

Technology in care for the aged in Japan - two case studies

Okuizumo town profile

Population & density: 15,000, 40/km²

Area: 370km²

Location and terrain: mountainous area in eastern Shimane prefecture, west Japan

History: formed on March 31, 2005 from the merger of the towns of Nita and Yokota



Case study 1

Okuizumo town's video phone and call centre system

Japan is one of many developed countries that is facing serious problems due to an ageing and shrinking population. The problem is magnified in remote towns and communities where a severe lack of people of working age, combined with an ever growing number of elderly people requiring specialised care causes major strains on social welfare systems. Okuizumo town in Shimane prefecture is one such town attempting to come to grips with the demographic change. The town's population of 15,000 has shrunk by 20 percent since 1980, a trend that is predicted to only continue. 35 percent of people are 65 years old or over, 21 percent are 75 or over, more than 15 percent require care, and one in four households is a single occupant aged 65 or over. To add to the problem, many people live far from the closest neighbour or shop, and there is a shortage of social care workers.

Video phone and call centre

Since 2008 Okuizumo town has embarked on a 93 million yen (£580,000) programme to set up video phones in 70% of all households of people aged 65 and over by March 2010. 600 video phones have been set up so far with another 300 installations planned for the remainder of 2009. The multi-function video phones connect to a small call centre located in the Health and Welfare Division of the Okuizumo town hall where personnel can give support to the users of the service in their everyday life. It also enables home nursing and home health care support, allows users to live

more independently, and lowers the number of people who move into care homes.

In Japan, as in many countries, many older people tend to shy away from confusing and intimidating new technologies. However the multi-function video phones have been designed specifically for an older user group and can be operated with ease via a touch panel display. As well as being installed in homes, they are also being set up in various social care facilities around the town.





Above: the easy to use touch-screen display lets users make video calls to the call-centre, or inform them of their condition through the "well-being confirmation" function.

The call centre is connected to an optic fibre network and enables Health and Welfare Division personnel to keep a watch over the health and well-being of the users, allowing them to lead a normal life. It also frees up the resources of and reduces the burden on nursing and medical care centres as they do not have to handle every call directly. In fact, many calls are from lonely people simply wanting to have a chat.

As video phones allow for visual, not just audio, interaction, it gives a more detailed picture of the person's condition. The call centre personnel regularly call the users of the service, which not only confirms their well-being, but also helps to build a relationship of mutual trust. This also ensures that the person will not hesitate in contacting the call centre when a real problem does arise.

Providing a service with video phones

Users can bring up a phone directory on the screen of the video phone, and can choose who they call by making a selection on the touch panel. They can then contact either the call centre or other people who have volunteered to take calls, and can talk about everyday life. Also on the video phone is a "well-being confirmation" function to let the call centre know that things are fine, and an "emergency call" function for when an emergency situation arises.

There is also a device attached to the video phone which can measure the person's vital health statistics. The device takes a reading of the blood pressure and heart rate and sends it to a data centre. A graph is also automatically generated from the data and displayed on the screen, making it easy for people to monitor their own health. If they notice something out of the ordinary they can contact the call centre right then and there via the video phone and discuss with the consultant whether they should go and see a doctor.

Users of the service can have groceries and other daily necessities delivered to their home from participating shops via the video phone touch panel. Order details are sent to the shops via video phone or email.

Okuizumo town is one of many examples of a local authority utilising technology to deal with the effects of demographic change in Japan. The video phone and call centre service helps to relieve strain on social welfare services by reducing the need for older people to physically see a nursing or medical care professional. It also provides an outlet for people who might otherwise lead lonely lives, and allows them to live life more independently than they would being confined to a care home.



Above: an Okuizumo resident demonstrates the video phone set up in her home.



Above: Health and Welfare Division personnel taking calls at the call centre.



Case study 2

Paro - the therapeutic robot harp seal

The falling birthrate and ageing population in Japan means that there is an ever growing increase in the number of people that require nursing care, and a continual decrease in number of people in younger generations to provide such care. One of the big issues to come out of this is how to support the independence of elderly people to reduce the social costs of old age care and how to reduce the overall degree of care required for an elderly person. Caring for elderly people with cognitive disorders such as dementia costs local authorities in Japan 4 million yen (£25,000) per patient per year. Also, giving direct hands-on care to these patients increases facilities maintenance and labour costs which is further magnified by the labour shortage. To help ease this strain on resources, a number of care robots are in development. One robot, which has already been put to practical use is Paro, a therapeutic robot baby harp seal.

World's "most therapeutic robot"

Humans have been keeping animals as pets for companionship for thousands of years, but only in recent years have animals been used as a specific form of therapy to help improve the physical, social, emotional, and cognitive functioning of people. Of course, with real animals comes problems such as allergies, infections, bites and scratches, so keeping an animal in places like social care facilities and hospitals can prove difficult. Paro is a "mental commitment" robot baby harp seal for therapeutic use, developed to interact with people and increase their emotional attachment. Paro acts as a companion for those who cannot take care of real animals and those who live in places where pets are forbidden. He costs 350,000 yen (£2200) for the basic model, or 420,000 yen (£2600) for the robot plus a three year support service. The main aim of Paro is to reduce the degree of care required for elderly people - to decrease the overall social costs of care.

Paro is said to have a therapeutic effect on patients with cognitive disorders, and according to the Guinness Book of Records he is the world's "most therapeutic robot". Development on Paro began in 1993 and sales began in March 2005. To date more than a thousand models have been sold. Paro can learn to behave in a way that the user prefers, and to respond to a new name. When Paro is stroked, he will remember the action he performed that resulted in him being stroked. If Paro is hit, he will remember his previous action and will try not to do that action again.

A real baby harp seal spends most of the day sleeping, but Paro has a diurnal rhythm of morning, daytime, and night, so he is active during the daytime, but gets sleepy at night. He can express feelings such as happiness and surprise, and reacts to human voices by crying out. When he is stroked he moves from left to right. Paro's artificial fur has an antibacterial, soil-resistant finish, and he is fitted with electromagnetic shield so he can be used by people with pacemakers. He is 57cm long and weighs 2.7kgs and is equipped with touch sensors, whisker sensors, light sensors, a microphone, temperature sensors, and head sensors. He is fitted with movement actuators in his eyes, neck, front legs, and fin, and runs on a nickel hydrogen rechargeable battery which is charged through a dummy in his mouth. He can operate for up to an hour and a half on one charge. Also, each model is hand made so the face of every Paro is different.





Above: getting to know Paro



Above: governor of Toyama prefecture (right) meets with Paro and Dr Takanori Shibata, Senior Research Scientist, AIST Intelligent Systems Research Institute

such as dementia and Alzheimer's disease. The brain waves of elderly patients with cognitive disorders who were asked to interact with Paro were measured before and after the interaction for analysis. Out of the 14 people who participated in the study, 7 (50%) experienced an improvement in brain function. There have also been a number of cases worldwide that have shown that robot therapy involving Paro in centres for elderly care produces expressions and behavior in the patients that is similar to those of healthy people. Interaction with Paro improves brain function in elderly patients with cognitive disorders and helps prevent the development of such disorders in healthy people. Furthermore, subjects who expressed a positive attitude towards Paro were found to show a greater response to the therapy.



Above: Toyama city, home of Intelligent System Co., Ltd, the company that manufactures Paro

Local authority initiatives

Nanto city, Toyama prefecture, the home of the company that manufactures and sells Paro, introduced him to eight nursing homes in May 2005 with the aim of preventing dementia and other cognitive disorders in the elderly residents. The Toyama prefectural government officially endorses Paro by permitting the use of the official 'Toyama Products' label.

In Tsukuba city, Ibaraki prefecture, home to the research institute that designed the robotics, Paro is being used in robot therapy to help its residents with depression and motivation, increase conversation and interaction, lower anxiety, and also reduce the stress of the centre's care workers. In 2007, the National Institute of Advanced Industrial Science and Technology, also located in Tsukuba city, provided a 50% rebate for elderly care centres that wished to purchase Paro. The local authority itself also bought a Paro and uses it to promote Tsukuba's achievements in robotics research at industry fairs.

In November 2008, the Japanese ambassador to Denmark announced a plan to introduce Paro into 1000 elderly care homes in Denmark by 2011. The Netherlands and Germany have also both introduced Paro into elderly care homes, and as at April 2009 there are over 1200 Paros in 20 countries being used around the world.

Effects of Paro on patients with cognitive disorders

The National Institute of Advanced Industrial Science and Technology, and Brain Functions Laboratory conducted joint research involving Paro to discover the effects of the robot on improving the brain function of patients with cognitive disorders

For more information on these case studies or on any other area of local government in Japan please contact the Japan Local Government Centre by the contact details provided.

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