

THE VALUE OF DESIGN RESEARCH

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Design research as core competency for exploring new market opportunities

HOW DESIGN CAN IMPROVE THE WELL-BEING OF ALZHEIMER PATIENTS THROUGH INNOVATIVE FLOORING SOLUTIONS

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ABSTRACT

Alzheimer's disease has become a public health policy priority for a large number of European countries. Given current projections¹, it will be a major challenge to develop specialised facilities with appropriate interior design and flooring for patients. While suitable medical treatment may be central to quality of care, a comfortable environment is also closely linked to patient well-being².

The design management of Tarkett, a worldwide leading flooring solution provider, researched the sensory impact and functional issues of flooring design in medical environments, especially in Alzheimer's facilities.

The research methodology consisted of the observation of health facilities and interviews with medical experts (gerontologists), Alzheimer's facility directors, and colour and light experts in Europe. The project was entirely managed by Tarkett's design department who translated field experiences and expert advice into recommendations and living space proposals, and published a report about the research findings and an overall solution for floor design in Alzheimer's facilities.

Major design outputs were design recommendations and new floor solutions. These guidelines are of great value for the company in advising on and selling adapted flooring solutions and contribute at the same time to address major society challenges related to a worldwide ageing population. They represent a further step for the design department in bringing value through user-centred design and not just through aesthetics. How has the design work been received? Three years after publishing the report, the design department started to look for feedback and measuring the value of this research. As such, it is defining and measuring the indicators that will be useful in improving design management.

Keywords: aged care, user centred design, design research, Alzheimer disease, society challenges

1 CONTEXT: A COMPANY IN SEARCH OF NEW MARKET OPPORTUNITIES

1.1 ALZHEIMER'S DISEASE, A NICHE MARKET TO BE EXPLORED

Directly correlated with the general ageing of the population, Alzheimer's disease has become a public health policy priority for a large number of countries around the world. Given current projections, it will be a major challenge to develop specialized facilities fitted with the appropriate interior design and flooring for patients with this disease. While suitable medical treatment may be central to the quality of the care, a comfortable environment is also closely linked to patient well-being.

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1.2 A RARE CONTEXT FOR A DESIGN PROJECT, INITIATED BY THE MANAGING BOARD

"How can design improve living spaces for those affected by Alzheimer's disease" this question came to the attention of the managing board of Tarkett. The company was active in several sectors including housing and education, and had significant market share supplying to healthcare and aged care facilities.

Vinyl flooring is widely used in hospitals, and is appreciated for its durability, hygienic properties and ease of maintenance. An ageing population and the probable future rise of dementia will represent new challenges and opportunities for growth for the flooring industry. As part of a strategic plan for Tarkett EMEA, the senior management tasked the design department with exploring opportunities and solutions for Alzheimer's facilities in Europe.

Market evolution as the Alzheimer's disease and the ageing demographics is providing a rare context to innovate (Slater and Narver, 1994)³. An opportunity that the management was able to identify as a way to explore new flooring solutions. Design processes help companies develop innovations that produce high user value as well as economic value and business value. (Vijay Kumar, 2009)⁴. In this case design also offers tangible solutions to larger society challenges that are likely to dominate the issue of overall ageing populations.

1.3 A DESIGN RESEARCH QUESTION

The initial request was brief: to innovate in Alzheimer's facility through design solutions. While ideally, the value of design should also translate into increased sales, in aged care and, more broadly, the health care sector in general.

The design management thus oriented the design research towards patient's well-being and more broadly usage improvement of Alzheimer's facilities through design. Innovating is key to companies who expect growth, but as expressed by Dr Bettina von Stamm "we must shift from 'innovation for growth' to 'innovation for wellbeing'"⁵.

There is a real concern about user's wellbeing in health facilities, thus good design can favor the healing process. A recent report, *The Psychological and Social Needs of Patients*, issued by the British Medical Association is calling on healthcare organizations to prioritize design in all future building projects: "good design can affect recovery times, and bad design can cause anxiety, delirium, high blood pressure and increased use of painkillers"⁶.

2 DESIGN RESEARCH FINDINGS AND PROCESS

2.1 ALZHEIMER'S FACILITIES FOCUS GUIDE

The design research findings were translated into practical recommendations, and published in a report which was widely distributed within the company and its international networks.

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This report, in the form of a brochure, aims to provide an overview of the impact of the overall care environment on Alzheimer's disease, supported by expert opinions. It also suggests some ideas that should be considered in planning interior spaces adapted for the care of people with Alzheimer's Disease and, in particular, in the choice of flooring.

As a world leader in flooring solutions, Tarkett contributes its specific expertise towards understanding the role that designing interior space can play in the quality of life for patients suffering from this complex disease (Chaline & Bousahba, 2001)⁷.

2.2 INSIGHTS

The research brought the opportunity to explore several questions in regards to planning living spaces for Alzheimer's facilities.

As reported by Prof. Dipl.-Ing. Rudolf Schrickler, President BDIA, one of the experts involved in this research program: "Until now, interior design has always been developed on the premise of rational and visual considerations. This academic understanding of design and the intellectual attitude in architecture have made it impossible to seriously consider the so-called soft factors of well-being in addition to the calculable hard factors."

Why do we need Alzheimer specialized units? Numerous countries have responded to the growth in Alzheimer's disease by establishing Alzheimer plans involving the creation of specialist units. This reflects the need to provide long-term care for people with this disease who can no longer live independently at home or in the care of relatives. The construction of Alzheimer units has seen a renewed debate about the overall environment of these medico-social units to ensure that they provide the best response to managing the disease.

Creating an environment adapted to the disease, Alzheimer units must provide an environment answering the needs of the patient and care staff, as well as offering visitor comfort. These units must therefore be designed taking into account everyone's requirements and specific usage. The parameters should include: designs, colours, acoustics, lighting – with rules defined according to the function of specific areas such as bedrooms, corridors, communal areas and treatment areas.

Two major design orientations were identified by the research:

"Just like home". Interiors should be clearly organised to make patients feel that they are in a reassuring and familiar environment that's 'just like home'. This makes it easier for them to continue routine activities, keeps them safe and reassures visiting families. The idea of a familiar and comfortable environment is inseparable from the idea of more personalised spaces that enable patients to transpose their own landmarks into the Alzheimer unit.

"Open spaces that flow". To counteract the sense of being enclosed, flexible multi-functional spaces that offer easy access and enhance movement are recommended. It's important to design light, large areas open to the outside and

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with numerous points of interest that will encourage exploration and ambulation, while avoiding to isolate a building from the outside world.

2.3 IDEAS AND RECOMMENDATIONS

Colour, design, light and acoustics are the essential parameters to consider in designing an Alzheimer unit (Witucki & Twibell, 1997)⁸. It is important that the architectural design stage incorporates these criteria into the choice of flooring.

Flooring can be a decisive factor in spaces designed for people with Alzheimer's disease. It has real technical added-value and helps to provide Alzheimer patients with a suitable environment in terms of acoustics, hygiene and safety.

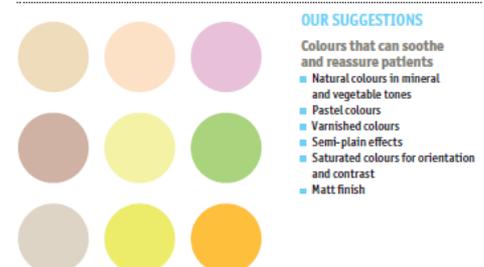
The flooring also offers added-value at a psychological and sensory level. In particular, colours and patterns can reassure patients and give them confidence, and also help to relieve the upset of a new environment by making them feel "at home".

"A good floor space for older people, and particularly those with dementia, allows and encourages activities, involvement, loyalty, comfort and ultimately identity in a positive way. People with dementia need to feel that every detail is designed to generate well-being. The floor is key to the environment." Prof. Dipl.-Ing. Rudolf Schrickler, President BDIA

2.3.1 **The role of colour**

Colour appears to perform an important function in how Alzheimer patients perceive their environment. Studies show that certain colours can cause behavioural problems (Mahnke & Mahnke, 1996)⁹. On the other hand, some colours seem to encourage a sense of well-being and help to create a setting that patients find reassuring. Colour can also be decisive in ensuring that an environment remains familiar to a patient, even as their condition evolves.

"Solid and contrasting colours make it possible to distinguish between the different zones of the unit and make it easier for patients to orient themselves – for example, by using an orangey colour for an activity zone." Prof. Cornel Sieber, Director of the Institute for Biomedicine of Ageing, Nuremberg University, Germany



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2.3.2 *The role of pattern*

Patterns on walls and floors are important in helping to create a comfortable and familiar environment in an Alzheimer's unit. However, some patterns can cause confusion in patients, while others create a sense of well-being by reminding them of daily life.

"Design for dementia patients has a radical impact on the understanding of interior design. It is no longer cognitive and intelligent interpretations that play the decisive role but emotional moments and psycho-social experiences. Factors of interior space perception, such as orientation, safety, movement, balance and recognition are now to be integrated in each phase of the interior design." Prof. Dipl.-Ing. Rudolf Schricker, President BDIA

OUR SUGGESTIONS

Patterns that prompt memories

We recommend patterns that recall familiar places, motifs that remind patients of home and comfort them. But it is important that designs take into account cultural differences between countries. Imitation wood works well in Nordic countries but not in Ireland; tiles and stone suit France but not Sweden where it suggests the outdoors. On a more general level, warm solid colours, small patterns and dots can be used because they reassure rather than disturb patients, as well as non-figurative patterns because they can't be confused with something real.



Figure 2 - Alzheimer's Facilities Guide - Pattern recommendations

2.3.3 *The role of acoustics*

Acoustic quality is an important element that should be carefully considered in designing an environment for patients with Alzheimer's Disease. Noise can cause problems particularly in the advanced stages of this illness, while an environment where sound levels are comfortable and reassuring can favour the well-being not only of patients but also care staff.

"Special attention should be paid to the acoustics in communal areas to prevent noise from resonating. It is also advisable to have special rooms available for dementia patients who make a lot of noise." Dr Xavier Cnockaert, Head of Gerontology, Beauvais Hospital, France.

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2.3.4 *The role of flooring in aiding ambulation*

Patients with Alzheimer Disease experience disorientation, particularly in the later stages of the disease. Because of this, it is essential to create a sense of familiarity and comfort that will make it easier for them to move between the different living spaces. The flooring has an important role to play in providing patients with spatial markers.

Colour contrasted and slip-resistant, different floorings can be chosen according to the type of room or movement, but also the specific needs of the patient and care staff. We recommend the use of slightly contrasting colours in patient rooms, and medium contrasts for communal areas. Pastel colours with little or no pattern should be used to avoid the risk of hallucinations. Flooring in a single colour is the best way to indicate ambulation areas. A slip-resistant surface is also recommended to reduce the risk of falls, because Alzheimer's patients often suffer from motor problems. Shiny finishes should be avoided as they can give the impression of walking on water.

"Markings on the floor can be used as a guide for ambulation and to mark out a route. The areas where the patient can walk and access points should be clearly marked." Prof. Cornel Sieber, Director of the Institute for Biomedicine of Ageing, Nuremberg University, Germany



Figure 3 - Alzheimer's facilities guide, corridor recommendations

2.3.5 *The role of flooring: a hygiene aid*

Urinary incontinence is a feature of Alzheimer's disease, so it is essential to choose flooring that is practical and easy to maintain, particularly in patient rooms and bathrooms. Certain colours should be avoided, including grey, brown, black and yellow. Light colours such as sky blue or neutrals (like beige) that give an impression of cleanliness are recommended.

2.3.6 *The role of flooring in emphasizing intimacy and memory*

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Alzheimer's disease is characterized by numerous memory problems. Flooring can be used to help stimulate memories and recreate a setting that patients find more familiar. Flooring has a role to play in recreating an intimate space in which Alzheimer's sufferers can feel comfortable and safe. This can be done by using designs that provide patients with familiar references. In practice, designs such as wood, traditional hexagonal tiles or square tiles can be a reminder of home and evoke childhood memories. This can create familiar surroundings that will help to reassure patients.

2.3.1 *The role of light*

Light management has an important role to play in managing the living experience of patients. Its function varies according to the time of day and should be adapted to suit the spaces where patients find themselves during waking hours but also according to the rhythm of their daily habits.

Insomnia is one of the most frequent psycho-behavioural problems to affect Alzheimer's patients. More characteristic, still, is the inversion of the wake/sleep pattern called the circadian rhythm.

We recommend using the building's orientation (north-south) to make the most of natural lateral and zenithal light, using special flooring in patient rooms to reflect light without dazzling, leaving on lights in ambulation areas at night and lowering lighting at the end of corridors to deter patients from wandering.

"It is extremely important to dissociate areas used during the day from those used at night. For example, in my Alzheimer's unit, the lighting is four times lower at night. There's natural light throughout the unit during the day, and night lights are used to lower the level during the night." Dr Xavier Cnockaert, Head of Gerontology, Beauvais Hospital, France

2.3.2 *Floor and light interactions: technical aspects to consider*

Measuring the interaction between lighting and flooring relies on three main factors: light resistance, reflection coefficient, and luminance (Bright & Cook, 2010)¹⁰.

— Light resistance. This is the flooring's resistance to natural light (UV). Any floor exposed to daylight (through a window for example) requires a good level of UV resistance. The light resistance of a colour is its ability to withstand the effects of light to retain colour without yellowing or discolouring. There are 8 levels of light resistance.

— Reflection coefficient. The reflection index describes the relationship between the quantity of light received and the quantity reflected. The NF X 35-103 standard recommends floors with a low reflection factor (between 30 and 40%) to prevent dazzling. The light reflective index is measured with a photometer and will vary according to the colour.

— Luminance. This is the luminous quality of a material. It depends on the source of light, the colour of the material (plaster reflects 85% of light rays while walnut only 16%), the texture (rough or smooth), the photometric capacity (what it reflects and what it absorbs), and the position of the light source in relation to the material.

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2.4 DESIGN RESEARCH TEAM AND PROCESS

The project was managed by the Design director who was supported by a design agency and experts with various backgrounds (lighting, colour and medical experts).

With the vision to explore how design could improve well-being among users of Alzheimer's facilities, the design management set up a design thinking process (Brown, 2009)¹¹. The iterative process explored questioning, observation, ideations, formalisation and testing of design solutions. In order to empathize with user's the team visited Alzheimer facilities and interviewed patients and their families. With several external supports, the insights were collected all around Europe in Sweden, Ireland, France, Germany.... Interviews with numerous gerontologists, professors, nurses ... who work directly with Alzheimer's disease gave precious indications on experiences and feedback on design issues.

This user-centred approach underlines the "why" of the design solutions (Laurel, 2013)¹², giving valuable arguments on innovative directions revealed by the research process. A research process that is despite two years of investigation still ongoing, with new questionings, observations, ideations and testings added to the initial document.

3 IMPACT OF THE DESIGN RESEARCH PROJECT IN TERMS OF DESIGN MANAGEMENT

This project has changed the traditional mission of the design, giving the opportunity to address prospective usage related outcomes rather than aesthetic aspects. For the Design director, this research has been an opportunity to increase the level of activity and to evolve her role. This has helped to step outside the design department's role as a service provider (that designs and develops products) into a more strategic role, according to the DMI's Design Value Scorecard¹³.

What could be the measurement tools that would be useful to the design management in order to prove the value of the research and therefore have the possibility to continue the research process?

3.1 CUSTOMER SATISFACTION SURVEY

One way is to conduct a customer satisfaction survey, for internal customers (sales network, marketing managers) and external customers (users, specifiers).

A brief internal survey was organized to collect feedback on both the use of the Alzheimer's facility guide and the colour training sessions. These training sessions were developed in order to raise design culture in the company.

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The result of the survey indicates that the research insights and colour training expertise are well perceived internally. Respondents indicate they use the report in their presentation and tenders. Alzheimer's project has been helpful to position Tarkett as an expert in these specific domains.

This internal feedback shows teams' interest in having qualitative design content that increases the value of the relationships with others over the short term and could bring about business growth in the long term. This process positions Design as one of the strategic actors in the company.

Preliminary external customer surveys among specifiers (architects) and Alzheimer facilities directors show strong interest in having Tarkett taking part in gerontology pilot projects. This recognizes the value of the expertise acquired through the design research and recommendations.

3.2 THE FOUR PERSPECTIVES OF THE BSC METHOD

In order to go further, the use of the design value model based on four powers (Borja de Mozota, 2006)¹⁴ identifies new perspectives to monitor design's strategic role. This first approach of the model opens up questions about defining and setting up specific measurement tools.

3.2.1 Value for the customer

Patient: living in a healing environment, providing wellbeing, lowering anxiety and other negative effects of the disease.

Measure: Customer satisfaction survey

3.2.2 Value for the process

Setting up user-centric and expert-based design methodologies, creating context and scientific arguments for design.

Measure: New expertise to value floor solutions (color, light ...)

3.2.3 Value for the personnel

Improving design knowledge and arguments that shifts the traditional commercial relation to a more valuable expert relationship.

Working through design with experts in various fields.

Measure: Internal feedback

3.2.4 Value for the shareholders

Design as a resource for all stakeholders to value wellbeing and human factors of floor solutions in a complex and competitive environment.

Brand awareness

Measure: Press releases, brand reputation survey

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4 CONCLUSION

The experience of the Alzheimer's project shows that companies can also initiate and conduct research projects. Unlike university or design school professionals who are used to conduct research, for in house designers these projects can be a tough challenge. Current measurement tools have to shift from short-term to long-term indicators. This represents a good opportunity for companies to favour the long term design research period for business benefits.

Design research projects change the perception of design expertise and competences inside the company and allow global organizations like Tarkett to use their know-how and expertise to make tangible contribution to pressing society challenges.

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