Patients', radiographers' and radiography students' experiences of 360° virtual counselling environment for the coronary computed tomography angiography: A qualitative study

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ABSTRACT

Introduction: The aim of this study was to describe patients', radiographers' and radiography students' experiences of the developed 360° virtual counselling environment (360°VCE) for the coronary computed tomography angiography (cCTA).

Methods: A descriptive qualitative approach was used. The participants were cCTA patients (n=10), radiographers (n=10) and radiography students (n=10) who used the 360°VCE and visited or worked at a university hospital in Finland. The 360°VCE, resembling the authentic environments of a CT imaging unit, included digital counselling materials in text, image, animation and video formats. Data were gathered through thematic interviews individually to obtain an understanding of participants' perspectives and analyzed by inductive content analysis.

Results: Five main categories and 15 categories were identified. Identified benefits of the 360°VCE for patients included improvements in knowledge, spatial and environmental orientation, and senses of security and self-efficacy, with reductions in fear and nervousness. Patients found the counselling materials engaging, and that the 360° technology conveniently provided reassuring familiarity with the environment before their visit. Identified benefits for radiographers and radiography students included improvements in patients' mental preparedness, knowledge, spatial and environmental orientation, and reductions in patients' fear, which eased procedures and enhanced diagnostic success. The 360°VCE also provided useful information and familiarization with the cCTA unit for students during clinical practice and staff of referring units.

Conclusion: It seems that patients', radiographers' and radiography students' experiences of 360°VCE respond to patients' needs by improved knowledge and reduced fears. Thus, current counselling practices can be usefully complemented with spherical panoramic imaging technology and online information delivery.

Implications for practice: The results may be used to improve patient counselling and care, thereby optimizing the cCTA examination procedure and reducing fear. However, further research is needed to characterize experiences of the 360° VCE more comprehensively.

Keywords: Counselling, Patient, Computed tomography, Radiographer, Digital, Virtual

Introduction

Coronary artery disease is the most common cause of death in Finland, causing 20% deaths in men and 17% in women in 2017[1]. It is diagnosed by invasive coronary angiography or coronary computed tomography angiography (cCTA)[2], both which provide images of the heart that can reveal blockages. cCTA is non-invasive, safe, fast and electrocardiogram (ECG)-gated to match the imaging sequence to the patient's heartbeat and restrict acquisition of data to a specified part of the cardiac cycle. This minimizes cardiac motion artifacts, improves image resolution and reduces the required radiation dose[3]. The patient's heart rate is also reduced with medication to reduce motion artifacts[3–5], but if an irregular or high heart rhythm may persists cCTA may not provide sufficiently diagnostic images, or it may lead to increase of the dose[6]. Problematically, 50-74% of cCTA patients felt fear or anxiety before the examination that increased their blood pressure and heart rate[7,8]. Moreover, increases in fear and anxiety levels before medical imaging procedures are common[9–12] and most pronounced among younger and female patients[8,10,12–14].

Counselling is important for patients undergoing cCTA to increase their knowledge and help to manage their anxiety and fear. There is a legal requirement to inform patients coming to a medical examination involving ionizing radiation clearly, and in an appropriate manner, of the expected diagnostic value of the procedure, as well as the radiation risks[15,16]. In counselling, patients value such information on doses and risks[17], as well as an inclusive and individually tailored approach, comprehensibility, good availability and flexibility[18–22]. However, radiographers may have little time to establish contact with the patient, and may focus on technical aspects and patient safety of the imaging procedure, rather than patient care[23]. CT and MRI patients have been shown to have unmet information needs related to results of the examination, scan-related fear, risks, after-effects and examination procedures[20]. Use of virtual counselling environments can potentially mitigate such problems by enabling patients to encounter the environments, access relevant information and familiarize themselves with the planned procedure at their own pace in advance. Virtual environments can also enable patients to visualize real environments they will encounter and acquire broader knowledge of planned procedures, which can lead to greater preparedness and understanding of examination processes than radiographers generally provide before CT examinations[19,24].

In efforts to increase patients' knowledge, improve adherence to the treatment and reduce anxiety before cCTA or coronary angiography, digital counselling methods (e.g. videos) have been used[9,25,26]. This study focuses on a novel 360° virtual counselling environment (360°VCE), based on spherical panoramic images and 360° technology, which enables individual counselling activities in appropriate places, times and manners. Such environments have been successfully used in health education to enhance students' knowledge and perceived satisfaction[27]. However, they have had limited application in computed tomography contexts, although 360° demonstration video and computer-generated virtual reality (VR) technologies with some similarities have been used to provide information and prepare radiotherapy, MRI and standard pediatric x-ray patients in recent studies[28–30].

The aim of this study was to describe the patients', radiographers' and radiography students' experiences of the developed 360° virtual counselling environment (360°VCE) for the coronary computed tomography angiography (cCTA). The study aimed to answer the following research questions: What kind of experiences cCTA patients had when using the 360°VCE? How the radiographers' and radiography students' experienced the use of 360°VCE?

Methods

A descriptive qualitative study design was used. The study was performed in two phases as development and implementation of 360°VCE.

Phase 1: Development of the 360°VCE

The 360°VCE was developed, based on results of the systematic review, to resemble authentic spaces that patients encounter on their way to and during a cCTA examination and hospital visit. The purpose was to offer virtual access to the cCTA unit (together with relevant contextual information) for patients undergoing a first cCTA, via a convenient link, before entering the hospital to reduce their fear.

The 360°VCE was produced in co-operation with Visuon (https://visuon.com) using spherical, panoramic digital images acquired at a radiology department of (blinded) University Hospital performing cCTA procedures. Three authentic spaces were remodeled

by spherical 360° images and could be accessed via any smart device with a network connection with no specific applications.

Figure 1. Example of virtual space in the 360°VCE, with links to relevant contextual information

The 360°VCE based on spherical panoramic images offers unlimited possibilities to zoom, rotate, view and review different angles of the covered space for as long as each user wants, with no predefined time limits or views. The 360°VCE user interface was designed to be as simple as possible, enabling movement, zooming and rotation of the images by touching the screen, and using connective links as hot spots. A visual example of a virtual space is presented in Figure 1.

Digital counselling materials were developed by the researchers based on current practices in cCTA counselling and literature searches. Relevant counselling materials covering seven categories of content in text, image, animation and video formats were included in the 360°VCE. Links to Finnish Heart Association (FHA) open access materials were also provided.

Phase 2: Implementation of the 360°VCE

When the first version of the 360°VCE was developed, an expert panel was organized for radiographers performing cCTA procedures, radiography students and lecturers (n=5). Discussion during the panel was recorded with the participants' permission, transcribed and analyzed by the content analysis. Minor changes, based on the results, were made before starting the second phase of this study.

Participants

Prospective cCTA patients (n=10), radiographers (n=10) and radiography students (n=10) who visited or worked in (blinded) university hospital in Finland during October-December 2018 were purposely selected in this study. Patients' eligibility criteria were: preparing for a first planned cCTA, older than 18 years, had no mental illness, and were capable of both independently using the 360°VCE and participating in an interview. Selected radiographers were performing cCTA procedures in the same hospital during the study period, and selected students were all engaged in radiography and radiation therapy studies at (blinded) University of Applied Sciences. The participating students were chosen because they already had experience of 360° virtual environments and thus could provide valuable comments for improving the virtual cCTA environment.

All participating patients were female, with a mean age of 60 years. Eight of them had university level, and two college level, education. All the radiographers (six female, four male) were regularly engaged in cCTA procedures, with a mean age of 36 years. All the students (eight female, two male; mean age 34.5 years), had passed courses in CT theory, and most had completed four weeks clinical practice in CT.

Procedure

Lists of patients with cCTA appointments were received from the referring unit and the information needed for patient selection was gathered from the patient information system. An invitation letter including relevant information about the study was sent to patients meeting the defined eligibility criteria (listed above). All patients indicating willingness to participate were included, until a pre-defined number of participants deemed sufficient for the purposes of the study (10) was reached. Radiographers and radiography students were recruited to participate through the electronic invitation letter. After enrolment the participants received a link, by e-mail, to access the 360°VCE by any smart device with a network connection, and instructions for its independent use at any times during a two-week period. The patients received a written letter providing information about the virtual environment and its purpose together with their cCTA appointment details approximately two months in advance, and the link two weeks before their appointment.

Data collection

Data were collected by thematic interviews (see Appendix 1) to obtain an understanding of participants' perspectives[31]. Interviews, focused on perceived experiences of the 360°VCE use, were conducted by the first author either face to face in a quiet place in the hospital, with only the participant and researcher present (n= 8), or by phone (n=22) with the interviewee at home. Patients' interviews were conducted post-scan.

The theme was pilot-tested with two participants who were not further involved in this study. The interviews were audio-recorded with the interviewees' permission. No additional notes were taken during the interviews. The total duration of interviews, for data saturation, was 414 minutes, yielding 124 pages of transcribed text. Transcripts were not returned to participants for comment.

Data analysis

The data were analyzed by inductive content analysis[32], as briefly described here Table 1 in efforts to enhance the study's transparency and reliability. The first author read through the transcripts several times to obtain an overall understanding of the content. The texts were then divided into smaller meaning units, such as sentences or clauses related to the research question. Defined meaning units were labelled with 71 codes[33]. In the abstraction process, similar codes were grouped together, forming 58 sub-categories, which were further grouped in 15 categories and finally five main categories, as illustrated in Table 1.

Table 1. Example of a main category formation (Benefits of the 360°VCE for patients).

Sub-category	Category	Main category
Information on the examination Information on healthy diet and exercise Motivation for self-care No need to ask for advice	Increased knowledge	
Information about where to go in hospital Less aimless searching in hospital Seeing the scanner's shape and size Seeing the patient posture	Better spatial and environmental orientation	
		Benefits of the 360° VCE for patients
Less claustrophobia Less fear of needles and cannulation Less fear of examination results Less adverse effects of fear Less feeling of tension	Less fear and nervousness	
Better feeling of security Less insecurity Relaxed feeling Less feeling of helplessness	Better sense of security	
Less dependence on professionals Less feeling of being an object of the procedure Calm feeling Feeling of accomplishment Feeling of normality	Better sense of self-efficacy	

Ethical considerations

This study was carried out in accordance with the World Medical Association Declaration of Helsinki[34]. The study was approved by the (blinded) University Hospital (75/2018) and University Hospital Regional Ethics Committee (34/2018). Participation was voluntary and all participants were informed orally and by written form. All participants signed written informed consent prior to interview. All data were collected and stored securely, and accessed only by the investigators. Participants were informed about the anonymization of the results.

Results

Patients' experiences

Two main categories (*Benefits of the 360°VCE for patients* and *Patients' overall experience of the 360°VCE*) and seven categories of patients' experiences were identified (Table 2).

Table 2. Categories of the patients' experiences of the 360°VCE.

Category	Main category
Improvement of knowledge Improvement of spatial and environmental orientation Reduction in fear and nervousness Improvement in sense of security Improvement in sense of self-efficacy	Benefits of the 360°VCE for patients
Engaging counselling materials Functionality and user-friendliness of the 360° technology	Patients' overall experience of the 360°VCE

Benefits of the 360°VCE for patients

The main category *Benefits of the 360°VCE for patients* encompassed improvements in their knowledge, spatial and environmental orientation, and senses of both security and self-efficacy, as well as reductions in their fear and nervousness.

Improvement of knowledge

The patients experienced that use of the 360°VCE increased their knowledge about various aspects of cCTA, such as the type of examination it is, the procedure and risks involved, and the duration. The information on a healthy diet enhanced their motivation for self-care. The information received from the hospital may be difficult to understand and improvements in patients' knowledge provided by the 360°VCE reduced their need to ask for advice.

> *I knew where I was going and what was going to happen, there was no need to ask for advice.* (Patient 2)

> *One of the first sentences in the letter about the examination simply states, "The examination is not risk free". It's uncomfortable going for such an examination when you don't know what will happen or what it will be like. In this (VCE) I did get the information.* (Patient 9)

> *Motivation for self-care was the most important part. The letter from the hospital was in medical jargon and didn't say anything that helps a layman to prepare. When patients have responsibility for their own care, they should get the means to do so. (*Patient 3*)*

Improvement of spatial and environmental orientation

The 360°VCE provided general information about locations of places that cCTA patients needed to visit (e.g. the radiology unit and examination room). They found this kind of basic information useful as it reduced the need for haphazard searching. It also enabled users to see and familiarize themselves with the examination room, equipment in it (e.g. the shape and size of the scanner) and patient postures. As illustrated by the following quotation, the patients found this helpful and reassuring:

> *"When you don't know anything about this type of examination and what's going to happen, this is really good. Then you know what position you're going to be in ... You can see that it isn't a long tube and it's open at both ends." (Patient 1)*

Reduction in fear and nervousness

The patients clearly indicated that the 360°VCE reduced their fear and nervousness. Its use and seeing the CT scanner also mitigated claustrophobia, as well as their fear of needles, cannulation and examination results, as illustrated by these comments:

> *I'm terribly afraid of needles, it was good to see the cannulation image, even though I tried to avoid it at first. Then I tried to look at it again and again so I would get used to it, and it would become a routine procedure.* (Patient 2)

Use of the 360°VCE, also reduced fear and associated effects:

> *There's deep concern about examinations and results, and it's debilitating. With this environment you can see well in advance in small pieces what it's all about. (Patient 8)*

In addition, its use decreased patients' nervousness:

> *I felt nervous before the examination, but seeing the environment somehow relieved it. I wish I had this information earlier!* (Patient 5)

Improvement in sense of security

The use of the 360°VCE increased patients' sense of security. As they knew where to go, feelings of security and relaxation increased, and feelings of insecurity and helplessness decreased.

Improvement in sense of self-efficacy

The patients expressed increases in their sense of self-efficacy, manifested in reductions in their dependence on professionals and feeling of being an object of the procedure. They also experienced feelings of ease, involvement and stability:

> *"Just the fact that I knew where I was going. There was a safe feeling that I wasn't clueless at any point, because I knew exactly what was going to happen and what to do next."* (Patient 2)
>
> *"That made it easier for me to get into that examination. Because it's always less nerve-wracking, the more you know about it and the more familiar you are with it.* (Patient 7)
>
> *"It scared me, and I think I'm not the only one. In such an unknown examination, you feel completely helpless and dependent on others, like an object of the procedure.* (Patient 3)

Patients' overall experience of the 360°VCE

The identified categories of the main category *Patients' overall experience of the 360°VCE* were *Engaging counselling materials* and *Functionality and user-friendliness of the 360° technology*.

Engaging counselling materials

The patients reportedly found the counselling materials engaging and encouraged them to spend time in the 360°VCE. They described becoming immersed in the materials as they were nice, understandable and interesting, especially the videos.

> *I was interested, so I spent quite a while there, about an hour at least. Out of curiosity I was clicking, reading materials and strolling around...going from one room to another, reading materials again and again.* (Patient 6)
>
> *I found these short videos really good, they helped me remember things.* (Patient 1)

Functionality and user-friendliness of the 360° technology

The patients experienced that the 360°VCE functioned very well, corresponded closely with their real-life experience and had high user-friendliness on both computers and smartphone:

> *I was very eager to see how it looks and what I would see there… the environment felt very real as I viewed it through my phone* (Patient 5)

I'd kind of already been in that examination when I visited this virtual environment, I felt it was really good. (Patient 2)

I tested it with my phone and found it was really good. If you have the link you can browse it even in the hospital lobby while waiting. I think that things have to work on smartphones nowadays. (Patient 10)

I was amazed how well it worked. I have seen these 360° things previously and often they didn't work like they should. But this functioned perfectly, it was nice to see and rotate it when it worked so well. (Patient 9)

Radiographers' and radiography students' experiences

Three main categories of radiographers' and radiography students' experiences (*Benefits of the 360°VCE for the patients*, *Use and benefits of the 360°VCE for the professionals* and *Professionals' overall experience of the 360°VCE*) and eight categories were identified (Table 3).

Table 3. Categories and main categories of radiographers' and radiography students' experiences of the 360°VCE.

Category	Main category
Improvement in patients' mental preparation and fear	Benefits of the 360°VCE for the patients
Improvement in patients' knowledge	
Improvement in patients' spatial and environmental orientation	
More successful examination	Use and benefits of the 360°VCE for the professionals
Benefits for students during clinical practice	
Benefits for staff of referring units	
Informative content and structure	Professionals' overall experience of the 360°VCE
Functionality and user-friendliness of the audiovisual materials	

Benefits of the 360°VCE for the patients

The identified categories of the main category *Benefits of the 360°VCE for the patients* were *Improvement in patients' mental preparation and fear*, *Improvement in patients' knowledge,* and *Improvement in patients' spatial and environmental orientation*.

Improvement in patients' mental preparation and fear

The radiographers and radiography students experienced that use of the 360°VCE enhanced patients' mental preparation for a cCTA examination and feeling that they could influence the preparation for their own examination. According to the radiographers, it was particularly beneficial for patients who are uncertain, anxious and afraid of cCTA, as well as for reducing the fear of patients coming for a first cCTA. They also indicated it could be helpful for patients who have irrational fear based on earlier radiological examinations, and confuse the radiological devices:

> *A person who hasn't been [to a cCTA] examination before will see what's going on and what's going to happen, and be able to mentally prepare for, and even practice being in that position at home.* (Radiography student 5)

> *Many patients don't know what kind of scanner a CT is, they usually confuse it with an MRI.* (Radiographer 5)

Improvement in patients' knowledge

The radiographers expressed that patients' knowledge was increased by the information about the CT scanner, the contrast media used in the imaging, prerequisites, medication and automatic registration provided in the 360°VCE, as illustrated by the following:

> *It's important that patients can get more information about CT scanners. Many of them are afraid of the scanner in advance, as they may have earlier experience of MRI. They don't realize that this is a totally different and much faster examination.* (Radiographer 5)

Improvement in patients' spatial and environmental orientation

According to the radiographers and radiography students, the patients' exposure to the virtual CT unit, patient posture and examination procedure through the 360°VCE improved their perceptions of the spaces and environment. They also indicated that patients visiting and going around the 360°VCE, watching videos and looking at the images provided much more diverse information than the textual descriptions in letters sent to patients:

> *I think that just getting information in advance and seeing what the examination room is like helps a lot. We do have patients who are afraid, and patients often ask if they can see the examination room in advance.* (Radiographer 8)

Benefits of the 360°VCE for the professionals

The main identified categories of *Benefits of the 360°VCE for the professionals* were *More successful examination*, *Benefits for students during clinical practice* and *Benefits for staff of referring units*.

More successful examination

The radiographers reported that patients' prior use of the 360°VCE facilitated their work by increasing the fluency and speed of examinations. The improvement in patients' preparation the 360°VCE provided helped them to keep their appointments. They also indicated that the thorough preparation it enabled could reduce patients' heart rates in examination and thus help them to obtain high quality results:

> *It makes our work easier. If you have a slower and more stable heart rate, it's easier to get high quality images and successful examinations.* (Radiographer 1)

> *It can ease the tension so that don't have to thoroughly explain everything from the start in the counselling situation.* (Radiographer 10)

Benefits for the students during clinical practice

Both the radiographers and radiography students recognized benefits of the 360°VCE for both radiography students during their clinical practice and new employees. With the environment, the progress of examination, spaces and patient pathways could be presented both to the radiography students and students from other health care fields.

> *The radiography students can familiarize themselves with the department, examination room and scanner before CT practice.* (Radiography student 2)

> *It is also helpful for other, nursing students as well, when they accompany patients to the CT department.* (Radiography student 6)

Benefits for the staff of referring units

Radiographers pointed out that the 360°VCE with the information about the CT examination and preparation might also be beneficial for professionals working in referring units, and to relatives.

> *Good information about CT, which may be an unfamiliar procedure for relatives of the patient* (Radiography student 7)

> *We could use this to assist basic CT orientation for staff visiting the CT unit with patients* (Radiographer 1)

Professionals' overall experience of 360°VCE

The categories associated with the main category *Professionals' overall experience of the 360°VCE* were *Informative content and structure* and *Functionality and user-friendliness of the audiovisual materials*.

Informative content and structure

Professionals found the content and structure of the 360°VCE to be clear, concrete and understandable for non-professionals and people who had not been to the CT department before.

> *Clear information also for non-professionals, presented in a clear, down-to-earth way. You don't have to be a professional to understand it.* (Radiography student 1)

Functionality and user-friendliness of the audiovisual materials

The professionals also experienced that the visualizations provided by multimedia materials in the 360°VCE provided more for the user than the same information given in text format.

They regarded the videos and links to reliable websites providing more information about coronary artery disease as particularly helpful:

> *Especially those videos, they were very good. Concretely showed what happens.* (Radiographer 3)

Discussion

In this study the use of the 360°VCE had clear benefits, including improvements in knowledge, fear, associated adverse effects, and spatial or environmental orientation. However, CT and MRI patients have also been shown to have unmet information needs related to results of the examination, scan-related fear, risks, after-effects and examination procedures[20]. The 360°VCE developed in this study appears to meet these counselling needs, at least partially, as it enhanced patients' knowledge about the type and duration of the examination, procedure and risks (*inter alia*). The 360°VCE also offered the patients much more diverse knowledge than radiographers generally provide before CT examinations[24].

This study also showed that using the 360°VCE may relieve patients' fears of needles, cannulation and examination results, as well as feelings of claustrophobia, which commonly arise before medical imaging procedures[7–12,14]. Females, younger patients and those with a higher education level may particularly require more counselling with alternative methods, such as 360° environments or videos. The radiographers participating in this study also deemed the 360°VCE as useful for patients to have a first cCTA procedure.

Our results support previous findings that provision of video information before cardiovascular MRI, SPECT[35] or coronary angiography[9,25,26] can reduce patients' anxiety. Clear instructions and demonstration before the examination may help to reduce patients' uncertainty, increase their feelings of relaxation and safety[36], and provide means for them to feel self-confident, and not like an object[18]. The patients here also appreciated the enhanced senses of security and self-efficacy, together with reduced dependence on professionals. These findings corroborate previous conclusions that patients must be treated as individuals and provided with emotional support to ensure they have positive experiences in medical imaging[19,21,37]. As recorded in a previous study of a VR environment for oncology patients[38], our participating patients were impressed with how similar the 360°VCE experience was to the authentic real-life experience.

The radiographers also expressed that use of the 360°VCE enhanced the success of examinations by easing and quickening the process, helping them to keep the schedule, and reducing numbers of patients' questions. Moreover, the thorough preparation could reduce patients' heart rates and enhance their relaxation, thereby helping the radiographers to obtain high quality images with smaller radiation doses. These results are consistent with previous findings that a 360° VR experience designed to prepare patients for MRI increased compliance, and thus reduced both patient motion and scanning times[30].

The 360°VCE also appears to be beneficial for radiography students, as well as both new employees and staff of radiology units. It enables systematic presentation of processes before and during the examination, relevant spaces and patient pathways. These results are consistent with previous findings that a remote CT simulation for undergraduate radiography students increased their skill acquisition and knowledge[39].

This is one of the first studies on the use of 360° technology based on spherical panoramas in clinical contexts to supplement traditional counselling practices with online delivery of information. It seems to meet patients' needs by increasing their knowledge and reducing fears, which is important for the quality and safety of cCTA as patients' fear increases risks of imaging failures during examination[6]. However, further research is needed to characterize effects of 360°VCE on patients' fear more thoroughly.

Our study has several limitations. The utility of the developed 360°VCE was gauged by gathering data from participants who had experience of its use. However, it is possible that the most digitally orientated patients participated, and they may have had more positive attitudes towards novel virtual environments than patients who did not volunteer. Moreover, they were highly educated females, clearly experiences of broader groups of participants warrant attention. In addition, this was a pilot study in one hospital, so the results may not be generalizable to other contexts. In addition, some of the radiographers were interviewed at their workplaces during their working day, which may have created a feeling of haste. To enhance quality in the reporting of the study, COREQ checklist[40] was used.

Conclusion

According to participating patients, the 360°VCE increased their knowledge, improved spatial and environmental orientation, reduced fear and nervousness, and increased

feelings of security and self-efficacy. Radiographers and radiography students expressed that the environment enhances examination success and is beneficial for both students during clinical practice and the staff of referring units. The results may be used to improve patient counselling and care, thereby optimizing the cCTA examination procedure and reducing fear.

Conflict of interest statement

The authors declare they have no conflicts of interest. The study was designed by KP, MV, AH and MK. KP was responsible for data collection, data analysis and drafting the manuscript KP, while MV, AH, MN and MK made critical and intellectual revisions. The authors thank Business Finland for their financial support (grant no. 6557/31/2016) during the 360°VCE production and data collection phases. The granting institution had no impact on the results or preparation of the manuscript.

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Supplementary

Guide for the thematic interviews designed to probe participants' experience of the 360°VCE

Background questions regarding participants':
sex, age, education, life situation, and device used to access the 360°VCE

Theme 1. The structure and look of the 360°VCE

- opinion of the three spaces
- opinion of the visual choices
- opinion of the fonts used
- opinion of the colours used
- opinion of the contrast between background and texts

Theme 2. The content of the 360°VCE

- opinion of the quality of the counselling materials
- opinion of the content of the counselling materials
- opinion of the terms used in the counselling materials
- opinion of the understandability of the counselling materials
- opinion of the amount of the counselling materials
- opinion of the clarity of the counselling materials

Additional questions for the radiographers and radiography students:

- flawlessness of the 360°VCE materials
- consistency of the content of the materials with working life

Theme 3. The usability of the 360°VCE

- opinion of the entry into the 360°VCE
- opinion of the use of the 360°VCE
- opinion of the navigation in the 360°VCE
- opinion of the material viewing in the 360°VCE
- opinion of the technical operational stability of the 360°VCE

Theme 4. Assessment of the 360°VCE's utility

As a **patient**, evaluate this 360°VCE's benefits for patients based on your experiences.

As a **radiographer / radiographer student**, evaluate this 360°VCE's benefits for the patients, radiographers and radiologic department based on your experiences. How do you think this environment could resolve problems you have faced with patients?

How would you further develop the 360°VCE?

For how long did you use the 360°VCE?