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A qualitative exploration of care home workers' views and training needs in relation to the use of socially assistive humanoid robots in their workplace

Abstract

Aim: The study aimed to explore the views and attitudes of care home workers about the socially assistive robot that was trialled in their workplace, in order to identify training needs in relation to the hypothetical future use of these robots in their workplace.

Background: Care home workers face challenging workload conditions which may require the exploration of new solutions such as the use of socially assistive robots (SARs).

Methods: This is a qualitative descriptive study which used semi-structured interviews. Care home workers (n=23) in the UK participated in the study, and data collection took place between October 2019 and January 2020. NVivo software was used for data management and a thematic inductive analysis was conducted.

Results: Findings indicated that many participants were open to the use of robots and valued the potential usefulness of SARs in the care setting. However, some participants showed resistance to the use of robots and did not feel comfortable with the idea of working alongside them. Participants wished to receive technical training that would enable them to be competent in using SARs. Participants took seriously their duty of care to the older people and thus wanted to ensure that the use of the SAR would not negatively impact on the care being provided. Robots were viewed as having potential to be supplementary to human carers, such as sharing the workload and improving upon the care already being provided.

Conclusions: Care home workers express both positive and negative views in relation to the hypothetical future deployment of socially assistive humanoid robots in their workplace.

Implications for practice: The findings highlighted the importance of values around person-centred care which should be taken into account when planning for the implementation of robots in social care settings and training care home workers in how to work with robots.

Key words: Socially assistive robots, social robotics, attitudes, older people, training.

SUMMARY STATEMENT OF IMPLICATIONS FOR PRACTICE

What does this research add to existing knowledge in gerontology?

- This study explored care home workers' views about the use of robots in the care of older people in a care home setting.
- Very few care home workers have been exposed to socially assistive humanoid robots that can intelligently and autonomously interact with older people.

What are the implications of this new knowledge for nursing care with older people?

- Person-centred care is an important value held by care home workers, and this should be a key part of any implementation of socially assistive robots in a care home setting.

How could the findings be used to influence policy or practice or research or education?

- Planning for the implementation of socially assistive robots in care home settings should involve consultation with users and involve training on technical skills as well as consideration of ethical issues.

Introduction

Over recent decades, the advancement of technology has led to robots being developed by large multinational companies and used in various settings including manufacturing, education, healthcare, and social care. The introduction of robots within care home settings could be a potential solution to a major problem in social care, where demand for care workers exceeds supply, as has been the case in the UK for many years (The King's Fund, 2018). Socially assistive robots (SARs) are designed to assist the user through social interaction and communication, using different gestures, movements, and language. These can fulfil roles such as training, therapy, social facilitation and companionship (Abdi, Al-Hindawi, Ng, & Vizcaychipi, 2018; Olaronke, Ojerinde, & Ikono, 2017). However, the use of robots in social care settings is still relatively new. So far, a small number of SARs have been trialled in these settings including animal-like robots such as the robotic seal Paro, the doglike robot AIBO, and the humanoid robot Pepper (Papadopoulos et al., 2020). A recent systematic review suggested that social robots can potentially improve the wellbeing of older people, although higher-quality research studies are needed (Pu et al., 2019).

Key to the successful use of such technologies is the understanding of care workers' attitudes and views about the use of robots in care settings, as this could help with predicting how likely they might be to accept technology (Davis, Bagozzi, & Warshaw, 1989). Existing evidence of care workers' attitudes towards assistive robots is mixed (Papadopoulos, Koulouglioti & Ali, 2018). Several studies have shown that there are positive emotions and attitudes towards robots, and that robots have been received positively (Jayawardena et al., 2010; Louie, Li, Vaquero, & Nejat, 2014; Stafford et al., 2010; Chen, Jones, & Moyle 2020). This was notably the case where studies involved interaction with a robot which was designed to accommodate the preferences of older

people (Jayawardena et al., 2010; Stafford et al., 2010). Research also suggests that care home workers and professional caregivers prefer robots to be assigned tasks that do not require the robot to take complete responsibility for caring for the older person, but instead provide support for the care that is already being provided and engage with tasks that are considered secondary (Hebesberger, Kortner, Pripfl, Gisinger, & Hanheide, 2015; Niemelä & Melkas 2019). On the other hand, concerns have been raised about the safety and acceptability of SARs (Zsiga et al., 2013; Louie et al., 2014). Some care home workers also feared that the use of robots may lead to the loss of jobs and the provision of personal care (Broadbent et al., 2009; Broadbent et al., 2012). When compared to the general population in Finland, healthcare professionals in Finland had negative attitudes towards the use of robots and thought that they could be used only in certain tasks such as lifting (Turja et al., 2017). Finnish care home staff have also been found to be more fearful of the use of robots in the care of older people compared to their Japanese counterparts in similar roles who had more positive attitudes (Coco, Kangasniemi & Rantanen, 2018). In the UK, in an online survey, adults reported more negative attitudes towards humanoid robots compared to responders from Japan (Nomura et al., 2015). Further, staff caring for older people reported in general positive attitudes towards the use of animal-like companion robots in their facility (Bradwell et al., 2020).

Pepper, developed by Softbank Robotics, is the first *humanoid* socially assistive robot ever marketed and in a recent test of cohabitation with older people in their home, it was perceived as useful especially in maintaining social relationships and as a link to the family and friends of the user (Fattal et al., 2020). Pepper was also used in an experiment recently in the UK. For the purposes of the experiment, Pepper was brought into several care homes and programmed to interact autonomously with older people from different cultural backgrounds. More about the CARESSES project and evaluation study can be

found in Papadopoulos et al., 2021. Workers from the care homes participating in this project were the *first* to ever see Pepper interact in a real-life situation. Therefore, the current study aimed to 1) explore the views and attitudes of UK-based care home workers regarding the use of robots in the care of older people, also particularly with respect to the use of a socially assistive humanoid robot such as Pepper in this context; and 2) explore their ideas about potential training needs in relation to the use of these robots if they were to be deployed in their workplace.

Methods

Design

A qualitative descriptive study using face to face semi-structured interviews.

Ethics

Ethical approval for the study was obtained from University of Bedfordshire (Ethics Committee of the Institute for Health Research; IHREC926) and ethical principles of research studies with human subjects were followed. A written informed consent was obtained from each study participant.

Sample and Recruitment

Participants were recruited from four privately-owned UK-based care homes in which residents only had participated in the CARESSES project trial and evaluation study (see Papadopoulos et al., 2021). The aim was to recruit at least 20 participants from the different care homes and in order to explore a range of different perspectives, care home workers with different job types (not only nurses) were approached and recruited. The participating care homes varied in size and number of rooms and included two medium size facilities with 25 and 35 beds and two larger facilities with 57 to 60 beds. Recruitment was done by one of the researchers (who had not been involved in data collection for the evaluation study) who contacted the care home managers initially, asking them for

permission to attend the care home to talk to the workers about being interviewed for this study. Subsequently, they made arrangements to visit the care homes to recruit participants and to carry out data collection. The workers at the care homes were introduced to the purpose of the study and their willingness to participate was sought. They were also made aware that the interview had nothing to do with their employment and that participation was voluntary.

Approach and data collection

In order to minimize disruption at the daily operation of the care home but at the same time maximise the opportunities to participate in the study for members of staff, researchers visited the care homes multiple times and at different times of the day (shifts). All interviews were semi-structured and were conducted by three of the authors, all of whom had previous experience with qualitative methodology and used the same interview guide. Two of the interviewers had been involved in the evaluation study but had not attended these particular care homes so they were unknown to the staff. The interviewers, prior to the initiation of the interviews, discussed the topic guide and questions to be asked of the interviewees. No changes were made to the interview guide during the data collection process, but clarification and prompting was used when needed. Participants were asked to give their views / thoughts / feelings about robots and any experiences with having robots in their workplace. They were also questioned about any training needs that they might have if, hypothetically speaking, a robot (like the one in the CARESSES study) was to be deployed permanently in their workplace. (See interview guide in appendix 1). All interviews were conducted in a quiet office space in each participant's workplace and they were audio-recorded and transcribed verbatim.

Data management

Following the university's ethical principles and policies ensured that the data were kept securely and confidentially. Collected hard copies of informed consents were kept in a locked cabinet in the principal investigator's office. Audio-recorded interviews were downloaded and saved in a password protected electronic project folder assigned to the study in university password protected computer. Similarly transcriptions were de-identified and were saved following the same procedures. Access to all data was restricted to the immediate research team and all team members have received training provided by the university on data protection.

Data analysis

An inductive thematic analysis was undertaken (Braun & Clarke, 2006; 2012) using a descriptive phenomenological approach, which was data-driven and grounded in the participant's own descriptions of their lived experiences and feelings rather than using pre-established categories. This approach to data analysis is described in Sundler et al (2019). The analysis was an iterative process. This involved reading and re-reading the interview transcripts, creating codes and then grouping these into broader over-arching themes. The data analysis process started during data collection so that the research team could make an appropriate decision regarding the final sample size. An additional two interviews were conducted, which confirmed data saturation. NVivo software (QSR International, 2019) was used for the analysis. Five key themes were identified in relation to the study's objectives (see Findings section). Quotes are given using participant's own words (clarification is given in square brackets and any excised text within an extract has been replaced with ellipses).

Findings

Twenty-three (n=23) care home workers from four care homes participated in the study, and data collection took place between October 2019 and January 2020. Interviews

ranged from 11.16 to 37.27 minutes, with a mean of 19.62 minutes. The two largest ethnic groups were Asian or Asian British (39.1%) and White (including White British and White other; 39.1%). The remainder of the participants (21.7%) were Black African or Black Caribbean. The largest age group (43.5%) consisted of participants who were over 50 years old, followed by those aged 40 to 50 years (26.1%).

The majority of participants (82.6%) worked full-time. One participant did not state whether they worked full time or part-time. More than half of the participants had a role that involved direct care for or interaction with the older people residing in the care home (e.g. staff nurse, care assistant, recreational activities coordinator). The remainder included roles that were managerial, administrative or ancillary in nature. Participants had worked in health and/or social care from 1.5 years to 39 years.

Thematic analysis

Theme 1: Openness to the use of technology

1.1 Views about technological advancement and general acceptance of robots

In general, participants had a variety of opinions and views about the use of technology and robots. Several comments suggested that participants were generally accepting of robots and saw the potential benefits of using robots in society. Participants also recognised that technology was rapidly advancing within society, and these innovations were welcomed. One participant commented: “...actually I think it’s a good thing, you know, ...we are in the age now that it’s all advanced and so technology is like ... improving every time...”

1.2 Positive views about robots in the care home setting

It appears that Pepper was received positively by several older people (residents of the care home) and care home workers, for example as illustrated by the following comment:

I was quite surprised that we were taking part in [the study], but I thought it was very interesting...I also liked how some of the residents, especially one of the residents that I worked with was really happy when he was ...speaking with the

robot, he really found it quite interesting, He was looking forward to seeing the robot. He remembered each day when the robot was due to come.

This positive reception seemed to be surprising, especially in cases where a negative reaction had been anticipated from older people in the care home. Also, the comment is similar to several other comments that related the sense of excitement and fascination that was elicited by seeing this type of new technology in the care home environment.

Theme 2: Resistance to the use of robots, or lack of familiarity with robots

2.1 Fear or dislike of robots

In contrast to the first theme, there were several comments from participants implying some resistance to or dislike of robots. A common underlying issue was fear, with some participants commenting that they and their colleagues found Pepper frightening. Several participants were concerned that the older people in the care home, especially those with dementia, may be fearful of a SAR. For example, one participant commented:

Interviewer: ...So ... do you recall any feelings that you had while Pepper was on site, and how did having a robot here make you feel?

Participant: I don't think I had any feelings. Just when I went up and saw it I just thought 'Oh what an ugly thing!' (laughs) you know. It was – well- quite frightening really. And I think for someone who hasn't got [cognitive] capacity, got dementia, you know they've got this white thing with big black eyes. Could be quite frightening I would say.

One participant explained that they felt uncomfortable working with a SAR because:

...with a colleague, you can talk to that person, you can know the person's body language you can know the person you're working with, but a robot you can't tell those kinds of things.

In this situation, it seemed that a sense of unease was caused by the SAR because of its lack of non-verbal communication in comparison to a human co-worker.

2.2 Lack of familiarity with robots

There were many comments indicating that participants were generally unfamiliar with robots and similar new technologies, although they were aware of how these technologies had been used in different contexts such as industry, education and in hospitals.

Some comments described a generational difference, with people from older generations less likely to be familiar with robots and new technologies than those from younger generations, and therefore they may be less likely to accept them. One participant commented about having been ‘almost very anti-technology’, but they had changed their viewpoint more recently and started to embrace technology such as mobile devices.

2.3 Preference for human carers

There were several strong opinions about robots not being used in care homes. One view put forward was that humans should always be involved in looking after people. Robots (and more specifically SARs) were seen as lacking many human traits and qualities necessary for looking after older people. For example, one participant stated:

For adults with [cognitive] capacity, they could have a conversation with [a robot]. But what you're kind of saying is [that] this person is not worthy of human contact. We are paying all this money to have this robot standing here talking to this human being. ... why should ... that lovely gentleman, have [to] talk to ... a lump of metal?... get a human being in and give that gentleman what he really deserves. It's compassion, love, understanding, and attention. Because none of that is given by a robot.

Therefore, the robot was seen as insentient and incapable of human feelings such as compassion. The striking image of a robot as a ‘lump of metal’ has connotations of coldness and impersonality, in contrast to ‘loving, compassionate, understanding and attentive’ human carers.

For a number of participants, the increase of robots being used within society was perceived negatively, with robots seen as an impending threat to jobs. There were some comments suggesting that participants and their colleagues had discussed the possibility of

robots replacing their own jobs within social care, but this was not perceived as a real threat. A common view was that robots were perceived as not matching up to the capability and performance of human care home workers and therefore they were not seen as capable of replacing human care home workers.

Theme 3: SARs as complementary to human carers

3.1 SARs assisting care home workers and meeting the needs of older people

Participants suggested that robots in the care home environment should be complementary to human carers, rather than being carers in their own right. Similar to what was described in the previous theme, robots were seen as lacking human qualities and not being technologically advanced enough to carry out complex activities with the same level of skill as human carers. Participants also acknowledged that there is a shortage within the social care workforce and that SARs may help to address this gap, although there was a preference for human care home workers. In most cases it was seen as beneficial to have a robot to help alleviate the workload of the human care home workers by supporting them to provide better care to the older people. Participants suggested several practical tasks that these robots could potentially help with, such as assisting with cleaning, meals, and medication, providing information, fetching things, and helping the older people to move around the care home. It was also suggested that the robot could provide a monitoring function and warn of potential hazards, or supervise the work of human care home workers, to minimise human error. One participant suggested that the robots could ‘...just look around, or just in case there’s a resident ... has a risk or a fall, or something, probably something like that. That could really help’.

3.3 Keeping the older people occupied

It was also seen as important for the robots to play a role in helping the older people in the care home to stay engaged and busy, either directly (such as providing entertainment, playing games, reading, singing, exercises, etc) or by facilitating their participation in group activities that were taking place at the care home. Several comments suggested that keeping busy may be helpful for older people in the care home who were experiencing particular emotional states such as feeling restless, bored or low in mood. One participant commented:

I think um- it can give company to the residents, because they do get lonely, so – sometimes, so it's a nice activity to keep them occupied and keep them amused. I know I think your robot played some music or something I think for YouTube or something for one of the residents, which I found really nice.

3.4 Social support

Robots in the care home environment were also seen as potentially valuable conduits for social support in several ways, for example: by facilitating interaction with others (such as family members), or even by providing companionship to the older people in the care home. Thus these robots seemed to be seen as a useful tool for combating isolation and loneliness, as illustrated by the following quote:

First time I saw your robot, I thought that in the future this kind of robot can replace human jobs... But I'm not sure. I think they can't complete our job, because nothing can compare with human completion and what it's about affection, but a robot can have strict evidence with what happened. It can be a good assistant for our residents. For example, if a robot stays in a room, we can have a good idea about what happened. Maybe we are busy in other room, at the same time something wrong happen in other room, we can have this feedback. Could be good for a resident too because they don't feel alone always... We ... try to spend time with every resident but you can't spend 100% of your time with just one resident.

Theme 4: Ethical values of care home workers

4.1 Prioritising the welfare of the older people in the care home

Participants greatly valued the welfare and safety of the older people in the care home, when considering the use of robots in the care home setting. This was the case for all types of care home workers who participated, even if they did not have a role involving direct care. Comments indicated the importance of ensuring that the older people in the care home were safe, comfortable and happy, and that the implementation of a robot did not create any problems or interrupt the care being given. One participant commented:

I would like to know obviously the pros and cons, like if it's around, like how's it going to affect my job for the day? Like ... do I need to pay extra attention at certain things? And ... how is it going to benefit ...the residents? So obviously, if there's a positive effect on the residents and they're happier, that's good. But I mean ... if something was to go wrong for example and I have to deal with that situation, I feel like well that would be a con because I have other things to do, it would mean I would have to stop everything else, because at the end of the day it is ... machinery. ...So I think that's the only thing. But as long as it's making a positive impact on the residents, that's fine. But as long as ... it doesn't ... take away my duty of care to the residents, for me to stop and be like worrying about the robot, which I know doesn't probably make sense but do you know, worrying like Oh my God it's malfunctioned, or something like that. I mean as long as that doesn't happen then I mean I really think it would be a positive thing for residents.

This quote suggests that the participant had considered the potential benefits and disadvantages of a robot being in the care home, as well as how their daily practice would need to change to be able to effectively work with the robot. The robot was seen as being worthwhile if it had a positive impact on the older people and did not create any disruption or detrimental effect on care provision.

4.2. Capacity and consent

Participants also placed importance on the ability of the older people to make choices about their care and give feedback. In many cases, when participants were asked about their own views about the use of SARs, they noted that it was important to involve the older people and to ask them about their wishes. This speaks to an underlying value of respecting the independence of older people and honouring their power to make choices about their own care. This was illustrated in the following comment:

I think it has to be their choice whether they want the robot. So I think [for] people with dementia [I] don't think it would necessarily be that good of an idea. Because obviously if they woke up in the middle of the night and saw a robot next to them, they could have forgotten that they had the robot in their room, and that could really upset them. I think it could only really be beneficial to people that are completely *compos mentis* [having full control of one's mind].

Here, the participant indicated that they were aware of the complicated ethics of obtaining consent from someone with dementia, due to issues related to cognitive capacity and memory. They recognised that the situation could cause distress which would be an additional burden on the older person.

4.3. Risk issues

Participants also highlighted the potential additional risk associated with the SAR having responsibility for doing certain tasks for the older people, such as risk of error or malfunction, or of the older person becoming agitated. Dealing with these issues could potentially be disruptive or increase the workload for the care home workers. Participants made it clear that it was important for them to be able to step in if there were any problems.

4.4 Dignity and privacy

Many comments were also related to the protection of the dignity and privacy of the older people. Robots and SARs were seen as a potential risk to privacy because of the possibility that they could have surveillance functions (such as video recording). For example, one participant commented: "... if it was recording or something, I don't think that dressing or personal care or you know helping with things like that would be appropriate..."

Theme 5: Care home workers' robotic competence

Participants specified what they needed to know in order to be able to work with SARs effectively, and their responses fell into two main domains.

5.1 Knowledge of the scope and functionality of the robot

Participants wanted information about the SAR in order to be able to understand it, to familiarise themselves with it and to know its scope, i.e. what it could be expected to do, as well as what it could not do. Most importantly, several comments mentioned wanting to know what kind of functions could either support the older people directly or help the participants to provide care for the older people. One participant commented:

I think I should be- my staff should be trained how to operate on the robot. If a resident asks me what can it do, I'm able to give it information, this is what it can do, for you, this is what it can- It's only to be educated. How much the Pepper can do for the residents. So that I can also be able to go back to my residents. These are the things it can do for you.

5.2 Technical skills and knowledge

Participants also reported the need for training focused on technical skills and knowledge regarding the operation and maintenance of the SAR. Participants highlighted a range of skills and knowledge that they would need, for example they wanted to learn about how to use the SAR effectively, how to communicate with it, how to use it to support the older people. Some participants reported that they wanted training related to managing risk and potential malfunctions. Also, one participant highlighted the need for practical training but also reflection:

Practical training and confidence building. Um not theoretical. Not talking about it, not reading about it, not even watching a video on it. Real utilisation of it, and what it does. Practicing, hands-on. Yeah. Hands-on training. And then, very important, even more than the hands-on training, reflective workshop. Always reflective workshop is almost more important than the training itself. Because that's when you sit. And I would say in a group setting.

Summary of findings

Overall, it seemed that participants had positive views about the advancement of technology in society and the use of robots in general, but when considering the use of SARs in their own work environment, there were a diverse range of views, including enthusiasm, fear and concern. Participants did however recognise that robots could be

helpful for addressing shortages within the social care workforce. SARs were largely seen as being helpful if they could assist the human care workers rather than having direct responsibility for caring for older people. Training needs mainly revolved around technical skills and knowledge about the SAR and its functions.

Discussion

The current study explored the views and attitudes of care home workers regarding the implementation of robots (particularly SARs such as Pepper) in their workplace, after having seen Pepper in their workplace. Training needs in relation to working with SARs were also explored.

In line with previous research (Hebesberger, Kortner, Gisinger, & Pripfl., 2017; Melkas et al 2020), the findings of the current study showed that care workers had both positive and negative attitudes towards robots. Many participants responded positively and recognised the potential usefulness of SARs in the care home setting. Overall, this supports previous research (e.g. Stafford et al., 2010; Jayawardena et al., 2010; Louie et al., 2014). By contrast, some participants were resistant to the use of robots, because they found the robot frightening, or because they were concerned that the older people may also be afraid of it. In addition, participants identified that people from older generations (both care home workers and older people) may be less familiar with technology and therefore may be less accepting of the use of a robot. Similar findings were reported by Louie et al (2014). In addition, robots were seen as best placed working alongside carers rather than being carers in their own right, and participants suggested several ways in which robots could usefully assist them; for example, by providing companionship or monitoring the older people in the care home. This confirms previous findings (Hebesberger et al., 2015; Turja, Van Aerschot, Sarkikoski, & Oksanen, 2017; Zsiga et al., 2013). The current study contributes to the existing literature by extending the previous findings in this area: the findings have

highlighted the values which drive ambivalent attitudes of care workers about robots and SARs. For example, the concepts of person-centred care and patient safety were key values when considering the introduction of SARs, i.e. participants wanted to ensure that the introduction of SARs did not negatively impact on the care being provided. Participants also highlighted training needs relating to building competence and knowledge about SARs, and it could be argued that these may be driven by values of person-centred care.

Implications for future investigation and practice

The findings raise questions about the future deployment of SARs in social care settings such as care homes for older people. One key issue is what the introduction of robots means for the future of social care, and how SARs can be integrated into the social care system. In this study, comments suggested that participants envisioned SARs working alongside them in their care home worker role, rather than the SARs taking full responsibility for caring for older people, which means that implementation would need to be designed such that SARs are trained assistants to care home workers. However this presents a dilemma, given the projected future demand for care workers due to an ageing population, coupled with anticipated shortages of workers within the social care workforce. If there are fewer workers, they will likely have greater workloads, including management of SARs and decision-making about which types of tasks would have to be delegated. This is something which requires further consideration and planning and could be explored in future research.

Recommendations

We recommend that any implementation plans for SARs should involve consultation with older people and care home workers. Training of care home workers should include a number of components: 1) basic information about the robot's design and functionality 2) technical skills including operation and maintenance of the robot; 3)

assessing and managing risk; 4) skills in communicating with the robot and facilitating communication between the robot and the older person. Moreover, training should also involve a reflective component, as well as discussion of ethical issues related to the use of robots in care.

Strengths and limitations

One strength of the study was that it took place in a real-life care home setting rather than in a lab, and participants had the opportunity to actually see the SAR and experience what it would be like to have it deployed in their own working environment. The main limitation of the study was the language fluency of some interviewees, which may have affected their understanding of the questions and the depth of the responses. In future studies, interviews and analyses could be conducted in the preferred language of the participants or with the help of an interpreter. In addition, participants spent a relatively short amount of time with the SAR and it would have been useful for participants to have a longer period of interaction in order for them to have more time to consider how it could be implemented in the care home. In future studies, the implementation period could be longer, and a range of data collection methods could be used including observation.

Conclusion

In conclusion, this study explored the views of care home workers about the use of robots in their work environment, and the training needed to help them work efficiently with a SAR. Participants highlighted some important issues including principles of person-centred care which influenced their views about the use of robots in the care setting. Participants saw the usefulness of robots in this setting if they could help to improve the care already being provided. These factors should be taken into consideration in future research on the implementation of robots in social care settings such as care homes for older people.

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