Abstract – This exploratory study identifies two existing conceptions of welfare technology identified from policy and practice. By using policy documents and previous research together with a survey of primary care managers and students, this paper identifies one wider and one narrower conception. The wider tends to include the whole society, making it difficult to specify end-user requirements, while the narrower focuses on the more vulnerable people in society, which can exclude possible users.

Keywords – welfare technology, healthcare

I. INTRODUCTION

Technology implementation is intensifying within the Swedish public sector demonstrated, for example, by the increasing creation of digitalisation policies [1]. The healthcare sector is greatly affected, and technologies are sometimes put into use too quickly and with the wrong purpose in order to create efficiency, cut costs and save time [2].

The healthcare sector’s basic aim is to provide services valuable for patients. But according to Porter, digitalisation of healthcare has lost focus on patient value. For example, in industry, profitability is a standardised measure, but in healthcare, it is not a reliable indicator of value since other aspects are more important. Repeated discussions about value from different perspectives have led to a lack of clarity. For example, quality has become a useless, meaningless concept because of the number of possible interpretations [2].

One concept health care digitalisation has contributed to (most commonly used in Scandinavia) is ‘welfare technology’, which is not necessarily different from traditional technologies but differs from traditional healthcare technologies [3]. The differences are the area of usage (e.g., at home), the users (patients, relatives, etc.), the user groups (e.g., older people and/or the physically or mentally impaired) and the purpose (e.g., social stimulation) [4].

Brynn [5] contends that the definition of welfare technology is currently vague and needs to be set. Currently, no other definition of the concept can be found and because of this researchers are using green reports and policy documents to state the meaning of the concept. See [6], [7] and [8] for examples. Another example is [9], where the main references used to define the concept are two government reports. Similarly, [10] refers to the Danish Agency for Digitisation for a definition of welfare technology.

Therefore, the purpose of this study is to create a picture of the existing concept of welfare technology from the perspectives of health care managers and students, previous research and policy documents. By reviewing the literature, conducting a survey and using policy documents, existing definitions of welfare technologies are identified from policy and practice perspectives. The aim is to identify similarities and differences among the perspectives and therefore explore whether the creation of a common definition is possible.

II. METHODOLOGY

By using an exploratory approach, this study aims to identify the current conception of the term ‘welfare technology’ from both policy and practice perspectives. Using information from policy makers, researchers, primary care managers and students, the study creates a picture of the current conception of welfare technology that exists independently and among the groups. Seven policy documents, such as green reports, were analysed using content analysis to describe policy makers’ conception. Previous studies were analysed to identify how researchers chose to describe welfare technology. These interpretations are considered part of the result due to the role researchers play in further shaping the concept. Primary care managers’ and students’ perspectives were gathered through a survey containing five open questions. The questions were formulated using what, where, when and why, inspired by the Content, Context, Process framework [11], which was initially used to evaluate information systems. The framework represents a broad approach by including several dimensions also appropriate in other fields. In this study, welfare technologies replace information systems in the framework to evaluate the respondents’ conceptions of what welfare technology is, who is using it, where it is being used and why it is being used. The questions were formulated using what, where, when and why, inspired by the Content, Context, Process framework [11], which was initially used to evaluate information systems. The framework represents a broad approach by including several dimensions also appropriate in other fields. 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Of the 13 primary care managers, 4 were male and 9 were female, 5 of the 44 nursing students were male and 39 female, and of 44 engineering students, 30 were male and 14 female. The age distribution within the respondent groups was generally between 50 and 60 years for primary care managers, between 20 and 45 for nursing students and between 18 and 25 for engineering students.

The survey questions asked the respondents to give as many examples as possible of what welfare technologies are (artefacts, activities, knowledge or volition), who uses them (both user groups and groups in society) and where they are being used. Respondents were asked to answer the survey using single words or short word combinations to simplify data interpretation. The responses were first translated into English and then coded by theme [12]. The data were separated into themes that emerged naturally. The resulting categories are presented as words separated with a forward slash (/) to preserve the expressions to the extent possible for information transparency.

One important observation during the first survey distribution to nursing students was that about half picked up their mobile phones to search on the internet to gain an understanding of welfare technology. This behaviour is interesting and indicates that a large part of the students were unsure of the meaning of the concept and needed the internet to support their understanding. The same observations could be made for the rest of the survey distributions to nursing students as they were not asked to refrain from using their phones due to the interest of the in knowing how other nursing students would behave.

For primary care managers and engineering students, a final question was added to identify whether they used the internet to support their understanding. The responses indicated that only a few percent did. This means that when analysing the results, the bias of nursing students answering questions according to what they found on the internet and not according to their own conception needs to be considered.

III. RESULTS

A. Previous research

Previous studies define welfare technology by separating it into four categories: safety technologies (e.g., safety alarms), assistive technologies (e.g., robots), social contact technologies (e.g., social media) and treatment technologies (e.g., devices and sensors for monitoring health status). This categorisation is done by using the previously mentioned green report by the Norwegian Ministry of Health [6] [7]. In contrast to the four categories, other researchers aim to identify the difference between assistive technologies and welfare technologies [5] as though assistive technologies were not included as a welfare technology, creating confusion about what counts as a welfare technology.

Many researchers focus their definition of welfare technology on the elderly user. For example, some researchers have limited the definition to technologies used by the elderly in everyday life to increase their independence and to improve their living conditions in their own homes [13]. Another example is a study by Östlund et al., which explains welfare technology as follows: ‘An innovation policy with older people at the center is being launched in Scandinavian context coined as “welfare technology”. It encompasses demographic developments, the restructuring of the welfare system and the expansion if the IT infrastructure’ [14].

Only one literature study could be found on the welfare technology terminology that aimed to evaluate the ethical aspect [4]. An important point to keep in mind is that studies written in languages other than English and Swedish were not included due to language constraints.

Currently, there exists confusion about the concept of welfare technology, and researchers are often interpreting the concept in relation to the elderly or the impaired. The lack of a clear scientific definition forces the researcher to use policy documents and green reports to understand the concept.

B. Content analysis: Policy documents

The term ‘welfare technologies’ first arose in Denmark in 2007. It was used by the Danish social minister, and it became a central concept in Danish welfare politics. It is open for interpretation, which means that it is up to the theoretical or practical user to define it [15]. One of the most common current definitions in Swedish policy documents is as follows: ‘Welfare technology aims to maintain or enhance the safety, activity and participation of a person who is impaired or has an increased risk of impairment. Welfare technology can be used by the person themselves, a close relative or someone else in the immediate vicinity of the person and can be given as assistance, prescribed as help in daily life or purchased on the consumer market’ (translated from Swedish to English). This definition of welfare technologies is used in [16] and [17] and was created in 2015 by the Swedish Social Board (Socialstyrelsen). As mentioned above, the definition is open for broad interpretation since it can include a wide variety of technologies, users, locations and purposes. Some examples of welfare technologies used today are auxiliary tools in elderly and disability care. Currently, the most frequently used welfare technology devices are safety alarms, such as door and movement alarms, and electronic planning systems for home visits [17]. The focus is often on the elderly [15] as they are the fastest growing segment of the population, and if measures are not taken, the shortage of elderly care workers will contribute to reduced welfare. Others representing a Scandinavian approach view welfare from a wider perspective [18] to include society as a whole and not only citizens with special needs, such as the elderly and the impaired.

As mentioned in previous research, the terminology used is not always precise. Various terms used to describe subareas could be counted as welfare technologies, for example, digital tools [19] and, in the context of the EU,
ambient assisted living [20] and care technology (omsorgsteknologi) [21].

Policy documents reveal that vagueness and confusion exist around the concept of welfare technology. Different terminologies are used depending on the user group and on who defines the concept, and no real scientific definition exists. Some researchers argue that the broadness of the definition is aimed at encouraging innovations in the form of new technologies [22].

C. Survey

The findings from the survey are separated into three respondent groups: primary care managers, representing current practitioners, and two groups of students (nursing and engineering), representing the voice of future users both as caregivers and creators. Table 1 presents the results from the surveys sectioned according to respondent group and question number. Only categories representing more than 15% of answers are included.

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>SURVEY RESULT CATEGORIES</th>
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</thead>
<tbody>
<tr>
<td>Q</td>
<td>Respondents</td>
</tr>
<tr>
<td></td>
<td>Primary care managers</td>
</tr>
<tr>
<td>Mobile phones/Computers/ Applications (51%)</td>
<td>Accessibility aids/ Alarms/ Surveillance cameras (23%)</td>
</tr>
<tr>
<td>Communication/ Administrative systems/ E-services (28%)</td>
<td>Mobile phones/ Computers/ Internet/GPS (23%)</td>
</tr>
<tr>
<td>Technical solutions for home care (21%)</td>
<td>Impact contributions (22%)</td>
</tr>
<tr>
<td>Caregivers/ Clinicians (25%)</td>
<td>Elderly/ Impaired/ Vulnerable (34%)</td>
</tr>
<tr>
<td>Elderly/ Impaired/ Sick (31%)</td>
<td>Elderly/ Impaired (28%)</td>
</tr>
<tr>
<td>Children/ Parents/ Adults/ Families (31%)</td>
<td>Do not know (23%)</td>
</tr>
<tr>
<td>Everyone (27%)</td>
<td>Everywhere (39%)</td>
</tr>
<tr>
<td>Government institutions/ Organisations (35%)</td>
<td>Everywhere (42%)</td>
</tr>
<tr>
<td>Healthcare facilities/ Hospitals (18%)</td>
<td>Hospitals/ Group living facilities (31%)</td>
</tr>
</tbody>
</table>

The leftmost column, marked with a Q, represents the four main questions asked in the survey.

1. Can you give as many examples as possible of what you believe/ know are welfare technologies?
2. Can you give as many examples as possible of who you believe/ know are users of welfare technologies?
3. Can you give as many examples as possible of what groups in society you believe/ know use welfare technologies?
4. Can you give as many examples as possible of where you believe/ know welfare technologies are being used?

Results indicate reoccurring categories for each of the four questions. For question 1, a common reoccurring category among the respondent groups includes mobile phones, computers, machines and applications but also accessibility aids, alarms and surveillance cameras.

Questions 2 and 3 asked about who the users and the societal user groups are. The responses reveal the conception that users of welfare technologies are the elderly, impaired, sick and vulnerable.

Question 4 indicates a two conceptions among the respondents, one that welfare technologies are being used within the healthcare system, such as in hospitals and group living facilities but also everywhere in the society.

Question 5 was “What do you believe are the purposes of welfare technologies?” This question also provided interesting results. They are not included in Table 1 because of the large number of categories resulting from a wide range of answers. However, some trends could be identified from the data. For instance, primary care managers seem to focus on efficiency and cutting costs as well as safety. Nursing students focus on support, help and safety, and engineering students generally did not know or chose not to answer, but those who did mentioned support and help.

IV. DISCUSSION

Content analysis of policy documents and the survey results of question 1 aggregates by denote accessibility aid. The survey respondents also added technologies such as mobile phones, computers, machines, robots and applications, which differentiate from the results from the policy documents.

For question 2, the predominant answers were the elderly, impaired and sick, which aligns with the Swedish policy documents that focus on the impaired or people with increased risk of impairment such as the elderly. The other part of the policy documents (Scandinavian), which focuses on the use of welfare technologies by everyone, aligns with answers given for question 3, although the predominant group here was also the elderly, impaired and sick.

The answers to question 4, related to where welfare technologies can be used, indicate that a large proportion of survey respondents think that they can be used everywhere and at hospitals. This finding does not always correspond to the policy documents that associate welfare technology with extended home living for the elderly or impaired, which aims to postpone the need to place them in hospitals or group living facilities.

Summarising the survey responses reveals two main differences from the policy documents: (1) the addition of mobile phones, computers, machines/robots and
applications and (2) the conception that welfare technology can be used everywhere. These conceptions can be influenced by many factors, but one theory could be the choice of the name ‘welfare technologies’. Welfare is associated with a larger audience than only the elderly, impaired and sick, a point that is further discussed in the next chapter.

A. Welfare and technology

The terms ‘welfare’ and ‘technology’, considered separately, point to different ideas than when combined. Looking at ‘welfare’, according to the Swedish National Encyclopedia (www.ne.se), welfare (‘Välfařd’ in Swedish) is an ambiguous concept related to most aspects that determine a citizen’s living conditions, such as life span and income, and originates in the poverty experienced during the 15th century. The term is commonly used in a narrower sense today to refer to social insurance and welfare services such as health and social care and schools. This picture of welfare can be explained as ‘the good life’ of the citizen and may explain the respondents’ partial perception of welfare technology user groups as general citizens.

‘Technology’ has a more extensive history than ‘welfare’. The survey results indicate that respondents often associate welfare technologies with artefacts such as mobile phones, computers or accessibility aids. However, Mitcham [23] states that technology is not always artefacts but also knowledge, activities and volition. Combined with welfare, ‘technology’ still includes a wide range of technology types. It not only includes artefacts but has evolved from meaning just applications to include applications, systems, administration and service [12]. This means that the activities clinicians perform and their knowledge combined with their volition to proceed with it are also technologies.

Mitcham also states that the perception of the concept differs depending on whether it is viewed from a technology or a humanities perspective. An engineer will focus on the solution and the creation of an artefact that may or may not be a solution to a problem. By contrast, a humanities philosopher will focus on the purpose of the artefact and the problem it is meant to solve—that is to say, problematisation—and the question of why the technology should be implemented. When creating or implementing a new technology, both humanities professionals and engineers have their own purposes, but too much focus on either side can create problems. It is proposed that they work as counterparts and share their knowledge during the creation and implementation of welfare technologies to prevent the process from being either rushed or stalled.

These two perspectives represent two ways of approaching technology. When attempting to define welfare technology, both sides need to be considered.
engineer or creator of welfare technologies, the narrow conception offers the possibility to identify more specific requirements for the end product, making it simpler to create technology customised for the end user. A wide conception includes the whole society as possible users, which creates problems when identifying requirements because they need to be more general.

By highlighting these two conceptions, this paper aims to create awareness of the welfare technology terminology and to urge users to specify what conception they are basing their assumptions on. Therefore, the welfare technology concept can continue to be highly interpretable as long as users are careful with its usage.

REFERENCES


[21] "Official Norwegian Reports NOU 2011: 11 Chapter 1, 2 and 3", s. 40.
