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Incorporating "care" into design education through games

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5. Incorporating “Care” into Design Education Through Games

by George E. Torrens, Ying Jiang, Hua Dong

Abstract

“Universal Care” can be regarded as the ultimate goal for Universal Design. It implies that design takes care of not only the user, but also the environment, and all other people directly or indirectly influenced by the design. However, “care” as a concept is not necessarily recognised or incorporated in existing design education.

In order to understand what “care” means for design education, the authors have developed two models: the “care” model addresses an Interior Design context, mapping the designer, the client/design, and the environment, to care-giving and care-receiving roles; the “relations” model shows the overlapping between Client, Design object, Design and Environment, for a product design context.

Subsequently two case studies (“My home” and “VI Boccia grid”) were presented to illustrate how the models could inform Interior Design education and accessible product design innovation. The game “My home” enabled the Interior Design students to have a detailed conversation about the client’s needs and family relations, thus helping raise the designer’s awareness of care. The “VI Boccia grid” is a game designed for visually impaired people, and the whole design process highlighted issues critical for the success of accessible product development. Design educators, students, design researchers and practitioners can learn from the two models and the two case studies when applying “care” in their design process.

Keywords: *Interior Design, Care, Game, Sustainability, Universal Design.*

5.1 Introduction: Creating a “Care” Model

“Universal Care” in a design context implies that design takes care of not only the user, but also the environment, and all other people directly or indirectly influenced by the design. It transfers caring from the designer to the user (through

“the design”) and makes people be more caring to their environment and to other people. This can be regarded as an ultimate goal for Universal Design.

However, existing design processes, design purposes and design methods do not necessarily embrace the core value of “Universal Care”, or “caring for all”. Although many designers have been educated to “design for needs”, they tend to treat “meeting needs” in isolation, and created designs with negative effects. e.g. lack of sustainability or even dangers for “unintended” users. The impact of design can be revealed by viewing design as an act of creation: everything that is created requires something else to be changed, destroyed, or depleted (Fry, 2009), leading to an unsustainable future. Therefore, taking “care” is important for design, and only with “universal care” can we develop ethical, inclusive and sustainable designs benefiting all people and the environment.

While “care” as a concept is widely used in other disciplines (e.g. Nursing), it is not well-recognised in design. In order to understand how the notion of “care” is perceived and practised in design, the second author of this paper conducted a pilot study in Hong Kong, involving 16 interior designers, 17 clients of various Interior Design projects. The main finding was that “care” had been understood and implemented at different levels by interior designers, consciously or unconsciously. A model was developed to help describe different levels of care in a typical Interior Design project.

The model is composed of four key elements, i.e. the designer, the client, the design (i.e. interior space), and the environment (Fig. 5.1).

At the lowest level of care, the designer only cares for self and no other elements; at a reasonable level of care, the designer cares for the design, and the design cares for the client; and the optimal level of care is achieved through the mutual interaction between the four elements, achieving “complete care”. The

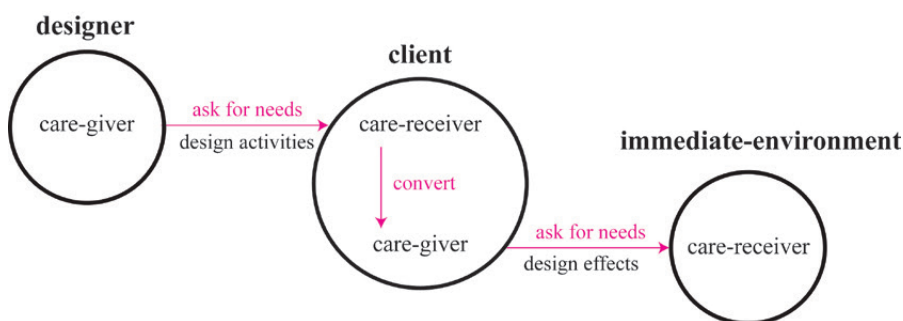


Fig. 5.1 - The “care” model. Modified from Jiang (2019, p. 133)

process of transforming the designer to a caregiver who turns the client/interior space from a care-receiver to a caregiver is regarded as “Universal Care”, an ethical, inclusive and sustainable design approach.

5.2 “My Home” Case Study: Developing and Evaluating a Game for Interior Designers

The proposed care model inspired us to develop a new way of educating interior designers: an interactive game “My Home” (Fig. 5.2).

“My Home” consists of three components, i.e. a map of the home space (typically with a sitting room, a kitchen, a bath room, several bedrooms and storage spaces), a set of daily activity cards (e.g. cooking, bathing, watching TV, dining), and colour labels of family roles (e.g. mother, father, son/daughter, grandparent). The game is played by pairs – typically there is a designer role and a client role within the pair (The pair may have two students or more, as long as they are divided as two parts: “the designer” and “the client”).

First, the pairs are introduced the rules of the game and the method of play. The students who play the role of the clients are asked to fill in their family members’ basic information, to place the coloured labels on the family tree provided; each colour corresponding to one family member. In addition, they are also asked to briefly report their family members’ habits and “likes and dislikes”. Second, the paired students are asked to pick a daily activity card in alternative turns until each student had 8 cards (half of the set). Then, one student draws



Fig. 5.2 - The “My Home” game with its components (Jiang, 2019, p. 203)

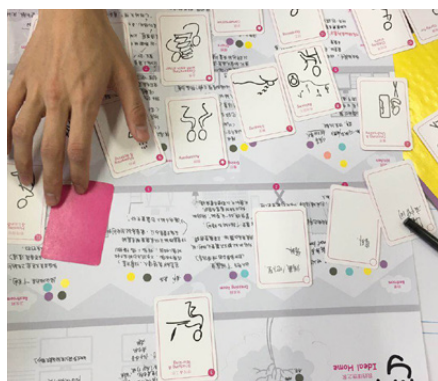
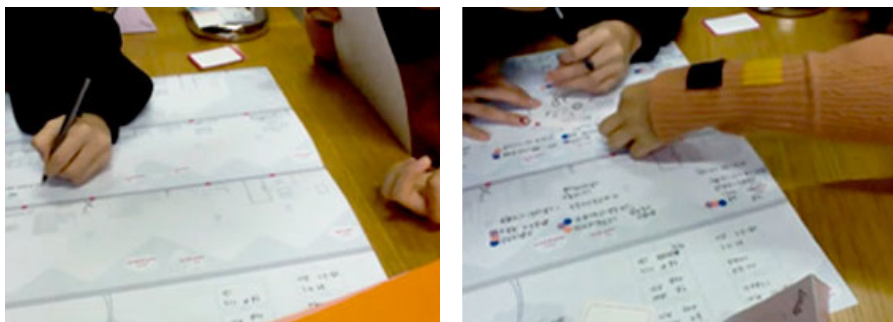


Fig. 5.3 - A piece of completed map and daily activity cards (Jiang, 2019, p. 209)

a card from the paired other, place it on the map, and start to have a conversation over the specific activity displayed on the card. When the game is over, the map will be filled in with notes and sketches (Fig. 5.3).

During the process, the students will discuss a range of issues (prompted by the cards, roles and spaces), developing their understanding of the real needs and the relations between people involved in the future environment, thus becoming more aware of the context and more prepared for addressing the needs, the relations, and the context. The core value of this game is to support the “designer” to help the “client” care about their families and environments. During the game, the “client” has the chance of becoming a caregiver.

The game “My Home” was tested with three groups of interior designers through a workshop (Figs. 5.4, 5.5). Before the game, the participants were interviewed about their understanding of care. During the game, each pair of the students (Participants A and B; Participants C and D; Participants X and Y) was observed through video recording (upon permission) and notes taking.



Figs. 5.4, 5.5 - The game evaluation workshop (Jiang, 2019, p. 211)

The recording included the conversations between the participants, their interactions during the game, and text notes and sketches. For example, Figs. 5.4, 5.5 show the recorded interaction of one group, and their map at the start of the game (on the left, almost empty) and near the completion of the game (on the right, almost full). The conversations were fully transcribed.

After the game, the participants were interviewed again to see whether their understanding of care had been enhanced through playing the game. Those who reported an improvement were asked further questions to understand the reasons. The interviews before and after the game were voice recorded (upon

permission) and fully transcribed into texts. The text transcriptions were emailed to the participants for checking accuracy.

The comparison between the interviews before and after playing the game suggests that four out of the six participants had an enhanced understanding of care after playing the game, and the other two indicated little change of understanding. The changes were reflected in three aspects: i.e. the subject, the scope and the context.

1. The change of the subject of care: from “artefacts” to “people”. Participant D regarded “care” as designers’ providing convenience to people’s lives through their design. After playing the game, she started to understand care as caring for people; and design does not only provide convenience to people but also helps improve people’s relationships.
2. The change of the scope of care: from “special groups” to “all”. Before the game, Participant X thought the subjects of care were disadvantaged groups such as disabled people, elderly people, or children. After the game, he realised that everybody needed care and the subjects for care should be beyond special groups.
3. The change of the context of care: from “designing” to “living”. When the student participants were asked about their understanding of care, they tended to answer this question from the perspective of design, and to interpret care from their knowledge of design. After playing the game, they tended to understand care within the context of home and the “living” contexts.

Universal Design has principles and methods, but the key is to make people (clients, designer and users) be more “caring”. The “My Home” game has demonstrated that it is possible to make the clients and the designers to be more aware of the issues of care in relatively short time, a positive step towards “universal care”.

5.3 Associating the “Care” Model with Accessible Product Design and New Product Development

The “care” model (Fig. 5.1) was proposed in the context of Interior Design. By associating the four key elements with product design, a “relationships” model was developed (Fig. 5.6), with reference to the relationships between assistive technology and design disciplines (Torrens, 2018, p. 67). The “relationships” model suggests the complexity of developing assistive technology

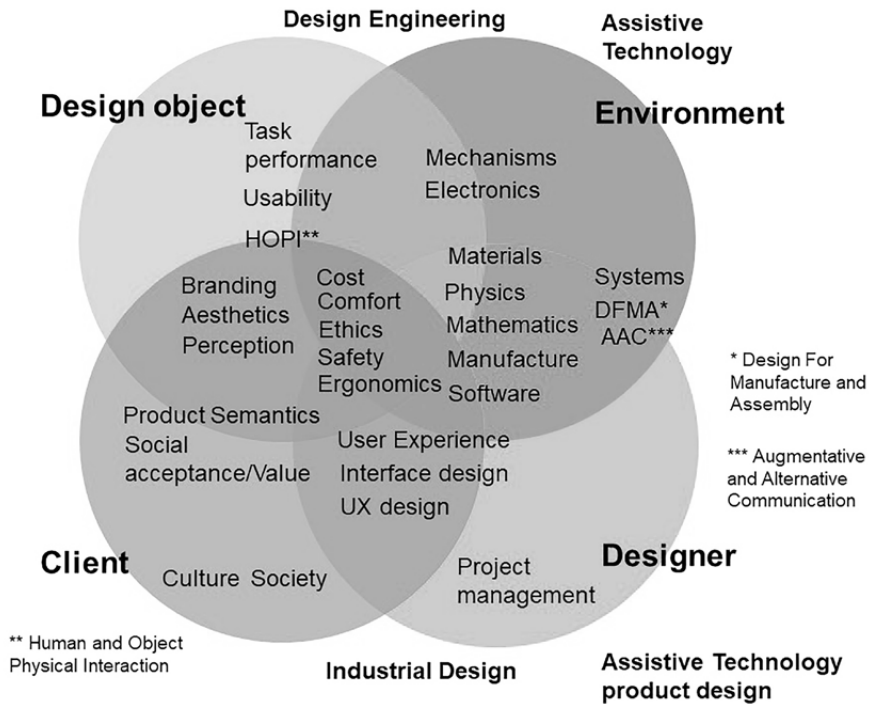


Fig. 5.6 - The “Relationships” model: Client, Design object, Designer and Environment. Modified from Torrens (2018, p. 67)

products, even without including design management. The standard for Inclusive design, British Standard BS7000-6: 2005 (BSI, 2005), provides details associated with design management.

Fig. 5.6 provides a better understanding of the point of application within a conventional new product development model. The Universal Method of Design provides a simplified design and development process (Hannington and Martin, 2012). The “care” approach is applied primarily during Phase 1-3 and Stage 1-5 of conventional new product development processes. The box at the bottom left corner of Fig. 5.7 specifies methods and procedures associated with Universal Design, which is based on the authors’ many years of accumulated knowledge in the field. These methods and procedures help designers to be more sensitive to users’ needs and become more “caring” in the research and design process.

A Universal Design approach has a number of defining attributes:

- a. it is participatory and inclusive, involving all actors in the process;

- b. it is holistic in scope that includes some elements of systems analysis and engineering;
- c. it is applied within a social model of assistive technology product and service design;
- d. it is multi-sensory in the communication of all aspects being described.
- e. it offers multiple outcomes with consequences beyond the immediate human scale interface.

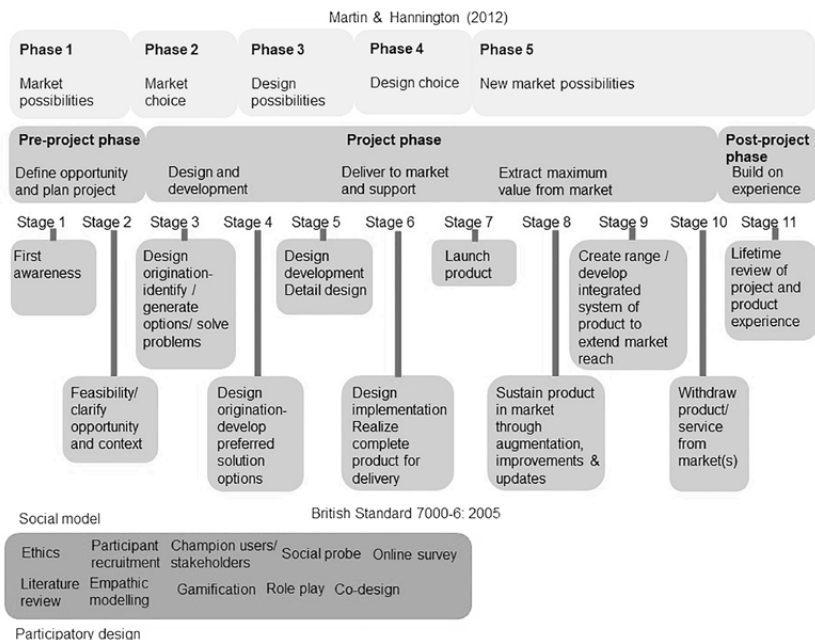


Fig. 5.7 - Contexts and specifics of Universal Design. Modified from Torrens (2018, p. 70)

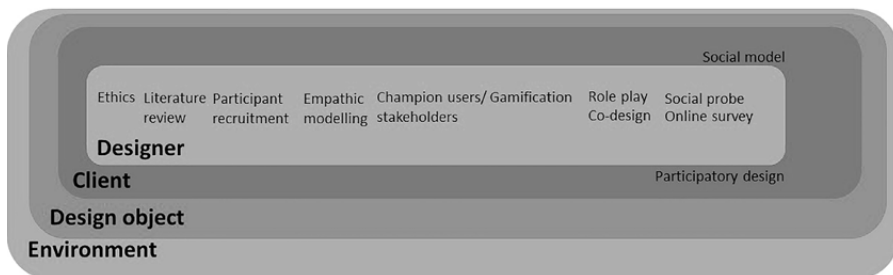


Fig. 5.8 - The “care” toolkit for designers

Fig. 5.8 provides more detail of the research and design methods and tools that make up the care approach in the product design context. An aspect that encompasses the care approach is ethics. Eliciting requirements from clients/end users of the design outcome; and, the additional consideration of what the design outcome may do to the wider physical and social environment demands a clear ethical standpoint. Two other key aspects that are critical to the effectiveness of the approach are participant recruitment, etiquette and interpersonal skills. The following case study describes these aspects.

5.4 “VI Boccia Grid” Case Study: Developing a Game for Visually Impaired People

In 2010, funding was provided by Sport England to develop inclusive sports products for Visually Impaired (VI) people. One of the products developed was the VI Boccia grid. The inventor of VI Boccia, Mark Beeby, a sports coach in the UK, had been developing a training programme to enable people who had visual impairment or were blind to be able to play the inclusive game Boccia. The Paralympic sport Boccia is a form of French “boules” played with sand-filled leather balls rather than on an area of sand. Mr Beeby had trained a small group of people who were visually impaired to effectively throw the balls to a line and length. He had developed coaching drills to overcome their sight loss and enable the VI players to play effectively against sighted opponents. However, there was an issue with playing the game more strategically. VI players needed some way of perceiving the relative positions of their balls and those of the opponents to the “jack” ball. Mr Beeby had devised two prototypes prior to the



Fig. 5.9 - VI Boccia grid early prototypes alongside the initial test-bed prototype 2010 (on the right)

project starting: a metal baking tray using magnets and a “pin-board” of a cork base covered by an embossed paper representation of the Boccia court using graph pins to represent the balls (Fig. 5.9). He approached the Loughborough Design School to develop a more effective grid.

Many methods and tools from the toolkit (Fig. 5.8) were applied in the design process, e.g. literature review, Co-Design, champion users, ethics, participant recruitment, and modelling.

Literature Review. An initial literature review was done to define the scope and boundaries of the product design:

- primary medical conditions that result in visual impairment or blindness and associated conditions that result in poor balance, tremor, learning difficulties or other compounding impairments;
- number and age of adults and children affected in the UK and Internationally, this provided with a potential market size in different socioeconomics categories;
- associated safety standards, industry guidelines and competition rules associated with the VI inclusive sports product and game;
- associated medical treatments or rehabilitation therapies that may affect the perception or use of a new product;
- existing similar products or those already used in Boccia, such as Boccia balls, measuring jigs and ramps, that may affect how the grid is used;
- where the game would be played;
- the cost of other equivalent or associated equipment or products.

The results of the literature review indicated the medical conditions in younger people were often associated with congenital conditions, with VI or sight loss from birth. In older sections of the population, VI or blindness were due to lens degradation from Ultra Violet sunlight exposure, injury, or associated conditions such as diabetes. There were around 30 Boccia clubs in the UK at that time, with approximately 300-600 players. Boccia was extensively played in special education schools. In the UK there were around 1,200 schools at that time. A realistic estimate was that there was a market in the UK for around 120 units. There were no similar products on the market against which to price the product; only the two prototypes existed. However, a set of Boccia England endorsed balls cost around £120. General British and European standards for product safety were the closest to the performance criteria for the product.

Conventions for haptic reading formats that were likely to be known to the players were Makaton (2019) and Braille (RNIB, 2019). The level of fidelity of

sensory perception relating to braille reading was used as a basis for the scale and proportion of the markers representing the balls on the grid. This was a height of 1-2mm and a smallest spacing between asperities being 0.5mm. The VI classifications for Paralympic sports were used to further characterise participants (Paralympic movement, 2019).

Co-Design: a team of three special education sports coaches, one academic industrial designer and four undergraduate industrial designers worked on the initial project to produce a batch of five grids, with a master's graduate level student involved in the subsequent development for manufacture of a batch of 100 units. The subsequent development was supported through internal University enterprise funding.

Champion Users: there were two champion users who provided the majority of feedback on the first prototypes and those subsequently produced by the design team.

Ethics: before communication started between stakeholders and design team, ethical approval for the project was obtained. Using an ethical approach to research and design activities ensures the safety and well-being of the people taking part in the activity, and the people running the activity.

The design and research validation activities were planned within the constraints of ethical guidelines. As a larger organisation who takes part in research involving human participants the University had a designated group or committee to review procedures (the recipe) used within any activities involving human participants.

This group considers a number of issues within a proposed project or study:

- aim and objectives of the human-based activity, the research questions answered (is the work needed?);
- awareness of vulnerabilities of participant and activity operator/investigator (do no harm physically or emotionally);
- working with young people and children (presenting information they can understand and involving guardians or advocates);
- information for the participant regards the purpose of the activity;
- a consent form to enable the participant to positively confirm involvement;
- making payments to participants (including, travel and expenses, inconvenience);
- data protection (how the information will be stored, used and for how long);

- rigour, respect and responsibility of the operators/investigators (all potential issues or circumstances considered, including cross-infection, preparation between participants and avoiding bias);
- invasive/non-invasive (taking blood samples, or just looking at information);
- appropriate health and safety measures, including aftercare (sub-maximal exercise, food, water, hospitality, showers, cleaning, and appropriately qualified medical support).

There are a number of detailed references that provide guidance on the ways in which both participant and research operators can be safe guarded and provide templates for an ethical approach to mixed research methods (Cohen, Mannion and Morrison, 2007, pp. 51-77; Wilson and Corlett, 1995, p. 87). In this case, there were a series of challenges to address. These included:

- digital ethics consent forms to enable visually impaired/blind participants to read the planned activities. The interaction with prototype products was explained in the participant information sheet along with an explanation of why the study was being done and what would be done with information collected from them.
- Etiquette of participant interviews; the designers verbally introduced themselves when they entered a room with participants; not touching, holding or physically moving the participant without first asking and gaining permission. Enhanced verbal descriptions and explanations that include orientation and distance, which would often be given through gestures, such as pointing.
- During interviews, researchers sat at 90 degrees to the participants and below eyeline to ensure a non-threatening or assertive posture.

Participant Recruitment: for vulnerable groups, such as children or adults with learning difficulties, the participant information sheet (PIS) and recruitment flyer (which would be a summarised version of the PIS), would include images, possibly a scenario of the protocol being applied, and emoji symbols, such as happy or unhappy to help the participant indicate their preferences. An additional PIS would be made available for the Guardians or Advocates of the participants.

Online special interest groups and internet marketing have helped in accessing the previously difficult groups and markets. If, for example, Facebook is being used to recruit participants the participant information sheet and ethics consent form should be fixed on the front page, to enable those who are considering taking part to make an informed choice.

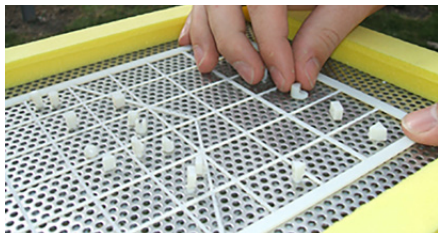


Fig. 5.10 - Prototype marker pins and grid



Fig. 5.11 - VI Boccia grid designs

Recruitment of participants who are willing and able to engage for the whole project is time consuming and challenging. Sports product research and assistive technology (AT) development are good examples of “niche” markets (Torrens and Black, 2011). The champion users provided the basis for initial cycles of development, which reduced the time in recruitment of individuals who would be actively involved throughout the project.

Recruitment for the second phase consensus seeking was made straightforward through working with a Sports College and using the opportunity of a Regional Boccia tournament locally to recruit participants. As there were no images or video taken, recruitment was done when players for the Boccia tournament arrived. Parents, Guardians and advocates along with players were given the participant information sheet document and asked to sign a consent form. A tip here is that lead researchers must make the initial links with Charities or support groups who are the likely beneficiaries of the design outcome before trying to recruit directly from the population. This sequence of recruitment will also engage a wider group of stakeholders in the form of specialists (in this case healthcare and Visually Impaired/Blind occupational and teaching) within each charity. If it is solely a commercial project, some financial payment would be expected for the participants. Since this project was a social impact project, participants were willing to take part without reward or compensation for the time and inconvenience.

Modelling: the feedback from Champion users was used to check the scale and proportion of the marker pins, shown in Fig. 5.10, and the choice of shapes to differentiate the competitors' pins from those of the player and the jack ball. The Figure also shows the background grid profile was defined through iterative cycles of participant Co-Design. Although a 1mm thick stock stainless steel perforated sheet was used for the test bed, the scale of the pins and pitch distance between the centres of the largest markers was used to specify the pitch of the pin holes in a subsequent compression-moulded rubber grid base.

Different widths and edging shapes were used in early development prototypes, but it was found that players preferred a more compact grid that could easily be held in one hand whilst seated. The scale of the grid in relation to the real court was 50:1 (Fig. 5.10).

The final production version was produced using a vacuum formed outer casing, with a compression moulded grid based. The pins were injection moulded. The outer casing had flat sections to take sponsors' advertising. A carry bag was added to display sponsors' logos (Fig. 5.11).

Nearly ten years on from development, VI Boccia game and grid is played Internationally. The VI Boccia grid is now commercially sold via Handi life Sport (Handi Life Sport, 2019), who have indicated that 162 grids have been sold into 13 countries. Taiwan have the largest number, 26, alongside the US. In Taiwan they have now set up a special VI Boccia League.

5.5 Discussion and Conclusions

The participatory approach applied in developing the VI Boccia grid is a "bottom-up" process. The reason for this choice is to minimise risk. Risk refers to the return on the investment of money, time and resources to the project through a successful (profitable) design outcome. The "profit" may be financial, social or environmental. The goal of this process is to minimise the number of iterative cycles of development. Less cycles of development, less time taken and less cost to achieve a feasible and viable design outcome.

When applying a Co-Design method, the authors have found that physical objects, existing products and low-fidelity models, combined with role play, evoke a much richer response (Torrens, 2017, p. 275). In both case studies, the physical game prototypes worked really well.

The "care" model and the "My Home" game developed for the interior context may well work for a product design context – this will need validation. The "care" model is more conceptual while the "relationship" model is more practical. By linking the "relationship" model with existing models of product design, the authors hoped that the readers would pay more attention to the etiquettes and practical details which are essential for an Inclusive Design process, a process emphasising care.

In summary, in order to understand "care" in the design context, and acknowledge the wider social, cultural and physical environment for Universal Design, the authors have developed two models: a "care" model for interior designers (Fig. 5.1), and a "relationships" model adapted for accessible product design (Fig. 5.6).

The “care” model suggests that to care for the micro-environment, designers have to transform clients and things from “care receivers” to “care givers”, passing “care” from design activities to the external environment. In the process of this transformation, designers must first improve their abilities of care. The “My home” case study has offered a practical approach (i.e. a game to be played in the early stage of Interior Design) to developing designers’ abilities of care. The evaluation of the game suggests it has potential to make designers be more aware of care.

The “VI Boccia grid” case study has highlighted some aspects of applying the “care” toolkit in real product development, for example, ethics in its broadest context, and the challenges faced when recruiting participants. In this case study, “care” has been implemented using methods and tools for Inclusive Design.

The models and the case studies have provided frameworks and methods for design educators, students, design researchers and practitioners, to help them understand “care” and implement care, in both Interior Design and product design contexts.

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