain, the coaches should sometimes take a break so that the client has no choice but to become independent.

Coaches that were named multiple times for inclusion in Council of Coaches were a physical therapy coach, a community nurse coach and a doctor (or GP) coach. Dependent on the condition, one should include a buddy or peer, or a psychosocial coach.

Once the diary study is finished, results of these interviews will be translated into requirements. For the time being, the development of Council of Coaches content should focus on the tasks the coaches should fulfil and the instruments they will need for them (diagnostic tools, interoperability with other devices, motivation strategies, health education material, etc.).

6 Preliminary Conclusions

In this deliverable, the first objective was to describe the methods to be used in the process of stakeholder analysis in the first phase of the project. Different kinds of interviews as well as a stakeholder workshop were held in the last few months. The preliminary results have been described in this deliverable. The methods will give the consortium input for both the RRI issues that are associated with the technology to be developed, as well as input for how the technology could and/or should be used in practice.

The second objective is to report on initial outcomes of the stakeholder analysis by presenting and discussing results of individual stakeholder interviews and a first stakeholder workshop that was held in January 2018.

Since the process of interviews with stakeholders is still ongoing, we are hesitant to draw any definitive conclusions just yet. However, we would like to draw some conclusions on the process of stakeholder involvement so far.

- 1) It is difficult to engage stakeholders in a technology that is still under development. Out of all actors we've identified, we've been able to discuss Council of Coaches with only ten participants through various meetings. We feel the international character of the project (and therefore travelling distances) as well as the preliminary vagueness of the technology contribute to a lack of participation. However, we have encountered a lot of enthusiasm for the project, so we assume that stakeholder involvement will improve as technology becomes more tangible, e.g. through demonstrators.
- 2) The information from stakeholders is very valuable, but the range of information is very broad. This creates the necessity for the consortium to engage extra efforts in translating the information we received from stakeholders into actual user requirements.
- 3) When looking at the specific RRI aspects of Council of Coaches, the input from the stakeholders slightly overlaps with the RRI aspects as identified by the consortium (as described in D2.1). However, many issues are wide apart as well. We embrace the difference in perspective from both viewpoints. However, to keep the development of the technology feasible (and within scope) we will need to be critical of which RRI issues will be used for prototype development and which issues could be of more use for the future product recommendations and development. These long-term requirements will probably be described in D2.7 at Month 22.

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