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## Electronic care planning and care worker engagement

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## Abstract

In the wider context of the advancement of digital technologies in healthcare, electronic care planning and recording systems are becoming increasingly prevalent in social care settings in the UK. At the same time, the engagement of employees is an important concern for senior managers of these services, where turnover rates are high and human resources are often scarce. This study researches the impact upon employees of the implementation of electronic care planning in two organisations running multiple social care services. Following a review of technology acceptance and engagement literature, hypothesised developments of technology enhanced engagement and concomitant increases in motivation, empowerment and productivity are researched. An exploratory sequential mixed methods approach is utilised, bringing together qualitative and quantitative data for analysis.

Findings suggest that care planning technology produces a positive engagement impact, broadly confirming the hypotheses. Overall workforce engagement of both organisations studied is shown to be very high. Correlation analysis shows that, while not all employees recognise the engagement impact of the care planning technology, those who do also demonstrate the highest levels of motivation, empowerment and productivity. Demographic differences are evaluated as moderating influences, but are not found to be highly significant in this study.

This is a cross-sectional short-range study, and recommendations for future longer-range and broader research are considered. In the light of the indicated engagement benefit of electronic care planning technology, implications for managers of services, application developers and social care workers are considered.

**Key words:** older persons; care; electronic care planning; employee engagement; person-centred care; productivity

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## Introduction

The rapid advancement of digital technologies is a highly topical subject in healthcare policy and in organisations providing care in the UK (Department of Health and Social Care (DHSC), 2018). There are a number of driving forces for the speed of change, which include: economic drivers at a government policy level in a time of increasing demand and rising customer expectations (Kings Fund, 2018); improved quality outcomes that result from more accurate and rigorous digital tools in the planning, delivering and recording of care interventions (Kings Fund, 2018); the economic benefits of freeing up time otherwise spent in monitoring of vulnerable people in community care settings or undertaking manual paper-based records of care (Al-Hamadani et al, 2016; Kings Fund, 2018); the ability for data to be interrogated and analysed at a macro level through ‘big data’ collaborations, leading to a quantum step in the richness of the pool of research findings (Al-Hamadani et al, 2016; Naylor, 2018).

It is also relevant to note the wider public adoption, acceptance and competence in digital platforms through the rise of parallel advanced technologies in daily life—in essence, the millennial generation who have grown up with smartphones and social media. The ubiquitous usage of powerful handheld mobile technology, particularly among younger adults, is striking. In a survey in 2019, 96% of UK residents aged between 16 and 34, and 91% of those aged between 35 and 54, reported owning a smartphone (Statista, 2019). The

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advancement of digital technologies across the broad spectrum of health and social care has been summarised by the King's Fund (Maguire et al, 2018) and Social Care Institute for Excellence (SCIE) (2018; 2019), with positive benefits emphasised, in line with the national policy steer. This report focused on outcomes from a number of case studies of digital transformations in health authorities, with a notable commonality in relation to digitised communication and information sharing.

A further key area of UK policy relevant to this study is in relation to employee engagement in organisations. UK Government policy has been influential: in 2011, following the publication of the MacLeod report (2009), the Government supported an Employee Engagement Task Force, chaired by the authors, which has led to the development of a leadership project called Engage for Success (Chartered Management Institute (CMI), 2015). The Task Force, made up of CEOs and senior thought leaders from UK industry across all sectors, was set up in order to address a growing concern regarding the engagement deficit that exists in the UK, estimated to cost around £26 billion annually in GDP, with only one-third of workers saying they are actively engaged (Wiley, 2012).

This research arose out of an interest in the application of electronic care planning technology in the social care environment, which is increasingly prevalent in line with the policy drivers outlined above. The research context was developed in conjunction with Nourish Care Systems, a UK market leader in electronic care planning technology. Anecdotally, business leaders in customer provider organisations had spoken about increased loyalty and reduced turnover of employees. The challenge was to investigate whether this could be measurably linked to the implementation of care planning technology.

In 2019, the reported vacancy rate across all social care roles was 8%, and the turnover rate was 31% (Skills for Care, 2019). These rates are higher than in comparable industries in which employees are paid at or near to the National Living Wage. Staffing is, therefore, an enormous and growing challenge affecting social care businesses in the UK. Skills for Care (2019) have forecast that, in the light of demographic changes and an increasingly older and dependent population, an additional 36% jobs (580 000) would be required in the sector by 2035. With recruitment and retention such a highly relevant and current topic, technology initiatives that potentially impact upon engagement are correspondingly high in research interest for managers and directors considering the adoption of new technologies in healthcare. This underlines the potential significance of this research.

In summary, the primary aim of this research was to investigate the engagement benefits of electronic care planning tools to employees, and thereby inform understanding of the importance of these tools in the wider context of digital technology advancements in healthcare.

## Literature review

There is a significant body of work in which theoretical models of the adoption of technology have been studied empirically (Lai, 2017). In particular, the Technology Acceptance Model (TAM) (Davis, 1989) and the Unified Theory of the Acceptance and Use of Technology (UTAUT) (Venkatesh et al, 2003) predict the likely conditions for adoption. TAM proposes that the key influences on the intention to use and adopt new technologies are 'perceived usefulness' and 'perceived ease of use'. UTAUT extends this further to four predictive constructs: 'performance expectancy', 'effort expectancy', 'social influence' and 'facilitating conditions'. Rogers' (2003) Diffusion of Innovation Theory defines the stages of the introduction process of new technology: initiation, decision and implementation. Diffusion of Innovation Theory and UTAUT take account of technology adoption where the decision to adopt is not necessarily voluntary and may have been made by people in power or authority within organisations. In this study, choice is not exercised by frontline social care staff; where the technology is implemented, they must adopt it.

Research studies from a variety of industries support a general consensus that technology implementation is perceived as positive (Partala and Sarri, 2015; Raut, 2016). There are caveats to this broad consensus: in particular, there may be motivational, age, gender and linguistic barriers to overcome (Long, 1993; Venkatesh et al, 2003; Boot et al, 2017; Rogers et al, 2017).

This research project considers how outcomes of technology implementation may be affected from an employee engagement perspective. There is a rich narrative in the existing literature around engagement—what it means and how it can be measured (Khan, 1990; Maslach and Leiter, 1997; Schaufeli and Salanova, 2007; Macey and Schneider, 2008; Gebauer and Lowman, 2009; Mone et al, 2011). There are key theoretically derived employee behaviour characteristics that would be expected to be evident where high levels of engagement exist. Three of these are the focus of this study: motivation, empowerment and productivity. While this is not an exhaustive summary of engagement benefit outcomes, these common themes recur frequently in the literature reviewed, and were chosen as the key hypothetical measures for the purposes of this study.

There is a credible theoretical explanation from Social Exchange Theory (Blau, 1964; Dajani, 2015) that new technology may provide an enabling resource or tool from which employee engagement is enhanced. Correspondingly, contemporary expert HR commentary, together with research from other industries, such as manufacturing and hospitality, supports the emerging narrative that technology implementation can lead to enhanced engagement (Parry and Solidoro, 2013; Goran et al, 2017; Kim and Gatling, 2018; Ewing et al, 2019; Gleeson, 2019; O’Boyle and Hogan, 2019; Harris-Briggs, 2019).

Technology use is becoming increasingly prevalent in all aspects of healthcare, and collaborative engagement benefits have been demonstrated (Hazzamm and Lahrech, 2018). Studies of applications of new technology in healthcare have also reinforced the idea that technology implementation can deliver efficiency gains (Al-Hamadani et al, 2016). However, some studies have shown that success of technology implementation may be limited by: financial and time constraints (Doyle et al, 2014); staffing levels and discomfort with technology (Doran et al, 2010); or complexity of the healthcare environment and culture (Greenhalgh, 2005; Greenhalgh et al, 2008; Bezboruah et al, 2014).

### Conceptual model

The model postulated for this study is summarised in Figure 1.

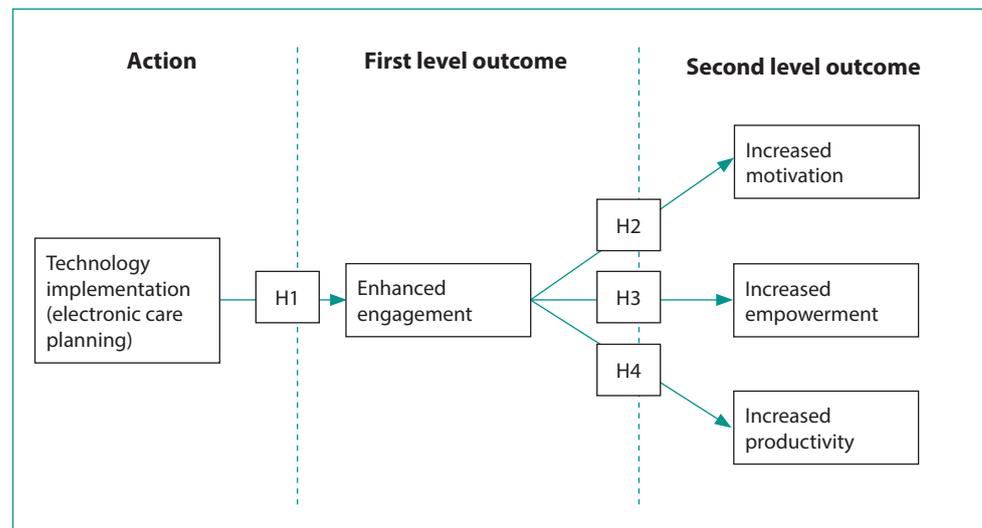


Figure 1. Theoretical conceptual model for research

From the literature reviewed, established theory and previous research predicts that technology implementation may lead to enhanced employee engagement. This formed the initial basis for the research, as a first level hypothesised outcome (H1).

Previous studies also predict that benefits of increased motivation, empowerment and productivity are associated with enhanced engagement. Therefore, these formed the basis of three further second level hypothesised outcomes (H2, H3, H4).

Taken together, the four hypotheses provide the underpinning theoretical basis for the research design:

- H1: Implementation of technology (electronic care planning) is associated with enhanced engagement of employees (first level outcome)
- H2: Enhanced engagement is associated with increased motivation and commitment of employees (second level outcome)
- H3: Enhanced engagement is associated with empowerment and enhanced learning of employees (second level outcome)
- H4: Enhanced engagement is associated with increased productivity and efficiency of employees (second level outcome).

## Methods

### Data collection and analysis

In keeping with the methodological choice of sequential exploratory mixed methods, data collection was undertaken by semi-structured interviews, followed by a survey. For the semi-structured interviews, a small sample of carers, senior carers and managers were interviewed from one of the two participating organisations. An interview script structure was followed for consistency of general responses and to provide checklists for key questions around use and benefits of the technology. Further exploratory questions, relating to the hypothesised outcomes of engagement, motivation, empowerment and productivity, formed the remainder of the interview structure ([Appendix A](#)).

The follow up survey drew upon previous studies (Colarelli, 1984; Shantz et al, 2016; Farndale and Murrer, 2009; 2015; Shuck et al, 2016), from which standardised statements for the measurement of engagement were derived. In this survey, a five-point Likert scale was used with five optional responses: strongly agree, agree, neither agree nor disagree, disagree, strongly disagree.

Six statements were adapted to gather data on the perceived change in engagement since the technology had been introduced. For example, an original statement from Shantz et al (2016) was: 'I am enthusiastic about my job'; this was adapted to 'Since I have been using electronic care planning, I am more enthusiastic about my job.' Subsequent statements regarding hypothesised aspects of engagement derived from the cited sources were retained in their original form ([Appendix B](#)). The survey was made available to all active users of the system in two participating organisations: Millennium Support in the north of England and Encompass in the south of England. Both organisations provide social care and support services to people with learning disabilities in registered residential care and supported living settings.

### Ethical considerations

In line with University of Plymouth policy and the principles for ethical management research set out by Kakabadse et al, (2002), a number of key ethical considerations were incorporated into this research project. These included: obtaining informed consent from participants; the right to withdraw from participation; the opportunity to make changes to transcripts; secure data storage, and confidentiality. Organisations have been named in this article with their consent, but no individuals have been identified. Ethical approval was given by the University of Plymouth.

### Summary of research design

[Figure 2](#) illustrates the research design in the form of a workflow diagram.

## Findings and analysis

### Interviewee cohort

The eight interviewees represented a voluntary cross-section sample of the organisation, consisting of: five frontline care workers and senior care workers, who use the system daily in their interactions with service users; one service manager and one senior manager with oversight of groups of services and daily access to the system; and one very senior

Research stage	Key activities
Literature review	Searches undertaken for the following areas: technology acceptance theory; benefits of technology to employees; engagement theory, definitions, benefits. Relevant policy on engagement in UK: technology studies in UK healthcare context. Literature review written with reference to these searches.
Conceptual model hypotheses 1–4	Conceptual model designed to incorporate and extrapolate from the literature reviewed. Hypotheses predict technology leading to engagement being enhanced and associated motivation, empowerment and productivity gains for employees.
Organisation engagement	Customer organisations contacted by Client Organisation to seek agreement to participate. Introductions made to researcher. Senior managers briefed on purpose and research process. three-way agreement shared and signed. Two organisations sign up.
Qualitative phase: semi-structured interviews	Eight semi-structured interviews conducted in Organisation 1. Interviewees informed of ethical rights including voluntary participation, confidentiality, right to withdraw. Interviews audio recorded for transcription. Transcripts edited by interviewees.
Quantitative phase: survey launched	Survey design finalised following clarifications derived from interviews. Pilot survey tested. Survey launched to all users in two organisations. Consent to participate and ethical rights informed and recorded. Survey window open for ten days (extended to twelve due to technical issues). 121 responses received.
Qualitative data analysis	Interview transcripts reviewed by simplified collation of responses to key questions followed by detailed coded thematic analysis, using anticipated themes of engagement, motivation, empowerment and productivity and identifying additional emergent themes.
Quantitative data analysis	Survey responses reviewed and filtered by organisation, gender, age, English speaking as second language to highlight demographic influences. Data exported for statistical analysis. Responses grouped for Engagement, Motivation, Empowerment and Productivity responses. Correlation analysis undertaken for Engagement vs associated constructs
Report writing	Themes identified from qualitative analysis compared to quantitative findings. Emerging themes considered. Discussion of findings with reference back to hypotheses. Conclusions, limitations and recommendations.

Figure 2. Research design workflow diagram

manager (board level executive) with oversight of the whole organisation with occasional access to the system. The sample was selected by the organisation themselves, with criteria set by the researcher that all participants should have a good working knowledge of the system. The sample consisted of five males and three females, of which five were in the age band 20–29 years and three were in the age band 40–49 years. The interviewees had a range of experience in the organisation, ranging from 3 to 20+ years. The interviewee cohort described above is summarised in Table 1.

ID	Role	Age band	Gender	Years in company
1	Senior manager	20–29	Male	9
2	Manager	40–49	Female	3
3	Senior care worker	20–29	Male	11
4	Senior care worker	20–29	Female	5
5	Senior care worker	40–49	Male	3
6	Care worker	20–29	Female	4
7	Care worker	20–29	Male	4
8	Senior manager	40–49	Male	20+

## Analysis of interview themes

A detailed separation of themes derived from the interviews was undertaken using a coded thematic analysis. Five anticipated themes for analysis arose directly from the hypotheses and the resulting interview structure:

- Acceptance of technology
- Engagement
- Motivation and commitment
- Empowerment and enhanced learning
- Productivity and efficiency.

Three additional emergent sub-themes were also identified:

- Benefits of continuous feedback
- Age and acceptance of technology
- Benefits to service users.

These anticipated and emergent themes are developed in detail below.

## Anticipated themes

### Acceptance of technology

With a remarkable degree of consistency, all interviewees stated that the technology has been universally accepted, eventually, by all staff. Some commented that this had surprised them. For example one, said: 'I think it kind of shocked us all how well it has been embraced', while another indicated that initial fears quickly dissipated.

### Engagement

All interviewees spoke about the positive impact of the technology on the workforce in terms of a variety of aspects that can be readily associated with engagement. The majority (7/8) confirmed it had improved morale. For example, one said:

**'Morale ... in the last couple of weeks it's just flown—like the morale has been so high.'**

In relation to carers' behaviours, a majority (6/8) felt there had been a positive impact. One said:

**'I think they are a bit more professional and they are showing more documentation.'**

With regard to the impact on organisational functioning, once again, a majority of interviewees (6/8) spoke positively about the impact of the technology. In particular, improved communication through the messaging function was highlighted as being an outstanding organisation benefit at all levels. Unprompted, one spoke of engagement specifically, commenting:

**'Massively the engagement's better—yes its really, really good.'**

### Motivation and commitment

The majority (7/8) spoke positively about the impact on care workers' enthusiasm and energy related to use of the application. A senior care worker said:

**'You can see where people are like trying and making an effort'. Similarly, a majority (6/8) spoke positively about the impact on care workers' confidence and competence.'**

A senior carer said that, in using the app:

**'They are kind of constantly thinking about the next step and what needs to be done.'**

Another felt care workers were more able to come forward with concerns or issues.

### **Empowerment and enhanced learning**

Almost all interviewees (7/8) spoke very positively about the app enabling carers to use their initiative or communicate their ideas. One senior carer suggested that the messaging function facilitated this:

**‘People do use the messaging and people do show initiative and communicate through messaging.’**

All interviewees (8/8) recognised the benefit of the app in terms of team working. There were numerous positive comments regarding empowerment and accountability. One said:

**‘I think it's just empowered people instantly and not only people we support but also people we employ.’**

A senior care worker said:

**‘It empowers them ... they feel valued ... because we are giving them that responsibility.’**

### **Productivity and efficiency**

Improved productivity was identified consistently by all the interviewees in terms of both quality and efficiency of work delivery. All interviewees (8/8) confirmed very positive gains in that work was getting done more efficiently and effectively—saving time and being more accurate. At the same time, all interviewees (8/8) confirmed that there was a positive effect on how care workers felt about their workload and, most commonly, that there was more time freed up to spend with residents. With regard to quality, all interviewees (8/8) confirmed that greater pride was being taken by care workers in their work. Quality improvements were identified in a variety of interviewees’ comments, many of which were shared by all. One said:

**‘Nothing is being missed and it's making everything to a better standard.’**

Another underlined:

**‘You see it, you witness it, you just record—so it's just so much better.’**

This contemporaneous nature of the recording was seen as beneficial in two ways: by being both more accurate and less burdensome at the end of the working day. The photo and speech-to-text functions were also seen by some to be a part of this, saving time and being more accurate. One carer said:

**‘When you take a photo when you're out on activities and you can upload it, I think is fantastic.’**

## **Emergent themes**

### **Benefits of continuous feedback**

As a product of improved communication, and the greater availability and transparency of recorded data, a majority (7/8) commented about the benefit of continuous messaging and enhanced feedback, meaning there was less risk of people forgetting to carry out tasks or responsibilities. This feature was highlighted by one care worker:

**‘As soon as you log in on the device, it pings up a handover.’**

Similarly, a senior care worker said:

**‘Communication as a team has improved. All the responsibilities are on there now, so if responsibilities have been missed, it sends an alert.’**

The ability of senior staff to take an enhanced overview view of operations was seen as an improvement driver. A manager said:

**‘I think that really comes with feedback, so when they've done something and say, for example, I can log on and read it and I can give them that instant feedback’.**

A senior manager said:

**‘It’s definitely improved us—the ability to monitor the ability to check-in, ability to analyse stuff a lot quicker.’**

### **Age and acceptance of technology**

A majority of interviewees (7/8) commented on the age dimension of acceptance of the technology. While age was viewed as an initial disadvantage in relation to acceptance and use of the technology, it was also felt that the barrier was not insurmountable. A senior care worker said:

**‘One lady did struggle with it ... but with training and one-to-one ... she’s absolutely fantastic on it now.’**

The general perception was that staff of a younger generation adapted very quickly to the technology because of their previous experience with smartphones, whereas staff from an older generation were more wary.

### **Benefits to service users**

An interesting additional theme that emerged, related to quality improvement, but quite specifically mentioned by the majority of interviewees (7/8), was based on the benefits to service users. With respect to the time saving aspects, supplementary questioning revealed that time saved meant more time spent with residents doing what they wanted. A senior care worker said:

**‘They're getting more interactions, instead of spending half an hour filling a big book in.’**

Reflexively, this was seen as rewarding back to employees. Another put it:

**‘Overall I think it’s boosted morale a lot because we have got a lot more time to spend with the people that we support.’**

Furthermore, the involvement of service users through the accessible nature of the technology, in particular speech-to-text and photos, was seen as beneficial, as anticipated by the Care Quality Commission (CQC) (2019). A care worker said:

**‘They are literally creating and working with the person to devise support plans, which is really good.’**

This, in turn, had a reciprocal benefit—according to a senior manager, this had the effect of:

**‘making them know they’re going to be more accountable; I think it’s making them a bit more person-centred.’**

### Survey cohort

In total, 121 participants (18.6% of the aggregate population of 651 employees) from two organisations took part in the survey. The survey cohort is summarised in [Table 2](#).

Table 2. Survey cohort summary			
Survey demographics		Number	%
Location	North	90	74.4
	South	31	25.6
Sex	Male	30	24.8
	Female	91	75.2
First language	English	117	96.7
	Other	4	3.3
Age band (years)	>20	2	1.7
	20–29	32	26.4
	30–39	22	18.2
	40–49	28	23.1
	50–59	25	20.7
	60+	12	9.9
Experience in social care (years)	<0.5	8	6.6
	0.5–1	4	3.3
	1–2	9	7.4
	3–4	21	17.4
	5–10	38	31.4
	>10	41	33.9
Experience with system	None	7	5.8
	A little	15	12.4
	Some	50	41.3
	A lot	46	38.0
	Expert	3	2.5

Of the 121 participants, 91 were female and 30 were male. There was quite an even spread of age, with 47% under 40 years of age and 53% aged 40 years or over. Some 117 (97%) spoke English as their first language, while four (3%) spoke a different first language (all of which were European). The survey cohort was highly experienced: 65% had more than five years' experience in social care, and 62% had more than three years working in their organisation. Just under 40% rated themselves as highly experienced or expert users of the Nourish system.

### Analysis of key survey findings

The top benefits highlighted by users of the system were: time saving (77%) and improved communication (76%). Some 47% said it made for better care, and 44% said it provided better safety. Some 30% said it gave greater confidence to care workers; just 12% said it improved training. Further to this, 71 of the respondents (59%) mentioned aspects they particularly liked, with ease of use, efficiency and improved communication featuring strongly. Just 29 (24%) noted aspects they particularly disliked, with technical issues (crashes, connectivity, speed of updates) being the most common concerns.

The balance of these pros and cons gives a strong sense of favourable overall feedback—positives far outweighed the negatives in this sample. Moreover, the 'particularly liked'

features can be associated with engagement benefits, because they suggest greater levels of motivation, empowerment and productivity, as predicted by the conceptual model.

Questions 15–20 (Appendix B, H1 statements) sought to understand change in engagement since the system was introduced. The distributions of responses were all highly symmetrical around the mode answer (neither agree nor disagree) for all six questions. Taking the aggregate of all responses across the six ‘change in engagement’ statements gave the following distribution (Figure 3).

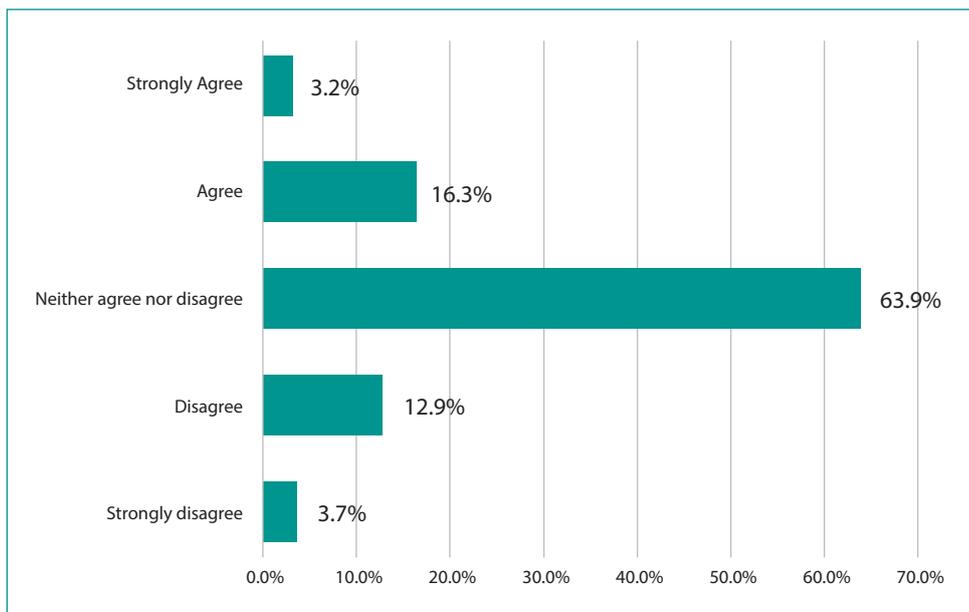


Figure 3. Aggregated increased engagement responses

Therefore, in this sample, the significant majority (63.9%) were neutral about the engagement impact of using the system upon engagement measures, with a relatively small proportion (19.5%) more positive and a similar, slightly smaller proportion (16.6%) more negative.

Questions 21–26 (Appendix B, H2 statements) sought to ascertain the current levels of motivation and commitment felt by the participants. Taking the aggregate of all responses across all six motivation statements gives a distribution (Figure 4), which shows that a

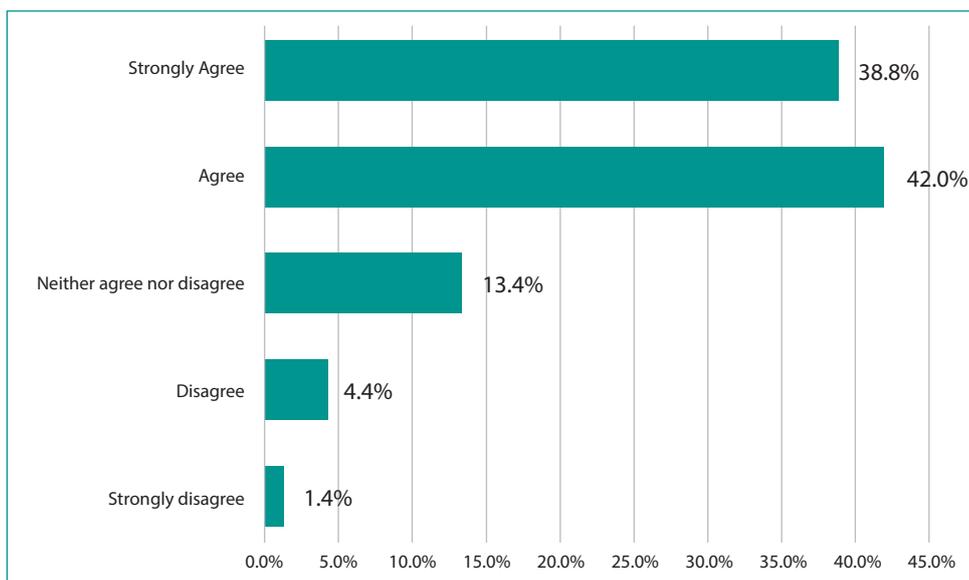


Figure 4. Aggregated motivation responses

significant majority (80.8%) of respondents regarded themselves as positively motivated and committed.

Questions 27–32 (Appendix B, H3 statements) sought to understand respondents’ current perceptions of their empowerment and enhanced learning in the workplace. Again, the distributions of responses were all strongly favourable. Taking the aggregate of all responses (Figure 5) shows that a significant majority (70.9%) of respondents regard themselves as positively empowered.

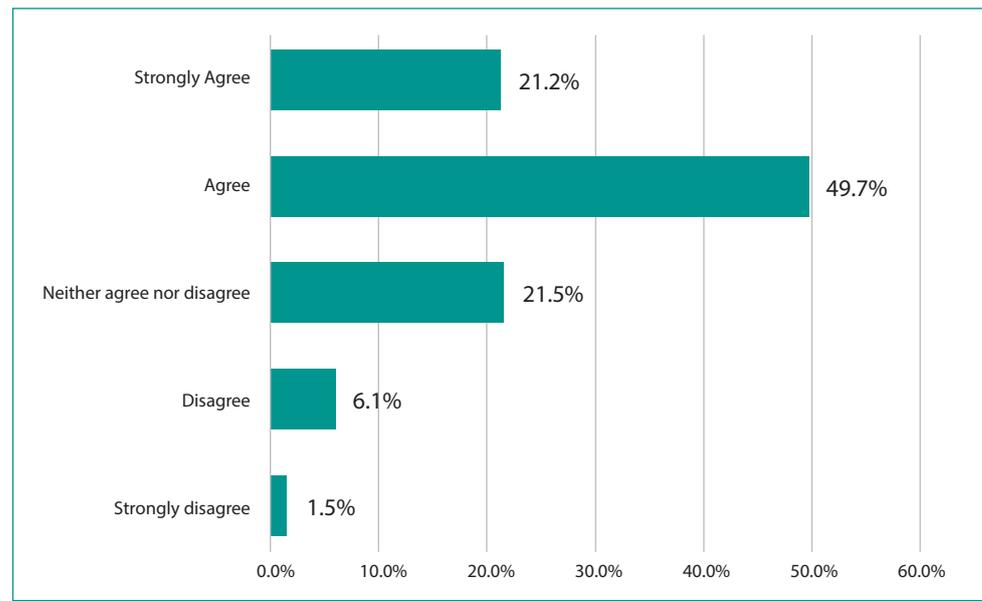


Figure 5. Aggregated empowerment responses

Finally, Questions 33–38 (Appendix B, H4 statements) sought to understand respondents’ current perceptions of their productivity and efficiency. Taking the aggregate of all responses across all six productivity statements gives the following distribution (Figure 6), which shows that a significant majority (75.2%) of respondents regard themselves positively in relation to their productivity.

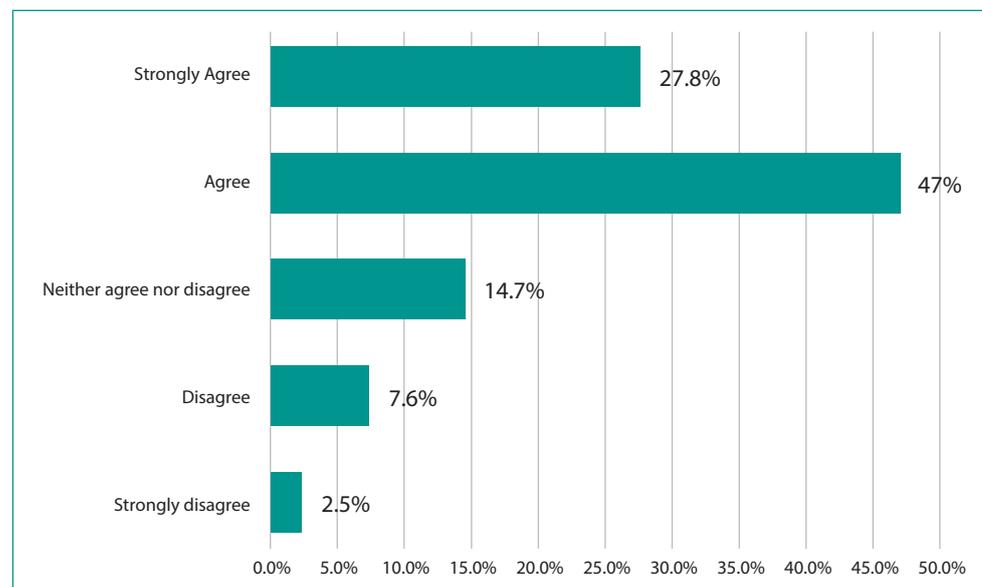


Figure 6. Aggregated productivity responses

Overall, the responses across all three engagement domains of motivation, empowerment and productivity were strikingly positive, with a very strong trend towards agreement or strong agreement with each of these constructs. This gives the strong indication of a very highly engaged workforce in the whole survey population (which is consistent when results were segmented by organisation).

### Correlation analysis

To drill down a little deeper into the relationship between the responses to the general engagement questions and the hypothesised consequences of motivation, empowerment and productivity, a statistical correlation analysis was undertaken. For this correlation analysis, mean averages were taken of the scores for each of the sub-construct statements.

By calculation of correlation of increased engagement against each of these sub-construct averages (then sub-divided for age, gender, and speaking English as a second language) the following results (Table 3) were obtained.

**Table 3. Correlation analysis of increased engagement vs behaviour constructs**

		Increased engagement						
		Overall	<50	50+	Male	Female	EFL	ESL
Behaviour construct	Motivation	0.938	0.935	0.945	0.978	0.922	0.937	0.993
	Turnover intention	0.854	0.856	0.833	0.911	0.835	0.853	1.000
	Training and development	0.180	0.245	0.073	0.201	0.143	0.190	-0.994
	Feedback	0.700	0.721	0.667	0.758	0.666	0.702	0.927
	Empowerment	0.700	0.721	0.667	0.758	0.666	0.702	0.927
	Discretionary effort	0.518	0.556	0.455	0.572	0.477	0.524	-0.934
	Effective communication	0.644	0.669	0.602	0.701	0.607	0.647	0.478

Note: EFL=English as a first language; ESL=English as a second language

The correlation analysis adds an important additional finding: in the survey sample as a whole, those who felt the greatest engagement benefit of the technology were very strongly correlated with the greatest levels of motivation and commitment. Similarly, those who felt the greatest engagement benefit were strongly correlated with associated benefits of enhanced empowerment and feedback. While still positively correlated, the association between increased engagement and discretionary effort and effective communication benefits was moderate. Enhanced training and development were only weakly associated with increased engagement in this survey.

Broadly speaking, these correlations were very similar, irrespective of age or gender. The small number of non-English speakers showed large variances to the overall correlation trend in relation to the training and development and discretionary effort constructs; however, a larger sample size would be required to understand whether these differences were significant.

## Discussion

### Technology acceptance

Venkatesh et al (2003) indicated the potential for further inquiry into the impact of information technology on job satisfaction, commitment and productivity, which relate to the engagement constructs in this study. With regard to the acceptance of the care planning technology, respondents' consistent description of a high level of acceptance, possibly mediated by a lack of choice in operational usage, was remarkable. As predicted by the TAM Model (Davis, 1989), this was apparently facilitated by both the perceived usefulness and perceived ease of use of the system. Interviewees frequently cited ease of use in their responses. and this was a common 'particularly liked' factor that emerged from the survey

respondents. Similarly, the usefulness of the system was strongly evidenced by interview and survey participants in referring to the time saving, communication and quality benefits. The additional factors of social influence and facilitating conditions proposed by UTAUT (Venkatesh et al, 2003) appear to have been favourable: according to the senior managers interviewed, the organisational context was of a highly values-led workforce, with admirable standards of person-centred care that existed before the introduction of the technology.

### Comparison of qualitative and quantitative findings

Qualitative and quantitative findings from this research provided evidence of confirmation of the four hypotheses proposed in the conceptual model derived from theory and previous research. In particular, qualitative interviews strongly evidenced increased employee engagement following electronic care planning technology implementation and concomitant benefits of increased motivation, empowerment and productivity, as predicted by the theory. Quantitative evidence derived from the survey revealed mixed perceptions regarding the impact of the technology on engagement. However, correlation analysis showed that those employees who most recognised the engagement impact of the technology also demonstrated the highest motivation, empowerment and productivity of all. Overall, both interview and survey data indicated a very highly engaged workforce across the two organisations studied.

Therefore, for this group in particular, a very clear relationship emerges between the first order outcome predicted by Hypothesis 1—technology leading to increased engagement—and the Hypotheses 2, 3 and 4 and the concomitant positive behavioural benefits. Identification of this correlation does not prove a causal relationship, so it is not possible to conclude that the technology was the sole or central reason for these benefits. Other factors are inevitably at play in any organisation where the workforce are highly engaged. Nonetheless, the association is striking and, given the high levels of engagement shown, it is reasonable to deduce that there was a recognition of the positive engagement impact of technology among the most engaged employees.

### The moderating role of demographic factors

There was broad consistency across both qualitative and quantitative findings when filtered for age, gender, experience of the system, length of service or whether English is spoken as a first language. While Venkatesh et al (2003) suggest that such variables may be significant and should be taken account in future research, their influence was not shown to be strong in this study.

Therefore, in each instance of gender, age and linguistic differences, it may be that there was a balance of driving forces around the technology adoption and its benefits, and these resulted in inconclusive demographic variations overall with regard to engagement. For older employees, in particular, this tension was emphasised: the anecdotal evidence pointed to an initial confidence barrier in first encountering the technology, but equally indicated that this was quickly overcome to achieve significant benefit and high engagement once mastered.

### Reflections on the conceptual model for this research

Findings from this research lend support to the theoretically derived concept that the implementation of care planning technology acted as a resource that influenced the development of engagement. In turn, as predicted by the conceptual model, engagement behavioural attributes were shown to be very high in the organisations studied and, for some employees, the technology was very clearly a significant positively influencing factor.

What is striking, however, is that, within the survey findings, the engagement impact of the technology was not necessarily recognised by all employees. Moreover, as indicated by the Gallup Model (Kavya and Padmavathy, 2017), there are various aspects of management practice and organisational context that influence levels of engagement, including: provision of resources; quality of feedback, support and supervision; clarity and communication of strategy; and development growth opportunities. These broad principles may be supported by corporate initiatives, such as employee newsletters and discount/reward schemes, or IT-enabled services, such as a company intranet, designed specifically with engagement in mind and enhancing a sense of belonging.

Given this variety of organisational and management influences, a further reflection is that the relative engagement impact of any individual initiative may be difficult to measure in isolation. Indeed, the successful implementation of a new technology may be highly dependent not only on the technology itself and its perceived benefits, but also the management vision, strategy, communication and training, which undoubtedly form essential components of a successful innovation project plan.

### Limitations

Demographic differences produced surprisingly little variation, and a bigger sample size may have shone a brighter light on these variables. In particular, in view of the large number of migrant workers in the social care workforce in the UK, the impact of new technology on those speaking English as a second language was of potential interest. However, in the survey cohort, only four participants were in this category and, therefore, findings were not statistically significant.

Being mindful of the very positive portrayal of the system and its benefits by interviewees, one reflection is that there may have been a degree of selection or participation bias (Saunders et al, 2019) in the organisation's self-selection of interview candidates. Consciously or unconsciously, there could have been a greater desire to represent the system positively. Interviewees were, nonetheless, able to offer criticisms and suggestions for improvement.

To avoid the potential pitfall of the relative complexity of the change in engagement statements in the survey, it would potentially be preferable to undertake a longitudinal survey methodology, to measure the change in engagement before and after the technology implementation. A longitudinal study would measure engagement levels before implementation and then again, possibly 1 year afterwards, to evaluate impact.

## Recommendations

### Service user empowerment

One specific narrative that emerged in the course of the qualitative interviews was that the care planning technology lent itself to empowerment of service users themselves, due to the accessible nature of its speech-to-text and photographic recording functions. These aspects were outside the scope of this study (other than the fact that employees valued this functionality and were positive in recognising the benefit to the people they supported). Nonetheless, this can be identified as an interesting topic for potential further research.

### Implications for provider organisations and managers of social care services

This study has shown that employees in social care settings may become more loyal, feel more empowered and work more effectively when they have electronic care planning tools at their disposal. This provides an additional added value return, which should be taken into consideration when making the decision to invest in technologies of this kind.

### Implications for application developers

The engagement benefits to employees, as evidenced in this study, should be considered when marketing the benefits of electronic care planning tools. Future development and implementation plans should take into account the views and experiences of care workers as key stakeholders in this regard; in particular, when the time saving and ease of use benefits are effectively assimilated by them, implementation is facilitated.

### Implications for social care workers

This study has shown that electronic care planning can assist in the challenges of daily work in social care by alleviating the burden of handwritten notes and, as a result, freeing up time that can be spent with the people supported in services. The technology can also help accuracy of recording and provide an aid to communication with colleagues and managers. Most importantly, it seems that those who embrace the technology, especially those who are initially daunted by it, gain the maximum benefit in terms of feeling motivated, empowered and working effectively.

## Conclusions

The organisational engagement of care workers employed in a healthcare setting was enhanced following the implementation of electronic care planning. Evidence of this change was derived from qualitative interviews of managers, senior practitioners and care workers themselves working in social care services and a survey of care workers using the technology. Motivation, empowerment and productivity levels were very high in the organisations studied, and were highest of all for those employees who perceived the greatest engagement impact of the technology.

This study has shown that electronic care planning tools play a vitally important role in the digital transformation of healthcare services. New technology of this type may not always be readily adopted, but adoption can be facilitated by clear strategy, leadership and an open learning culture. Favourable employee perceptions of ease of use and usefulness of the technology facilitate the active take-up and impact of the technology in general. These conditions were clearly evident in the organisations studied and, as a result, the implementations had been successful.

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### Key points

- Electronic care planning and recording tools offer benefits to care workers that go beyond their functional utility—in particular, they can support employee engagement.
- Ease of use and practicality enables anxiety about new technology to be quickly overcome, which then lead to improved commitment and job satisfaction.
- Electronic recording saves time compared to handwritten notes, which is beneficial to care workers and service users alike.
- Electronic tools also improve communication between peers and enhance management oversight, providing better handover information and giving new opportunities for feedback and support.
- Those care workers who most recognise the benefits of the technology are also the most motivated, empowered and productive.

### Reflective questions

- How do electronic care planning tools and records offer opportunities for service improvement and professional development?
- What is employee engagement and why is it important in the context of residential care, nursing care or supported living?
- What are the factors which help people adapt to and embrace new technologies when introduced?
- What if care technology doesn't work for some reason? Do you have a written procedure or contingency plan?

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## Appendix A: Semi-structured interview script

### General questions:

1. What tasks are staff performing using the Nourish app (review checklist)?
  - Prompts to provide care
  - Medication management
  - Recording notes about residents
  - Raising concerns
  - Communicating with colleagues
  - Communicating with management
  - Receiving training or policy updates
  - Anything else—please specify
2. Do all staff use the Nourish app in the same way?
  - If yes—please confirm do they all do all of the things on the checklist above?
  - If no—how do staff use it differently? Please describe? Why do you think this is?
3. Generally speaking, what are the main practical benefits you think staff gain using the Nourish technology? (review checklist)
  - Time saved from writing notes/time to spend with residents
  - More confidence in doing the right thing for residents
  - Improved training
  - Improved communication
  - Better care for residents
  - Safety for residents
  - An others (record)

### H1 questions:

4. Can you tell me how well the Nourish technology been accepted by staff? is it the same for all staff groups e.g. males/females, younger/older?
5. What do carers say they particularly like or dislike about the Nourish app?
6. How has using the Nourish app affected carers' learning and development?
7. Are there any carers for whom English is a second language? Would you say the app is any more or less beneficial to this group? If there are differences, why is that?
8. How has the use of the Nourish app affected carers' morale?
9. How has the use of the Nourish app affected carers' behaviours?
10. How has the use of the Nourish app affected how the organisation works?

### H2 questions:

11. Since introduction of the Nourish app have you seen any change in carers' enthusiasm and energy at work?
12. Is there any change in how carers feel in terms of their confidence and competence?
13. Is there any change in things like the attendance and timekeeping of carers?

### H3 questions:

14. Since the introduction of the Nourish app, is there any change in carers using their initiative or communicating their ideas?
15. Have you noticed any differences in how carers work together to get tasks done?
16. Have you noticed any changes in the relationship between carers and management?

### H4 questions:

17. How has the use of the Nourish system impacted on getting work done?
18. How has using Nourish affected carers' pride in their work?
19. How do carers feel about their workload since using the Nourish system?

### Final (general) question:

20. Finally, is there anything else you want to say about how things have changed since using the Nourish app—in particular anything further that has impacted on carers?

## Appendix B: Survey statements

Note: All statements on five-point Likert scale: strongly agree, agree, neutral, disagree or strongly disagree; H=hypothesis

H	Statement for Questionnaire (5 point Likert scale)	Construct	Source
H1	Since I have been using electronic care planning, I look forward to going to work more	General engagement	Shantz et al, 2016
H1	Since I have been using electronic care planning, I am more enthusiastic about my job	General engagement	Shantz et al, 2016
H1	Time passes more quickly at work since I have been using electronic care planning	General engagement	Shantz et al, 2016
H1	Since I have been using electronic care planning, I am more likely to refer a good friend or family member	General engagement	Farndale and Murrer, 2013
H1	I am more proud to work here since electronic care planning was introduced	General engagement	Farndale and Murrer, 2013
H1	Overall, I am more satisfied working here since electronic care planning was introduced	General engagement	Farndale and Murrer, 2013
H2	I strive as hard as I can to be successful in my work	Motivation	Morris, 2009
H2	I go out of my way to help new employees	Motivation	Morris, 2009
H2	When I work, I really exert myself to the fullest	Motivation	Morris, 2009
H2	I rarely think of quitting my job	Turnover intention	Colarelli, 1984
H2	If I have my own way, I will be working for this organisation 1 year from now	Turnover intention	Colarelli, 1984
H2	I am planning to search for a new job during the next 12 months	Turnover intention	Colarelli, 1984
H3	My training, learning and development has helped me to do my job better	Training and development	Shantz et al, 2016
H3	My manager gives me feedback that helps me improve my performance	Performance feedback	Farndale and Murrer, 2013
H3	I regularly receive appropriate recognition when I do a good job	Performance feedback	Farndale and Murrer, 2013
H3	I am able to make suggestions to improve the work of my team	Empowerment	Shantz et al, 2016
H3	There are frequent opportunities for me to show initiative in my role	Empowerment	Shantz et al, 2016
H3	I am able to make improvements happen in my area of work	Empowerment	Shantz et al, 2016
H4	I really push myself to work beyond what is expected of me	Discretionary effort	Shuck et al, 2016
H4	I am willing to put in extra effort without being asked	Discretionary effort	Shuck et al, 2016
H4	I often go above what is expected of me to help my team be successful	Discretionary effort	Shuck et al, 2016
H4	Communication between management and staff is effective	Effective communication	Shantz et al, 2016
H4	On the whole, different parts of the organisation communicate effectively with each other	Effective communication	Shantz et al, 2016
H4	I know who the senior managers are around here	Effective communication	Shantz et al, 2016

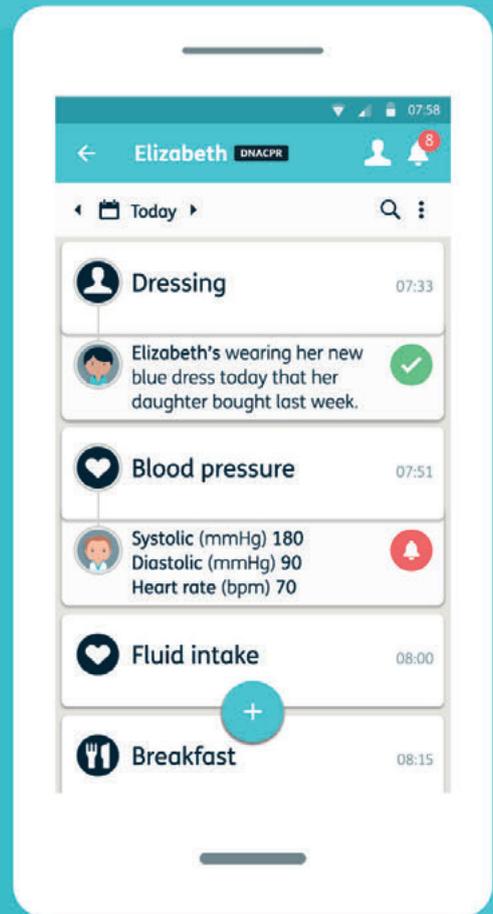




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