Designing information for pediatric health education that is easily interpreted by patients is complicated by factors including attitudes and complex power relationships. This study examines such factors in relation to three pediatric health education case studies on asthma management, chronic functional constipation and rehabilitation. They emphasize direct communication with pediatric patients with a view to increasing patient empowerment. Strategic graphic design is employed in collaboration with clinicians to create multimodal semiotic resources. This paper examines these cases within Wahlin’s CHaSSMM Model (Wahlin 2015), which combines social semiotics with multimodality and critical hermeneutics. CHaSSMM’s potential is making explicit the project’s underlying power structures and meaning potential of multimodal, semiotic resources. It begins with an overview of the pediatric health education case studies and the CHaSSMM Model of analysis, and then explains how CHaSSMM can provide support for the planning and interpretive stages of design projects.
The What, Who, How & Why

Building interpretive support models for the design of pediatric health education materials

Abstract

Designing information for pediatric health education that is easily interpreted and understood by the target audience is complicated by a number of factors, including attitudes, behaviors, and complex power relationships. This paper will examine these factors in the context of three pediatric health education case studies focusing on asthma management, chronic functional constipation and rehabilitation. The emphasis within these case studies is to direct communication to the pediatric patient (rather than the parent or guardian) in order to circumvent power structures that are barriers to patient empowerment. Graphic design is utilized strategically, combining image and text to create meaning as guided by the clinicians involved in each case study.

This paper will provide an overview of the social semiotic approach to understanding meaning, but within Wahlin’s CHaSSMM Model (Wahlin 2015). In this framework, social semiotic analysis is brought together with critical hermeneutics and multimodality, in order to, with the former, understand underlying power structures and ideological frameworks, and, with the latter, how meaning potential can shift when various modes of semiotic resources are combined. We will begin by providing an overview of the pediatric health education case study, followed by an overview of the CHaSSMM Model of analysis, and then explain how the approach can provide support for the planning and interpretive stages of design projects.

Keywords: 3 Corner Collaborative Design Model, CHaSSMM analysis, critical hermeneutics, difficult knowledge, graphic design, multimodality, pediatric health, social semiotics
Introduction

In a new paradigm of design to create value, we consider the designer as connector (Manzini 2008: 11) – the designer “understands, communicates, discovers and synthesizes to create more meaningful outputs” (Choi 2011). Within this process, the designer needs to be able to source explicit knowledge from stakeholders as part of a collaborative approach to design, rather than relying heavily on tacit knowledge. This is of particular importance when designing for topics or experiences for which empathizing is difficult for someone without first hand experience. While graphic design involves intuitive decision making in which the designer must make appropriate choices amongst infinite options (Frascara 1997: 11), this paper will show that distilling designerly intuition into a framework can assist designers in making informed, evidence-based decisions.

The first section of the paper will provide an overview of designing information for pediatric health education in the context of three case studies that were conducted in pediatric rehabilitation, gastroenterology and asthma as part of a larger research project around co-design in health. In this section of the paper we will provide insight into how designer-end-user relationships were navigated throughout the project addressing constraints around patient access that shaped the design process and research methodology. We will then discuss the function of educational designs as social intermediaries that alleviate the impact of uneven power balances in the exchange of health information between clinician and patient.

The second section of the paper will provide some background on the CHaSSMM model of analysis, which is being utilized as a framework to support design practice, particularly for projects that have complex stakeholder engagement. CHaSSMM analysis combines Critical Hermeneutics with Social Semiotics and Multimodality, and is a conceptual theoretical model that is being developed as part of a wider research project on the design of difficult knowledge exhibitions. Within this paper, we will be extending the boundaries of this

1 Here we refer to the doctorate completed by Belinda Paulovich in 2015 entitled Developing a co-design model through the production of education materials in the health environment.

2 Here we refer to the practice-led doctorate in difficult exhibition design being undertaken by Willhemina Wahlin, which focuses on the designer’s role in the creation of typographic representations of people’s testimonies of trauma within these types of exhibits. Difficult exhibitions, stemming from the term ‘difficult knowledge’, include information related to issues such as genocide, gender violence, contested histories and war (Pitt & Britzman 2003).
model by applying it to the specific field of information design for health education, and asking if it can be of use to designers in other fields.

**Section 1: Information design for pediatric health education: Case study overview**

Over a period of 22 months from May 2012 to March 2014 in Adelaide, South Australia, three instrumental case studies were conducted in a large public hospital within the Pediatric Rehabilitation, Gastroenterology, Respiratory and Sleep Medicine, and Emergency departments. A comparative case study approach was used to gain an in-depth understanding of clinician and patient interaction with designed materials in a real-life context. The research was primarily qualitative and interpretive in approach and made use of techniques from Ethnography, Participatory Design and Grounded Theory.

The guiding premise behind the research was that the design of accurate, user-centered health education materials requires input from designers and end-users, and that effective designs cannot be created in isolation. A collaborative approach “marked by shared decision making, the give and take of ideas exchanged and explored, the integration of multiple perspectives, and a synthesis ... [of] isolated ideas” (Poggenpohl 2004: 144), was critical to the success of the project. Collaboration was facilitated by inviting clinical experts into the design process, and by visiting the health setting to develop a holistic, ethnographic understanding of the organizational culture, and the needs of clinicians and patients as end-users.

**Navigating the clinician-patient relationship from a design research perspective**

Figure 1 refers to the design model that emerged from the pediatric health education case studies. It is specifically informed by the *Communication Research Institute Design Process Model* developed by David Sless (2008). The inner circle is a representation of the designer-end-user interactions that occurred throughout the design process, which is depicted by the outer circle. At each stage of the 3-Corner Collaborative Design Model, the designer, the health professional and the patients have different roles to play. The information gathering stage is facilitated by the designer, but the health professional is the main contributor of knowledge and information. The designer then uses this information to develop concepts. Concept development, design development and prototyping are the domain of the designer
as they rely on the technical and creative skills required to produce sketches, imagery and mock-ups for presentation to the health professional. However, after each of these stages the designs are shown to the health professional, and the direction of the design is manipulated by both parties. The evaluation phase actively assesses health professional and patient interaction with the prototype where the designer assumes a passive, anti-interventionist role. The decisions regarding re-design require input from both the designer and the health professional (using patient feedback gathered from the evaluation phase) with the aim of reaching a mutual agreement. Clearly, the solution cannot be achieved without integrating designer, health professional and patient perspectives.

Constraints of the health field led to the development of a creative methodology that afforded insight into interactions between designer, clinician, patient, prototype and environment. Specifically, restrictions around designer access to medically vulnerable patients led to the development of an anti-interventionist evaluation method, through which prototype testing was conducted by clinicians in order to preserve the normal health
education paradigm. This had the unexpected benefit of allowing the clinicians to engage in reflection-on-action (Schön 1983), which ultimately had a positive impact on the design outcome, as evidenced in the quotation below:

Now I’m thinking of it, [designing the prototype this way] does make a bit more sense, but at the time when we were putting it... together... I guess you need to do this to work out what would be useful (Gastroenterology Clinician, personal communication, 30 September, 2013).

The anti-interventionist approach relies heavily on the clinician’s ability to convey information about the patient experience to the designer. This requires a very strong rapport and goes back to the idea that effective health education materials cannot be made in isolation. The designer and the clinician are dependent on each other’s discipline specific skills, much like the clinician and patient are dependent on one another in the exchange of health information.

Complex power relationships are a hallmark of the health field. In terms of designing for patient education, we need to be mindful that clinicians and patients co-exist in an asymmetrical relationship. Clinicians are the culturally designated dominant party, having situational authority as well as professional prestige, while patients have situational dependency. Often, young patients are positioned as bystanders in the health communication exchange with information directed above them to parents or guardians (Lambert, Glacken & McCarron 2010).

**Educational design as social intermediary**

The case studies demonstrated that well designed, age appropriate health education materials offer a way to circumvent power structures that are barriers to patient empowerment. When patient education materials are designed collaboratively, with consideration given to accuracy of content, design appeal and meaning potential, the benefits to patient understanding and empowerment, and clinical practice are evident:
I showed her the card here which had a child in a wheelchair and it opened up conversation for me which I’d had trouble about bringing up, actually, on Paraquad (Rehabilitation Clinician, personal communication, 7 June, 2013).

It helped me to... chunk down the information into smaller pieces and more relevant pieces (Asthma Clinician, personal communication, 7 June, 2013).

I feel really confident that I could explain this to my partner now (Asthma Clinician, personal communication, 7 June, 2013).

What was apparent throughout the course of the project is that the educational designs acted as social intermediaries that facilitated the flow of information between clinician and patient. This was particularly helpful when:

- There was a stigma or element of embarrassment associated with the health condition;
- When the information was complex;
- When the patient had a low level of health literacy;
- In environments that were chaotic (such as the emergency room);
- When familial conflict was present.

It must be emphasized that it is extremely challenging for clinicians to deliver effective education when any of the above situational factors are present. Clinicians often find themselves taking on the role of facilitator while validating the concerns and opinions of various members of the family (Foster & Cohen-Katz 2011: 333-334), or competing with other distractions such as loud environments. We found that the design prototypes were beneficial in these situations because they were:

- Simple enough to be absorbed despite disruptive behavior;
• Simple enough to be understood by all members of the family, encouraging unity;
• Useful in dispelling the myths associated with these conditions;
• Encouraging, uplifting and positive;
• Tactile, encouraging interaction;
• Culturally and clinically inclusive through depiction of a diverse range of people;
• Able to be broken down into small categories of information, which allowed the clinicians to develop a systematic approach to education.

Throughout the project, clinicians were informed about the importance of simplifying complex, confusing and ambiguous health information. According to the Asthma Clinician “that’s exactly what health promotion should be about. You get complicated medical information; crunch it down into simple language, into small chunks of easy to digest information…” (Asthma Clinician, personal communication, 12 September, 2013).

We can draw two interesting points from this: firstly, that both clinicians and designers have their own industry-specific knowledge to share within these projects: clinicians need to share with designers their knowledge of medical terminology and data, while designers need to use their skills and knowledge in visual communication to “crunch it down into simple language”. In this regard, project partnerships that have an open platform to communicate knowledge have a greater potential for success. Secondly, however, not all knowledge is easily sharable: tacit knowledge, that is, knowledge that is ‘known’ but more difficult to articulate (Polanyi 1966), still needs to be recognized and become part of the design project’s brief. This is especially true for fields which have established power structures that are tacitly understood as cultural norms, such as the medical field.

In the next section, we explain the CHaSSMM model of analysis, which is specifically aimed at addressing the needs of designers when working on projects that include a range of factors: complex data and knowledge, tacit or explicit power structures, and, in particular, vulnerable stakeholders to whom the information that is to be produced is aimed. For these projects, we argue that key elements need to be examined: the underlying ideology, which can inform power structures, what kinds of semiotic resources are both provided and need
to be created by designers in order to communicate effectively, and what kind of experiences we want our target audience to have. Through examining organizational texts and practices through critical hermeneutics, and combining this with social semiotic, multimodal analysis, we can collect important data to inform our design practice.

Section 2: An outline of the CHaSSMM model of analysis: Why CHaSSMM?
Before discussing the theoretical foundations of the CHaSSMM model of analysis, it’s first worth noting how and why it has been developed in the way it has. Born from practice-led design inquiry, it is a model that is directly related to the open-ended questioning that designers often undertake, particularly when working on projects that contain complex information created by specialists from a range of different fields. CHaSSMM’s aim is to act as a support for all the stages of design: for the research and planning of a project; for the interpretive stages of design; and as a tool of reflective analysis once the design is complete. It’s an acknowledgement of the necessity for designers to know who they’re designing for and why, and what multimodal, semiotic resources are being employed to make meaning, and by extension, also represent people and communities. By drawing out the tacit knowledge of a project’s stakeholders, ideological frameworks, and the semiotic resources employed to ‘perform’ that ideology can become more explicit. This can be valuable in a medical setting, where positions of power are often deeply established, and often go unspoken. Understanding this tacit knowledge, in conjunction with the complex medical information designers also need to break down, can reveal both the opportunities and pitfalls of potential design outcomes.

The CHaSSMM Framework: five stages of analysis
The combination of Critical Hermeneutics, Social Semiotics and Multimodality can provide a ‘reflexive circuit’ for the design process (see figure 2). It is being developed with the recognition that knowledge of a project’s aims and its wider issues is fundamental to the interpretive process of design. It also acknowledges that any analytical and interpretive support system has to address two critical needs of designers: that it be an efficient yet flexible path for knowledge gathering and sharing, and that the resulting design brief provides a sounding board throughout the design process that encourages reflexivity in practice.
There are five stages to the CHaSSMM framework, and each directly relates back to the idea that ideology is always at play, and that multimodal semiotic resources are its performers. Further, each stage refers back to three critical hermeneutic theories outlined by Roberge (2011): the theory of meaning, theory of action and the theory of experience.

CHaSSMM Stage 1 and the theory of meaning

The theory of meaning relates to ideology, which, Roberge argues, can never be partial or secondary, but is meaning-full. It can also be understood as a text, a semiotic network of
things that place themselves in opposition to one another. It is also interpretive, as it relates to the members of a group, its foundation and its boundaries (Roberge 2011). For example, our ideological boundaries can be based upon personal or institutional contexts; our relationships and attitudes to family, personal or professional networks, or issues of national identity, for example. We don’t only exist as passive receivers of ideology either, but as active participants in frameworks that we create and foster for ourselves: the food we eat, the people we prefer to associate with, or the political policies we align ourselves to, can all be linked back to our ideological position on a variety of issues, such as health, social justice or the environment. CHaSSMM is an acknowledgement that every design project has an underlying ideological position, one that is created by individuals working independently or within institutional frameworks. Likewise, the knowledge born from projects can have an impact on an existing ideological boundary, both for individuals and communities, and it can be said that this is the very reason why so many projects are instigated in the first place. A deeper understanding of this can provide significant support for the interpretive stages of design.

Stage 1 of CHaSSMM is designed to encourage designers to frame questions directly related to stakeholder organizations or individuals. These questions may include:

- *Who are the main stakeholders in the project? Who is not included, and why?*
- *What aims or desired outcomes do these stakeholders have for the project?*
- *What fields do the stakeholders come from?*
- *What do we need to know from those other professionals?*
- *Who are they speaking on behalf of?*
- *Why is the project being undertaken?*
- *Why now?*

In practical terms, this can yield significant information that can feed into the creation of a substantial design brief. This becomes a central working document for the life of the project, through which information can be shared among all relevant project stakeholders, and continue to be built upon.
CHaSSMM Stages 2-4 and the theory of action

The theory of action helps us to understand the ways in which ideology is performed in the world. Critical hermeneutics is particularly concerned with examining power structures, social movements and counter movements, and how, through action or performance, ideologies become legitimized or undermined (Roberge 2011). Social semiotics also shares an interest in understanding power structures (van Leeuwen 2005a), and as a working theory that proffers the idea that semiotics is an activity, it has exciting potential as a complementary tool of analysis alongside critical hermeneutics. After all, what we design is ideology in action. As designers, therefore, we have a fundamental need – and a responsibility – to understand the meaning potential of semiotic resources, and how that meaning can be affected once it inevitably becomes multimodal (Kress 2010). CHaSSMM looks towards social semiotics because it does not seek to find a fixed meaning through the idea of sign systems in the Saussarian sense (Saussure 2005), but instead, through the idea of analyzing the meaning potential of semiotic resources (Kress & Van Leeuwen 2005; van Leeuwen 2003, 2005a).

Stage 2 of CHaSSMM adopts the social semiotic activity of conducting ‘semiotic inventories’. Much like a stock take, we list what semiotic resources have been provided by a project’s stakeholders, providing us with an overview of the resources at our disposal, and taking the opportunity to note the more significant meaning potential of each resource and key words for each. We then extend this through the lens of multimodality, so that we can understand how meaning potential can shift when semiotic resources are combined together. Multimodality, according to Kress (2010), recognizes that almost all communication is inevitably multimodal, and in order to understand the potential of what resources we have been provided, we cannot only look at their meaning potential in isolation. Stage 2 also connects the stakeholders, which were our focus in stage 1, to their intended audience, and, where possible, is a stage well suited to seeking out the opinions of people within our target audience. We then ask questions that reflect back again on the information we have already gathered, and these can include:

- Who is communicating with whom?
• What are the potential metaphorical connections that can be drawn between the semiotic resources and the target audience?
• Are there any potential contextual issues these raise in relation to the political, historical, social or cultural contexts of the audience?

Stage 3 of CHaSSMM brings together stages 1 & 2 and includes initial propositions for design directions and an initial production plan that includes who is responsible for what part of the project, the deadlines for each stage of the project, and other technical issues related to production. It also asks:

• What is missing?
• What are the possible implications of the representation proposed?
• Who is being represented? Why now?

It should be noted that, because CHaSSMM analysis is aimed at providing all project stakeholders with a working document, it also has the potential to raise any red flags before the design process begins. For example, there might be semiotic resources missing from the inventory, or the scope and aims of the project might have been miscommunicated. This document provides an opportunity for all stakeholders to review project aims, and can help mitigate potential issues down the line, such as the need to redesign and reprint, or misrepresenting people and their communities.

Stage 4 of CHaSSMM is focused on the design process itself, as depicted by the 3-Corner Collaborative Design Model. The designer refers back to the central design brief that was created through CHaSSMM stages 1-3, and it is in stage 4 that this working document becomes most valuable. As an extensive project reference, it’s a reminder of the project’s aims, deadlines, semiotic resources, underlying ideological position and target audience. It also has perhaps a less visible value, in that it has worked towards drawing out the tacit knowledge of stakeholders, including the designer, converting it into knowledge that can be explained and shared.
Stage 4 also reflects the very heart of the theory of action: that is, in the process of designing, we are deeply involved in creating the performance of ideology in the world by combining and creating semiotic resources multimodally: the typeface that represents the ‘voice’ of an institution, individual or community group can have a significant impact, for example, on the modality of a text. Modality, in social semiotic terms, relates to the perceived notion of ‘truth’ of a text, or rather, the level of authority a text can be said to have visually (van Leeuwen 2005a, 2005b, 2006). Designers also create the spatial relationships and framing that imply rhythm or mood, or create graphics that can communicate what words might fail to. But we need to always do this reflexively, looking back to our central document that can guide that practice, and, hopefully, make us aware of those times in which our own personal context might be steering us away from the project’s aims.

**Stage 5 and the theory of experience**

In stage 5, we come somewhat full circle in the process of CHaSSMM analysis. It is in this stage during which we reflect back on the project’s outcomes, but in a more focused way towards the target audience. It is in this stage that we look at the theory of experience, which examines the way we come to understand ideology’s effect on us through the meaning-making processes. Complex and ever-shifting, experience relates to the hermeneutic text as it brings us back to the reader-receiver relationship, and how it is only through this act of reading that a text can “renew and fulfill itself” (Roberge 2011: 13). As designers, we might utilize information on users/readers that we gathered in stage 3, but, often due to budgetary constraints, we seldom have the opportunity to refine designs based on user/reader interactions with it before it is produced. This reinforces why it is so important for many projects to work on a basis of explicit, rather than tacit, knowledge, and why gathering information – and asking the right questions – can be so important to the success of a project.

From stage 5, we can re-examine a project by coming back again to stage 1, completing the reflexive circuit. We see that, upon closer inspection, the questions we have asked all have something in common—that is, they can also lead us to a better understanding of a project’s ideological framework, and in so doing, to having a clearer view of how that framework will
be ‘performed’ through design. Importantly, it can reveal power relationships within these frameworks, and identifying this can be an important part of projects that work with, for example, pediatric patients.

**Conclusion**

While the CHaSSMM model of analysis has not yet been implemented in the health setting, a retrospective examination of the model in relation to the pediatric health education case studies discussed within this paper shows that there are multiple points of convergence. Firstly, stakeholders and end-users are considered knowledge experts and are embedded in the design process as valued participants who have a critical role to play in the ultimate design outcome. Secondly, dependence on tacit knowledge is removed by engaging in deep information gathering (as in the 3-Corner Collaborative Design Model), and through collaborative, stakeholder informed development of the design brief as in CHaSSMM. Both models prize reflexive practice and evaluation of the design outcome. While there is a minor point of divergence here (the 3-Corner Collaborative Design Model is health education specific and requires evaluation of a prototype with the target audience before production), the reflexive intent and action on stakeholder input is similar.

Social semiotics shows great promise for design projects such as the one outlined in this paper, because it is a practical analytical tool for understanding how meaning is made with multimodal semiotic resources. Combining social semiotics with critical hermeneutics can have far reaching potential for pediatric design and other projects where there are underlying power structures, helping to reveal underlying relationships, and make tacit power structures more explicit. As such, this model has the capacity to be useful in any design project where there are potentially vulnerable stakeholders.

In order to further develop the potential for designers to make evidence-based decisions, especially when designing for complex stakeholder engagement, the next stage of this research involves fusing the CHaSSMM model of analysis with the 3-Corner Collaborative Design Model for further testing in health and related fields. Our aim is to build upon the complementary nature of the models and their points of convergence to help guide other designers through unfamiliar territory.
References


