Framework for Design Research in Health and Care Services

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Abstract. In England, services addressing the complex needs of people with learning disabilities by integrating health and social care are currently designed in an ad hoc fashion. A structured approach has the potential to address variable levels of service provision and quality as well as provide clarity about the purpose and boundaries of the services. A design process is a series of steps taken to develop a product or process from initial needs to final design specifications and implementation. Currently no structured design process for these complex health and care services exists. Based on a literature review and an extensive set of interviews and observations carried out in a learning disability service we suggest a research framework rooted in engineering design to develop an appropriate design process.

An existing model for design research forms the basis of an exploratory approach that allows for adaptation to different internal and external factors and constraints.

Keywords: Framework, health care, social care, integrated services, learning disability, intellectual disability, design research, design model.

1 Introduction

When designing services which aim to integrate health and social care, one has to address a set of challenges arising from e.g. a wide spectrum of complex user needs, large number of stakeholders, cultural differences between health and social care and a fast changing policy context. A structured set of design steps, a design process, can facilitate this task. However, the utility of such a process depends on its ability to address these particular challenges.

We present a research framework for developing a design process, i.e. how to design the design. Our model is based on an existing framework as a starting point, and it was modified by research carried out in a learning disability service, which served as an exemplar for health and care services.

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1.1 Learning Disability

According to the American Association on Intellectual and Developmental Disabilities [1], learning disability originates before the age of 18 and involves significant limitations in intellectual functioning and adaptive behaviour as expressed in conceptual, social, and practical adaptive skills. Possible causes can be physical and/or social. An intelligence quotient (IQ) score of 70 or below is generally considered as an indicator for diagnosis, but the exact criteria for a diagnosis may vary between services. While "mental handicap" or "mental retardation" are no longer used, the terms "intellectual disability" or "developmental disability" have the same meaning.

Having a learning disability means having significant cognitive impairments and limitations in adaptive behaviour. The resulting needs can be medical but often go far beyond that. This reflects the main challenge for integrated services. It is no longer sufficient for health professionals to provide treatment and social service professionals to provide care. Instead care has to be understood in a more holistic way. Good health is a prerequisite for delivering social care assistance, such as housing or day services, while on the other side a stable social environment is crucial for wellbeing and effective health care. An appropriate service design process will have to be designed to reflect this. As well as being complex, the care delivery process is also adaptive [2] and this self-modifying behaviour needs to be accounted for, too.

1.2 Services

In the England it is the responsibility of the National Health Service (NHS) to provide health care which is delivered through local primary care trusts. Social care is commissioned by the local authorities, such as county councils. Besides their function as commissioners, local authorities often also provide some services themselves. For learning disability services, health and social care partners sometimes pool resources, with one of the organizations formally leading. In Cambridgeshire, this led to the foundation of the Cambridgeshire Learning Disability Partnership (Cambs LDP) in 2003 under the lead of the Cambridgeshire County Council.

Learning disability services in England and elsewhere in the United Kingdom have seen significant changes over the past two decades. In the 1980s, health care organizations started closing down the residential hospitals where many people with learning disability had lived their whole lives with the aim of returning people to the local communities, a process known as deinstitutionalisation [3]. When dissolving the hospitals, community services started taking their place in caring for the special needs of people with a learning disability. Since around the year 2000, following the Health Act 1999, integrated teams have been formed in which health and social care professionals work together to provide a single care package. These integrated services aim to blend three components: commissioning, providing social care and providing secondary and tertiary health care. Primary care remains a responsibility of the primary care trust. Bringing together expertise from different fields of social care and health services to provide

seamless care is particularly important not only because learning disability is a life-long condition but also because of the high levels of co-morbidity [4,5]. Needs range from behavioural and general mental health problems to issues caused by independent and associated physical impairments, including visual or hearing difficulties.

As part of a larger research project on health care delivery, the Cambs LDP allowed us to examine their service development processes and investigate how these could be developed into design processes. In the following, we propose a framework for carrying out this task, based on observations and literature.

2 Service Design

Service design processes bridge the gap between strategic goals and the actual delivery in a systematic way (figure 1). Designing services in an ad hoc way, as it is usually done in the health sector [6], concentrates on a solution for the particular service being designed. On the other hand, a service design process aims to give guidance on how to design a range of services. This provides a stable link between the design objectives and the designed outcomes and contributes to the goal of "getting it right first time".

Design processes impact on the delivery of care via their influence on care processes (figure 2). A care process is a coordinated set of activities within care delivery. This could be a care pathway if defining the patient journey or cross cutting functions such as appointment booking but may equally describe a whole service. Figure 2 is idealized as currently the care provided by most services is still split along the divide between medical treatment and social care. Therefore the feedback loops between delivery and processes are in reality more ambiguous. However, in a truly integrated service this divide should vanish.

Projects have been successfully carried out where a team of designers have worked together with health care experts [7,8]. However, most health care organizations lack permanent expert design capacity. Design capacity is the ability and knowledge to carry out good design and successfully put it into practice. Design processes are determined by the exisiting design capacity. However, good design processes can in return inspire an increase in abilty and knowledge (figure 2).

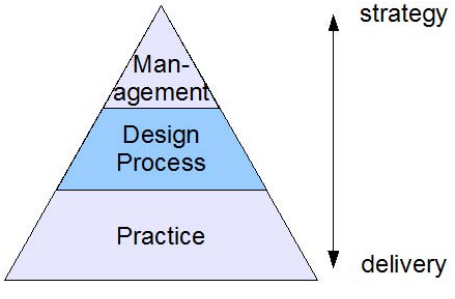

Fig. 1. Connecting delivery and strategy via the design process

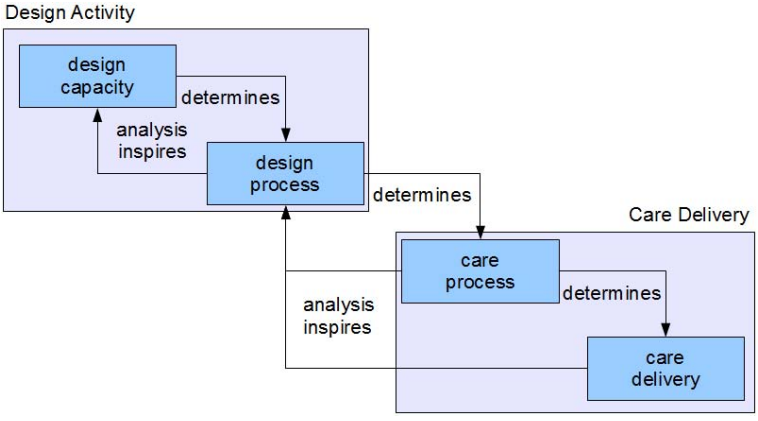

Fig. 2. Idealized relationship between care delivery, the care process and the design process

This could be achieved by hiring people with a design background or affinity for service development roles. A second option is to provide design knowledge and tools to non-specialist designers, specialists in a particular domain without explicit training in design. The options are not mutually exclusive.

Designers will bring design capacity to the organization and are familiar with design processes. This knowledge can be passed on and spread to the people involved in service design and development. If there are no permanent expert designers within an organization, co-developing a design process with experts is a first step in building capacity and can help ensuring that future projects are well designed. Further steps could include the introduction of design tools and looking into which factors are constraining creative solutions. The need for bringing design thinking into health care delivery has been recognized by the NHS which led to an adoption of the Experience Based Design approach for the NHS [9]. This approach consists of design tools and methods which have been successfully applied to service improvement projects [8].

A review of the available literature returned several examples of the application of design thinking to health care services. However there were no existing design processes specific for learning disability services. The existing general models were either too limited in scope [9,10] or too inflexible, lacking a sufficiently wide systems view and exclusively targeted at service improvement [11]. Models used by commercial design agencies also fell short in meeting the requirements we identified in a exploratory study of the issues faced in our exemplary service.

This exploratory study consisted of investigation of the current local practice by interviewing key stakeholders and analyzing documentation. We found that in particular the issues caused by combining two culturally quite different service types, health and social care, were insufficiently or not at all addressed by the existing models. We therefore decided to investigate in more depth how the service was originally developed and continues to evolve in order to draw conclusions on how to build a suitable service design process.

The foundation of the Cambs LDP was driven by national legislation and carried out by the management of the constituent partners. Examining documents from this period and interviewing senior managers, no formal or informal design process is evident. The procedure contained elements of staff and user consultations, drafting business plans and piloting. However, there is no evidence that these were embedded in an overarching process that could assure the link between objectives and outcomes. This ad hoc fashion of developing services is repeated in designing organizational structures as well as individual care arrangements. There are usually design elements, such as a need analysis or a pilot, but a more structured approach can provide more transparency and effectiveness. This could be achieved by designing in creative elements which may lead to innovative and more effective solutions. However, one of the strengths of the current system is that is allows flexibility for the range of conditions a learning disability service has to deal with. Thus a design process must not be too prescriptive.

3 Proposed Research Framework

Blessing and her co-workers proposed a general design research methodology whichw as aimed at improving the process of designing products [12]. In order to successively answer the questions of what is a successful process, how to create it and how to improve the chances of it being successful, they propose starting with problem definition-based success criteria. This is followed by a descriptive study to reveal chains of cause and effect between influencing factors and the success criteria. Based on these insights, methods are then developed in a prescriptive step and the outcomes evaluated in a final descriptive stage. Verification takes place by comparing the final description with the success criteria, as well as the situation pre-intervention.

When this methodological framework was applied to learning disability services, we encountered two main challenges. Compared to product design there is an even larger number of influences to consider. The initial problem definition is usually vague, due to the numerous stakeholders and possible ways of addressing the problem. Thus an initial phase of gaining familiarity with the field is necessary. At the same time, health care services are under public and media scrutiny. The government reacts to these pressures with frequent new guidelines and policies. Between just two strategic plans, one by the local authority and another one by the Cambs LDP, thirteen different influential national policy documents are mentioned [13,14]. This reflects a very fast changing environment to which service designs have to adapt.

The methodological framework put forward by Blessing et al needs also modification, as our aim is not the development of a particular service but rather the design of a general design process for care services. We therefore dedicated a separate stage to the actual development of the design process, which is then, according to the original model, implemented in the prescription phase.

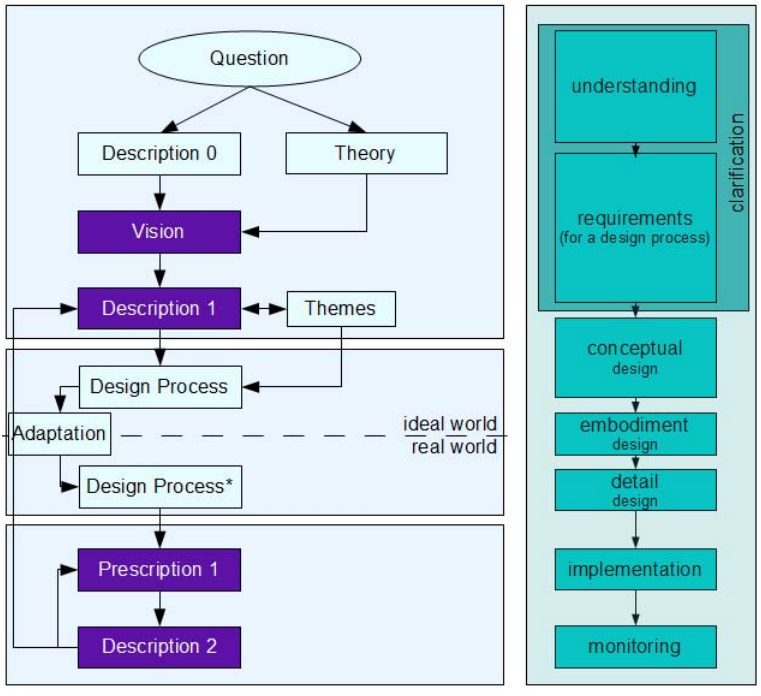

Fig. 3. Proposed research framework corresponding to classical engineering design language (right hand side), according to e.g. Pahl and Beitz [15]. The dark boxes on the left hand side are the stages in the original Blessing et al [12] design research methodology.

3.1 Initial Descriptions of the Design Task

From our experience and from comparing literature [8,16,17,18,19,20,21], we found that in designing a care service the initial problem statement is usually more diffuse than in product design. Although product design is influenced by numerous factors which have to be taken into account, it is ultimately limited by the laws of physics and mechanics. By contrast, in service design the range of options is much wider and knowledge is less centralized. When designing a new product one usually deals with clearly defined roles which are linked to certain pieces of knowledge, e.g. engineers knowing what is technically feasible. This is less so the case in health care services. It might take considerable effort to locate information and subsequently create a common base of understanding. This is in part due to frequent changes in structures and roles which have taken place in the NHS in recent years and poor knowledge systems but also due to different professional viewpoints.

For the product design process put forward by Blessing et al, the initial need has to be sufficiently well defined to derive tangible criteria for success. These criteria serve in the following as the lens for context exploration. When we tried to define criteria for a good service design process, we found that our identified

need, a better design process, was too broad to enable us to develop criteria that were meaningful.

The role of a process framework is to provide guidance which steps need to be taken. However, in this case we felt that we would already need to know which steps we want to take in order to be able to use the framework. Thus an exploratory descriptive phase (description 0) was necessary to familiarize ourselves with the field of learning disability services. This included investigating the expected and actual roles of stakeholders and locating knowledge. When complemented with a review of available literature [8,17,15,20], this enables us to develop an idea of what a successful service design would look like. Instead of criteria, we prefer to name this stage *vision*. Criteria imply a fixed set of measures. However, during a project new insights might arise which can lead to a modification of these original measures while the overall goal persists. We therefore separate the general idea behind the solution, the vision, from more defined sub goals or *themes*, which are revisited and modified. These themes will be explored in detail in the more focused *description 1* phase, where the identified vision guides the information gathering. At the end of this phase we aim to obtain a comprehensive set of themes and an in depth understanding of the relevant aspects of the organization.

The requirement of initial knowledge for defining success as well as the iterative process of descriptive work and refining themes, is also observed as a general feature in specific service design projects. As part of a national initiative of the Design Council, a project asked how they could improve the lives of people with dementia and their carers. The team consisted of a design firm and staff from the Alzheimer Society, which provided the background knowledge to shape the initial question into a more general vision. Instead of focusing on measures and medical intervention, the project would look at patients' experiences. Key themes were then derived in an iterative matter and developed into concepts [7]. Applied to our framework for service design, equivalent concepts would e.g. relate to essential elements of design or how the particular environment can be taken into account within the design process.

3.2 Design Process

When designing a service, as in the example of people with dementia, the themes and insights of description 1 are the base for the development of concepts for new services. This is referred to as *prescriptive phase*. However, we aim to develop a general concept of a learning disability design process, which requires some additional modifications.

In the initial description 0 phase, we gained the impression that there are strong external drivers for both health and social care. These influence the structure, priorities and philosophies of the service. One Cambs LDP manager estimated that in the past, the structure of the organization changed about every 18 months. Contrary to the idea of a decentralized NHS, with most of the budgets held by local primary care trusts, which enables care according to the needs of the local community, the major priorities appear to be set externally. One

example are the seven outcomes set by the document "Our Health Our Care Our Say" [22], which form the backbone of the Cambs LDP Commissioning Strategy [23]. Failure to comply with these external drivers will have a negative effect on performance indicators or other measures which determine funding levels and trust ratings. This is not likely to change, as health and social care can attract a high level of public interest. Particularly after tragic events this leads to pressure for action, as happened in the case of six people with learning disability whose care and treatment in hospital was well below accepted standards [24]. Thus a general design process needs to be robust and able to adapt to changing policy environment.

To achieve this robustness, we first aim for a model of how to design a service that is un-constrained, i.e. in an *ideal* world. This allows for a consensus on the features of a best-case solution. The adaptation of the process to the conditions of the particular situation will take place through an *adaptation* process; this allows flexibility to adapt to different real world scenarios - given the rapid rate of changes in policy and the frequent restructures - this was deemed an essential feature. The additional advantage of first creating an ideal world design process is that this provides guidance about the conditions to aspire to when implementing new policy or reaction to an organizational restructure. We chose the solution of an adaptation step because we deem it essential to have a clear idea of what the ideal world solution would be, even if current circumstances do not allow for it to be implemented without modifications.

3.3 Prescription and Final Description

The final two phases of the framework are in line with the original Blessing model. Depending on the results of the previous steps, changes and actions are prescribed. For a service this will include the specification of the concept which was agreed upon. For a design process the *prescription* will likely take the form of methods and tools as well as actions linked to the implementation and dissemination. The *description 2* phase is examines the situation after the changes have taken place. Verification is sought by comparing the final with the initial situation, as captured in description 1 and by comparing the final "as is" situation with the intended "to be" situation of the prescriptive phase.

4 Framework as an Engineering Design Process

The right hand column in figure 3 links the design process to the typical language of engineering design. This is to understand the proposed method as a design process in itself and to root it in a tried and tested approach for addressing complexity. The definition of *requirements* stands alone in order to stress its importance for the design process. It is preceded by a stage of gaining a general *understanding* of the problem. In the original model by Pahl and Beitz, these two stages are combined in a *clarification* stage.

The *conceptual* phase will take place towards the end of "description 1" and as the basic features of an ideal design process are determined via the vision and

themes. *Embodiment design* is the phase in which the concept is turned into a practical solution. The individual parts, their functions and interrelationships are sketched out without going into detail. In figure 3 this sits between the ideal and the real design process, where a particular solution is selected. Decisions about the structure can be made without knowing the particular situation the process will operate in, but may have to be altered once this knowledge is available. This is the case in the *detail design* phase which is specific to the particular environment and thus has to be done individually for the ideal and the real process. Figure 3 depicts the design of the real world process and therefore omits the ideal world detail design stage. The "prescription 1" is the phase when the design process is actually implemented. The design of the *implementation* and the subsequent *monitoring* are essential to the design process but tend to be neglected by designers, which can lead to the unfortunate situation of a well design product or service failing because of inadequate understanding of adoption and implementation [25]. The prescriptive phase also should be used to verify the design against the requirements set out earlier by asking whether the right sort of service was designed. This is a prerequisite for the later phase of validation where "description 2" is compared with the initial problem specification to assess whether the service has been designed in the right way.

When applied to a typical engineering design problem, the different stages in the Pahl and Beitz model all involve widening the scope, generating a range of options and subsequently narrowing it back down for the beginning of the next phase. In the clarification stage, starting from the initial problem statement, the solution space is widened by analyzing the underlying true needs. Once the real problem is understood, the focus can be narrowed down again by specifying requirements for a solution. This refocusing in order to ensure a thorough exploration of all possibilities is repeated in the conceptual, embodiment and detail design phase. The output of the previous stage is expanded, multiple options are generated and the most suitable one selected to be the starting point for the next phase. The initial phase of our proposed research framework shows the same characteristics. Starting from the question how to design a design process for health and care services, the exploratory phase opened up a wide field of issues concerning to need for and use of such a process. This will be eventually narrowed down to a concise set of requirements. As a complex problem requires a sound exploration of the solution space, it seem likely that the conceptual, embodiment and detail design phase of developing the design process will also be carried out in a similar exploratory fashion.

5 Conclusion

The proposed model is a the design of a design process based on the principles of engineering design. It aims to guide the development of an adequate service design process when existing models fail to address the complexity of the task. This process guides the work of experts and also allows non-experts to incorporate good design in their services. As such it follows steps which can be traced in existing successful service design projects [8].

In this regard, our proposed framework can already serve as a rudimentary design process. However, from our initial observations we feel that a service design process needs more detail to provide meaningful guidance. There are essential features to good service design, such as an analysis of stakeholder purpose and values, which are not covered by the framework.

We identified two main characteristics for health care service design. Firstly, an initial exploratory phase is important to acquire the necessary background knowledge. Secondly, a more gradual build up of success criteria via vision and themes is a more realistic description of the research process. We identified a fast-changing policy context as another issue, which we suggest addressing through a two step process. In the first step agreement is reached on the solution in an ideal world; in the second an adaptation step takes into account the particular circumstances. Changes in context can then be absorbed by the adaptation step and do not require a complete redesign. Rapidly changing context also present a challenge in other fields attracting public interest, such as environment or education. A service design process which addresses this and allows flexibility to react to changes, is more robust and will, ultimately, be more useful.

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