



The 8th International Conference on Current and Future Trends of Information and
Communication Technologies in Healthcare
(ICTH 2018)

A training simulation for practicing shared decision making for older patients

Ruth Pel-Littel^a, Henk van Zeijts^b, Nadine Schram^b, Henk Herman Nap^a, Johan
Jeuring^{b,c,*}

^aVilans, <https://www.vilans.nl/contact>

^bDialogueTrainer, <https://www.dialoguetrainer.com/contact/>

^cUtrecht University, <https://www.uu.nl/organisatie/contact>

Abstract

We describe the design of a product that supports older patients in preparing themselves for a consultation with a health-care professional. The product focuses on shared-decision making, and supports multi-modal interaction. Users can interact with the product through speech, text, and mouse. The product has been designed and evaluated in several co-creation sessions.

© 2018 The Authors. Published by Elsevier Ltd.

This is an open access article under the CC BY-NC-ND license (<https://creativecommons.org/licenses/by-nc-nd/4.0/>)

Selection and peer-review under responsibility of the scientific committee of ICTH 2018.

Keywords: Training simulation, communication skills, older patients, shared decision making.

1. Introduction

Shared decision making (SDM) facilitates the discussion between health care professionals and older patients when decisions have to be made about desired care and treatment. SDM has a number of benefits, and several countries have set up programs to stimulate SDM in discussions between health care professionals and older patients. These programs target awareness of SDM of health-care professionals and patients, and sometimes offer trainings to health care professionals. We are not aware of projects or products aimed at training older patients.

This paper describes the design of a product aimed at training older patients to practice SDM in discussions with healthcare professionals. The product is based on our earlier work on developing a serious game for practicing communication skills targeted at students in higher education [12]. The main challenge of our work is the target group of older patients instead of higher education students.

* Corresponding author.

E-mail address: j.t.jeuring@uu.nl

Our target group is community dwelling older patients, aged 65+ years, with minimal digital health literacy skills. These patients might encounter various diseases and health conditions. We want to offer users of our simulation a choice to practice with multiple situations, such as a patient with diabetes, or a patient with multi-morbidity problems.

This paper is organised as follows. Section 2 discusses some related work. Section 3 discusses shared decision making, together with its benefits. Section 4 describes two co-creation sessions in which we discuss and evaluate the design of a product to help older patients in discussions with a healthcare professional. Section 5 describes the design of the product. Section 6 describes future work and concludes.

2. Related work

There exists quite a number of simulations or serious games for training, sometimes particular, communication skills. For example, Bosse et al. [2,1] developed a training environment in which a dialogue is simulated to train public transport employees to deal with aggressive passengers. The user of the simulation is confronted with a virtual character - similar to the approach described in this paper - and can choose between a number of pre-defined answers which determine if a situation escalates. The user receives feedback on choices made. Other examples have been developed by Bracegirdle and Chapman [3] a game for communication training for pharmacists, Cláudio et al. [4] for self-medication consultation skills in pharmacy students, and Muller et al. [16] for sales dialogues. We are not aware of any such games for practicing shared decision making.

Our target group is older patients. These patients might encounter various diseases and health conditions. We want to offer users of our simulation a choice to practice with multiple situations, such as a patient with diabetes, or a patient with multi-morbidity problems. Also, we want to be able to easily adapt situations to some particularities of the context (male/female, nursing home/general practitioner, country specific protocols, etc). For that reason, we want a simulation that makes it easy to create and adapt various scenarios. There exist various such simulations [15], and Communicate [12] is among the tools that offers most flexibility.

For older adults, not using digital technology is sometimes a choice [14]. There exists a number of game design and gamification requirements and approaches that are appealing to older adults [10,17,18]. These requirements and approaches positively support the usability and play experience of the product by older people.

3. Shared decision making

SDM is the process in which a health professional and a patient communicate to make decisions about health and treatment, using the best available evidence, and including the patient's preferences and personal goals in the discussion [6]. A patient is supported in the deliberation about the possible attributes and consequences of options, to arrive at informed preferences in determining the best action to take, respecting a patient's autonomy, where this is desired, ethical and legal [6].

Despite proven benefits, such as increased patients knowledge of the options, more accurate risk perception, greater comfort with decisions, greater participation in decision making, fewer major surgeries and fewer people that stay undecided [20], SDM is not yet common practice. It is estimated that in only 10% of the situations in which health decisions are made, shared decision making is used [8]. Reviews show that both health professionals and patients experience barriers in making shared decisions [13,7,9]. We expect that for older patients with multiple chronic conditions (MCC) and their informal caregivers, additional barriers and facilitators exist and should be identified and remedied, to support the implementation of SDM [11,22].

In a systematic literature review [19] we found that the most reported barriers for implementing SDM in older patients are poor health and cognitive or physical impairments. Prior exposure to illness is considered to be a facilitator to SDM. Explicit permission to participate in SDM is experienced by many older patients as a facilitator. Recognizing that there are two experts taking part in the medical encounter is a major facilitator. Health professionals frequently experience patients not wanting or thinking there is no need to participate in SDM as a barrier. Older patients that accept responsibility to be involved in decision making facilitate the SDM process. Decision support from others in the preparation phase is often seen as a facilitator.

In the past decades, much effort has been put in the development of models for SDM [6,5,21], training of health professionals in SDM, and the development of patient decision aids (PDA) in order to enhance the process of SDM in

a clinical consultation. Following the UK Magic programme, the Dutch Patient Federation developed the "Ask Three Questions" campaign for patients. The goal of this campaign is to stimulate active participation in the SDM process by informing patients about three relevant questions they should ask the health professional when a health decision has to be made:

1. What are my options?
2. What are the benefits and disadvantages of these options?
3. What does this mean for my situation?

This national campaign used mainly animated films, patient narratives, posters, folders, postcards etc. The focus of this campaign and the focus of patient decision aids is on informing patients and creating awareness of choices. It does not help with developing communication strategies to empower older patients to participate in SDM. Older patients might benefit more when they are able to exercise health care conversations with health professionals in a safe and inviting digital environment and learn how to overcome major current barriers to SDM, such as:

- The patient's fear of being considered "a difficult patient" when asking questions
- The patient being unaware that health professionals appreciate a patient asking questions and expressing their preferences, so that they do not have "to guess" what a patient wants
- The patient waiting for an explicit invitation from a health professional to participate
- The patient feeling an unequal partner in the conversation
- The patient values his or her own experience in living with chronic conditions very low
- The use of difficult language by the health professional
- The health professional not personalizing the information given

The next section discusses two co-creation sessions in which we looked at the design of a digital environment in which older patients exercise health care conversations with health professionals.

4. Co-creating a product for older people for training SDM skills

We organised two co-creation sessions to discuss the design of a product for older people for training SDM skills in Utrecht on April 12th and June 7th 2018 from 15.00–17.00. The sessions were supported by Ruth Pel and Henk Herman Nap from Vilans, and Henk van Zeijts and Nadine Schram from DialogueTrainer.

The participants of session 1 were a recently retired general practitioner, one general practitioner assistant, and three older people (one male two females). Two of the older people are active members of an elderly union, two of them worked in healthcare, two of them had no experience with computer games. The participants of session 2 were the same practitioners and one older female who attended session 1. Two new older people joined this second session (one male and one female).

The sessions consisted of

- Introduction, background of participants, informed consent
- Short introduction on shared decision making
- Short introduction on serious gaming
- In pairs (professional and older person) participants practica SDM by playing:
 - Session 1: one scenario
 - Session 2: three scenario's
- Feedback on scenario's
- Group discussion
- Session 1: work out communication examples in two groups, and design a scenario for the product
 - Session 2: feedback on design (lettertype, font size, colors etc)

Overall, our findings from the sessions are the following:

Relevance and user immersion. Both older people and GPs were very positive about the project: they find the topic of stimulating shared decision making very relevant. They could see the value of the tool. They enjoyed playing the scenario. The scenario gave rise to explicit reflection upon the behaviour of the GP in the game, indicating they do know what they want from him. This may be used as a game element, e.g. asking meta-questions like How do you think the doctor is doing?

Perspective and location of where the game is played. The older people didn't have any problem relating to the scenario in which they had to "play" they had diabetes. So the "first person" perspective is fine. They did admit that identifying with the character may cause confusion if you're in the waiting room of your GP, being focussed on your actual complaint. So the preferable location would probably not be the waiting room, but e.g. home, through online availability of the game. This is something to be discussed with general practitioners and insurance companiers.

Scenarios in context. To manage the expectations of players, it is crucial to be clear about the context in the game. We created a new prototype scenario (with identifier 1347 in our database) in which the GP explicitly is a virtual actor. We introduce him as a "Oefendokter" (training doctor), to clarify the purpose of the game. This was tested in the second co-creation session on June 7th. The participants were very positive about the Oefendokter concept.

Various scenarios. The diabetes scenario is received well by the older people. In the second co-creation session we presented two additional scenarios. The first of these is about multi-morbidity: besides the main complaint, the patient has other diseases. This is a common situation and especially relevant to older patients. The goal of the second extra scenario is to prepare a player for a discussion by asking to describe the personal situation.

Functionality and Interaction design.

5. A first design of the product

Based on discussion in the project-team and the co-creation sessions, we designed the following product. We develop an online environment in which older patients can practice conversations with general practitioners (GP's). A screenshot of the environment is displayed in Figure 1.

The design is based on the serious game for practicing communication skills targeted at students in higher education [12] we have been developing since 2015. A notable difference between the new product and the environment on which it is based are the different input modalities: besides using a mouse, players can also use speech and text.

The design has partially been tested in the second co-creation session, and we include some of the comments we received and observations we made.

The user (learning) experience of our product consists of the following phases:

- Phase 0: Landing page
- Phase 1: Introduction and context
- Phase 2 (optional): Information gathering
- Phase 3: Play*
- Phase 4: Reflection*
- Phase 5: Wrap-up

In the final learning arrangement phases 3 and 4 may recur.

Phase 0: Landing page. The project and/or product landing page contains information about the project and gives access to the product(s). Components on the landing page: webpage project description; product launch options

Phase 1: Introduction and context. In this phase the relation of the player to the product is made clear: what is it for, why is it useful, what can the player expect, etc. All possible confusion about the goal of the context and goal of the product must be prevented.

Components in the introduction phase: context description; setting the scene: who is the player and what is the assignment; explanation of the game: how does it work.

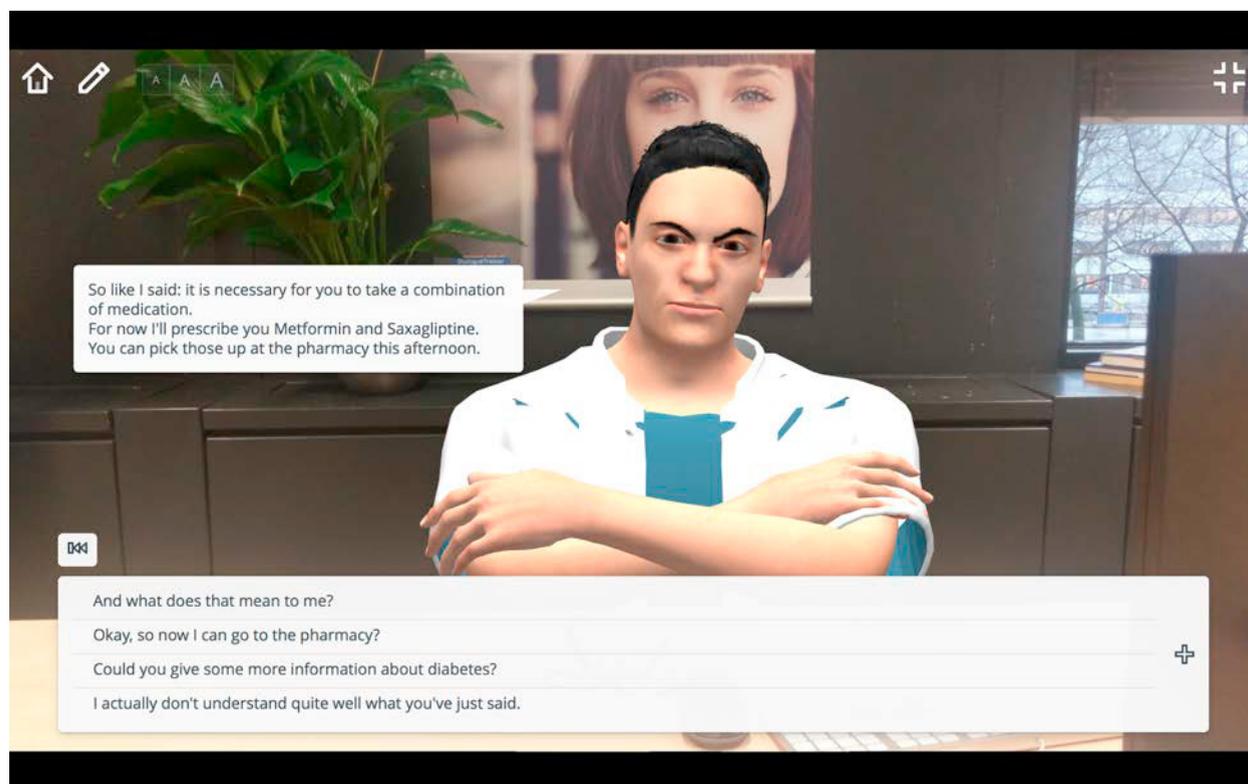


Fig. 1. Screenshot of the simulation depicting a step in the discussion with the training doctor.

Parts of the introduction may also be presented at the start of the Play phase.

In the second co-creation session we had integrated this phase with the playing phase. The players thought this was a good way to start the experience, and had some useful remarks about the scenario. Although we spent considerable effort in explaining all details of the goal, the context, and the environment, there were some sources of confusion in the introduction, both related to the goal of the scenario as well as the user interface of the game. We decided to be even more explicit in describing the goal in the next version, and to try to make the interaction elements on the screen more consistent.

Phase 2 (optional): Information gathering. We are still unsure whether or not we want to gather information. For now we leave the possibility open. If the product is used in real healthcare situations, information gathering may be important. However, medical knowledge and responsibility is not within the scope of this project. Information gathering systems have been developed by others (e.g. ConsultAssistent); eventually, integration and/or cooperation might be interesting.

A pre-inquiry of the patients' standard behaviour in interactions with healthcare professionals may be relevant. For this, we would need a survey tool.

Phase 3: Play. In the Play phase the senior patient plays the dialogue scenario.

Components in the Play phase: dialogue scenarios for older patients, a training simulation for playing these scenarios, with suitable interaction modalities.

In the second co-creation session the participants played four scenarios:

- two scenarios on multi-morbidity, showing both a perfect, from an SDM perspective, discussion between a health professional and an older patient, and a discussion that goes completely wrong
- a scenario about diabetes

- a scenario in which we gather information from the players that is useful in a following discussion with a health professional

Generally, the players enjoyed working with the scenarios. The multi-morbidity scenarios did not offer choice to the players, which led to some confusion. The other scenarios were well appreciated.

Phase 4: Reflection. In the reflection phase we want to collect information about the senior patients' experience with the game, change in mind set and ideas about new kinds of behaviour.

Phase 5: Wrap-up. In the Wrap-up phase we finalize the user experience. We may give the results of the *playthroughs* of the scenarios, and give suggestions for other scenarios and/or useful suggestions. A playthrough gives an overview of the choices made in a scenario, and might display scores for the choices made by the player. We may ask the players to return / give feedback / otherwise (call to action).

6. Conclusions and future work

We have designed a product with which older patients can practice and prepare themselves for SDM in discussions with healthcare professionals. The product has been tested in two co-creation sessions with older people, and the findings are incorporated in the new version of the product.

In the near future we will work on several ways to improve the product: we will make the customer story more explicit by further explaining the goal and the context. We will make improvements to the scenarios we already developed, and test the resulting product on a larger scale in the Netherlands and at several conferences and symposia. In the longer term we want to develop scenarios in which players get more explicit assignments, such as: in this scenario you think that the doctor gives unclear information: how do you ensure that you better understand the doctor?

In upcoming co-design sessions we will further enhance the product and use the game design and gamification requirements and approaches, mentioned in the related work, that are appealing to older adults. These requirements and approaches positively support the usability and play experience of the product by older people.

Acknowledgements

The activity "Empowering older people in conversations with health-care professionals" has received funding from the European Institute of Innovation and Technology (EIT). This body of the European Union receives support from the European Union's Horizon 2020 research and innovation programme. We thank the participants in the co-creation sessions for their ideas and efforts. Jordy van Dortmont, Marcell van Geest, and Ingnaz Keevenaar helped implementing the necessary features of the simulation.

References

- [1] Bosse, T., Gerritsen, C., de Man, J., 2016. An intelligent system for aggression de-escalation training. In: Proceedings ECAI'16: the 22nd European Conference on Artificial Intelligence. IOS Press.
- [2] Bosse, T., Provoost, S., 2015. Integrating conversation trees and cognitive models within an ECA for aggression de-escalation training. In: Proceedings PRIMA 2015: the 18th International Conference on Principles and Practice of Multi-Agent Systems. Vol. 9387 of LNCS. Springer, pp. 650–659.
- [3] Bracegirdle, L., Chapman, S., 2010. Programmable patients: Simulation of consultation skills in a virtual environment. *Bio-algorithms & Med-Systems* 6, 111–115.
- [4] Cláudio, A. P., Carmo, M. B., Pinto, V., Cavaco, A., 2015. Virtual humans for training and assessment of self-medication consultation skills in pharmacy students. In: Proceedings ICCSE 2015: the 10th International Conference on Computer Science & Education. IEEE, pp. 175–180.
- [5] Elwyn, G., Durand, M., Song, J. Aarts, J., Barr, P., Berger, Z., Cochran, N., Frosch, D., Galasinski, D., Gulbrandsen, P., Han, P., Harter, M., Kinnersley, P., Lloyd, A., Mishra, M., Perestelo-Perez, L., Scholl, I., Tomori, K., Trevena, L., Witteman, H., van der Weijden, T., 2017. A three-talk model for shared decision making: multistage consultation process. *BMJ (Clinical research ed.)* 359, j4891.

- [6] Elwyn, G., Frosch, D., Thomson, R., Joseph-Williams, N., Lloyd, A., Kinnersley, P., Cording, E., Tomson, D., Dodd, C., Rollnick, S., Edwards, A., Barry, M., 2012. Shared decision making: a model for clinical practice. *Journal of general internal medicine* 27 (10), 1361–1367.
- [7] Elwyn, G., Scholl, I., Tietbohl, C., Mann, M., Edwards, A., Clay, C., Legare, F., van der Weijden, T., Lewis, C., Wexler, R., Frosch, D., 2013. "Many miles to go ...": a systematic review of the implementation of patient decision support interventions into routine clinical practice. *BMC medical informatics and decision making* 13 (Suppl 2 S14).
- [8] Godolphin, W., 2009. Shared decision-making. *Healthc Quarterly* 12, 186–190.
- [9] Gravel, K., Legare, F., Graham, I., 2006. Barriers and facilitators to implementing shared decision-making in clinical practice: a systematic review of health professionals' perceptions. *Implementation science* 1, 16.
- [10] IJsselsteijn, W., Nap, H. H., de Kort, Y., Poels, K., 2007. Digital game design for elderly users. In: *Proceedings of the 2007 Conference on Future Play. Future Play '07*. ACM, pp. 17–22.
- [11] Jansen, J., Naganathan, V., Carter, S., McLachlan, A., Nickel, B., Irwig, L., Bonner, C., Doust, J., Colvin, J., Heaney, A., Turner, R., McCaffery, K., 2016. Too much medicine in older people? deprescribing through shared decision making. *BMJ (Clinical research ed.)* 353, i2893.
- [12] Jeuring, J., Grosfeld, F., Heeren, B., Hulsbergen, M., IJntema, R., Jonker, V., Mastenbroek, N., van der Smagt, M., Wijmans, F., Wolters, M., van Zeijts, H., 2015. Communicate! — a serious game for communication skills —. In: *Proceedings EC-TEL 2015: Design for Teaching and Learning in a Networked World: 10th European Conference on Technology Enhanced Learning*. Vol. 9307 of LNCS. Springer, pp. 513–517.
- [13] Joseph-Williams, N., Elwyn, G., Edwards, A., 2014. Knowledge is not power for patients: a systematic review and thematic synthesis of patient-reported barriers and facilitators to shared decision making. *Patient education and counseling* 94 (3), 291–309.
- [14] Knowles, B., Hanson, V. L., 2018. The wisdom of older technology (non)users. *Commun. ACM* 61 (3), 72–77.
- [15] Lala, R., Jeuring, J., van Dortmont, J., van Geest, M., May 2017. Scenarios in virtual learning environments for one-to-one communication skills training. *International Journal of Educational Technology in Higher Education* 14 (1), 17.
- [16] Muller, T. J., Heuvelink, A., van den Bosch, K., Swartjes, I., 2012. Glengarry glen ross: Using bdi for sales game dialogues. In: *Proceedings AIIDE 2012: 8th AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment*. AAAI Press, pp. 167–172.
- [17] Nap, H. H., de Kort, Y., IJsselsteijn, W., 2009. Senior gamers: Preferences, motivations and needs. *Gerontechnology* 8 (4), 247–262.
- [18] Nap, H. H., Diaz-Orueta, U., Gonzalez, M., Lozar-Manfreda, K., Facal, D., Dolniar, V., Oyarzun, D., Ranga, M.-M., de Schutte, B., 2015. Older people's perceptions and experiences of a digital learning game. *Gerontechnology* 13 (3), 322–331.
- [19] Pel-Littel, R., Snaterse, M., Teppich, N., Buurman, B., van Edden, F., van Weert, J., Minkman, M., Scholte op Reimer, W., 2018. Barriers and facilitators of shared decision making in older patients with chronic conditions; a systematic review, submitted.
- [20] Stacey, D., Legare, F., Lewis, K., Barry, M., Bennett, C., Eden, K., Holmes-Rovner, M., Llewellyn-Thomas, H., Lyddiatt, A., Thomson, R., Trevena, L., 2017. Decision aids for people facing health treatment or screening decisions. *The Cochrane database of systematic reviews* 4, cD001431.
- [21] Stiggelbout, A., Pieterse, A., De Haes, J., 2015. Shared decision making: Concepts, evidence, and practice. *Patient education and counseling* 98, 1172–1179.
- [22] van Weert, J., van Munster, B., Sanders, R., Spijker, R., Hooft, L., Jansen, J., 2016. Decision aids to help older people make health decisions: a systematic review and meta-analysis. *BMC medical informatics and decision making* 16, 45.