(E)MOTIONAL DESIGN:
DOUBLE MEDIATION IN KINETIC INTERFACES

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ABSTRACT

We are increasingly surrounded by screen-based interfaces that are characterized by visual movement, referred to as *kinetic interfaces*. This paper argues that kinetic interfaces engage and affect us in two distinct ways. First, kinetic interfaces may engage users when visual movement is employed to allow them to carry out specific actions, referred to as *instrumental mediation*. Second, kinetic interfaces may affect users when movement is employed to allow specific meanings to be made, referred to as *semiotic mediation*. Situated within a sociocultural view on design and use, this dual role of the kinetic interface is referred to as *double mediation*. The complex relationship between instrumental and semiotic mediation is elaborated through analysis of the screen interface of the Apple iPad, and through a practical design experiment.

Keywords: interface, movement, mediation, social semiotics, activity theory.

INTRODUCTION

Digital products affect us by pervading society in a variety of contexts. Our everyday lives are permeated by smart phones, MP3 players, GPS navigation devices, laptops, tablets, TVs and gaming devices. The screen interfaces of these products are increasingly characterised by movement; as we interact with our devices, graphical elements on the screens scale, fade, flip, move and transform in various ways. Eikenes (2010b), drawing on the work of Skjulstad (2004), has referred to such interfaces as 'kinetic interfaces' (Figure 1).

Figure 1. The interface of the Apple iPad is characterized by visual movement, and is therefore an example of a kinetic interface. Here, the front page of the Katachi magazine app is displayed.

The employment of movement in interfaces poses new opportunities and challenges for design as well as analysis. The title of this paper, *(E)motional design*, refers not only to the famous book by Norman (2004), but also to the power of visual movement to affect, engage and persuade us. As interfaces are manipulated by us, we are simultaneously moved and affected by them. Kinetic screen interfaces play a key role in our lives, and there is a need to investigate how we may understand as well as design them in order to make the most of their potential.

The term *double mediation* has previously been developed to account for how a kinetic interface may function both semiotically by creating meaning (as a composition of signs), and instrumentally (as a tool) by enabling human actions to be carried out (Eikenes 2010a, 2010b). The concept of double mediation allows us to see the interface not only as a functional tool, but also as a rich cultural artefact, and how its

meaning and use is situated in specific social and cultural contexts.

How may the concept of double mediation be used for investigating how kinetic interfaces may affect and engage us? I will investigate double mediation theoretically as well as practically, by using it as an analytical concept in analysis as well as a generative concept for design. First, however, it is necessary to describe the theoretical views and concepts that are adopted in this paper.

THEORETICAL PERSPECTIVE

A SOCIOCULTURAL VIEW ON INTERFACES

This paper adopts a sociocultural perspective on interfaces, design and use (e.g. Morrison 2011). A basic assumption in sociocultural perspectives is that the relationship between people and the world is mediated by activities in which symbolic as well as physical tools and material artefacts are used. This notion of mediation stems primarily from the work of the soviet psychologist Vygotsky (1978), who found that higher psychological activity and development is mediated and enabled by the use of signs and language, in a similar way to how activity in labour is mediated by tools. Wertsch (1991), drawing on the work of Vygotsky and his colleague Leont'ev, describes these tools and artefacts as 'mediational means' that are created and developed by human culture over time. Following the sociocultural perspective, digital products and their interfaces can be understood as meditational means. The notions of action and activity are central to this view, and according to Wertsch, mental as well as physical actions must be understood as being situated in specific cultural, historical, and institutional settings. Further, a distinction proposed by Wartofsky (1979) is useful for talking about artefacts and their meditational role. Wartofsky proposed a three-level hierarchy of mediating artefacts, in which *primary artefacts* are seen as tools used in production, *secondary artefacts* are representations of primary artefacts, their production and 'mode of action', while *tertiary artefacts*, such as works of art, are autonomous and imaginative worlds that can change the way we see the actual world and thereby change our practices. I have previously argued that kinetic interfaces can

work as both primary, secondary and tertiary artefacts (Eikenes 2010b).

A kinetic interface may also be conceptualized as a multimodal text, drawing on social semiotics and especially the work of Kress and van Leeuwen (2001). As a multimodal text, the interface can be seen as a communicating artefact and semiotic composition, one that communicates through a range of semiotic modes such as colour, typography and movement. By looking at the interface as a multimodal text as well as a mediating artefact, we may understand the interface as a symbolic artefact in its own right as much as a practical tool that mediates human action. This is radically different from how interfaces commonly have been regarded in the field of Human-Computer Interaction (HCI), which has often adopted cognitivist and functionalistic views on interfaces.

ENGAGEMENT AND KINETIC INTERFACES

In HCI, animation and movement in interfaces has not received much attention. When it has been addressed, the focus has most often been on usability and ease of use, and not on cultural and semiotic aspects, play or engagement (e.g. Baecker & Small 1990; Petersen & Nielsen 2002). On the contrary, animation has often been regarded as something negative, something to avoid. For example, usability guru Jakob Nielsen has stated that "in general, it is best to minimize the use of animation" (Nielsen 2000: 143). In my opinion, he sees the interface only as a primary artefact, that is, as a more or less innocent tool for carrying out tasks. By expressing such an attitude he indicates that he does not consider interfaces as valuable cultural artefacts in themselves, that is, as secondary and tertiary artefacts.

Some efforts have been made to describe how visual movement in interfaces may be used to affect and engage users. For example, when Jonas Löwgren explores the aesthetics of interaction design, he mentions animation as one of the properties that may lead to specific 'experiential qualities' such as fluency (Löwgren 2007a) and pliability (Löwgren 2007b). Movement and affect are tightly coupled; in theatre and dance bodily movement is used actively to convey and evoke emotions. However, as Vaughan

(1997) points out, bodily movement is very different from the movement of objects on screens.

How may we design kinetic interfaces that engage and affect user? Jay Lemke, a leading researcher in sociocultural theory as well as social semiotics, argues that it is unlikely that we may come up with universal guidelines for designing interfaces that evoke positive affective responses, given "the variation in users' backgrounds (social, cultural, biographical, temperamental); the combinatorial effects of feelings regarding technologies, media, genres, content, etc.; and the effects of embedding activities and contexts (situational and temporal)" (Lemke 2010: n. pag). A further challenge is, as Löwgren (2007b) points out, that the quality of the experience is neither a property of the artefact nor a physiological property of the user; it is a relational quality that appears in use. A specific emotional response to movement cannot be fully predicted. However, based on empathy and a deep understanding of users' sociocultural background as well as their needs and desires, designers may create potentials for affect and engagement as well as meaning and action. As Lemke points out, meaning and feeling are intrinsically linked together; "Meaning and feeling are two words for a single experiential reality. One emphasizes the descriptive, the other the evaluative aspect of our sense of something" (Lemke in press: n. pag). In order to understand how interfaces engage and affect us, we need to consider how the interface mediates activity (what we are able to do by using the interface, and how well we are able to carry out actions) as well as how meaning is created through the use of semiotic resources. I will now address these issues.

INSTRUMENTAL AND SEMIOTIC MEDIATION

Based on the understanding of mediation from the sociocultural perspective, it is possible to distinguish between instrumental and semiotic mediation.

For understanding instrumental mediation I draw mostly on activity theory, Vygotsky and Leont'ev, who describe tools as means to an end. For example, Vygotsky describes a tool as "an auxiliary means for the solution of any task" (Vygotsky 1994/1929: 69) and Leont'ev (1977) describes tools as object by

which labour actions and labour operations are performed. Further, Vygotsky talks about tools as being externally oriented, towards mastering nature, in contrast to signs, which are more internally oriented, towards mastering oneself. So when I talk about instrumental mediation, I mean using the interface as a means to an end, as a tool in activity. In this paper I will also refer to the concept of *interface action* (Eikenes 2010a) to refer to the actions that a user performs with and through an interface. This understanding of action draws on the classification of activity by Leont'ev (1977), in which actions are carried out through a series of operations to realize objective results in the world.

In semiotic mediation, the term mediation is used slightly differently. Here, the focus is more on meaning and communication rather than activity. Drawing on semiotics, meaning can be seen as communication through signs, that is, something that stands for something else. Media texts, such as movies, images and music, as well as physical artefacts, can be seen as communicating meaning. As the semiotician Roland Barthes (Barthes 1994/1964: 182) has pointed out, "all objects which belong to a society have a meaning". An interface may be seen as such an object or text that communicates through its multimodal design (Morrison 2011). For accounting for semiotic mediation, I draw on social semiotics, and especially the work of Kress and van Leeuwen (2001). Rather than seeing meaning as fixed through signs, they talk about *semiotic resources* that have potential meanings that are socially constructed, continuously being negotiated and redefined as they are used over time in practice. Meanings are therefore neither objective nor subjective, but inter-subjective. Hence, if a given product or interface is used worldwide, the meanings and affects connected to it may differ from one country to another, from one group of people to another, and from one person to another.

The distinction between the instrumental and the semiotic, between sign and tool, may seem clear, but is a complex one. Bødker and Andersen (2005: 361) state that "clean instrumental and semiotic behaviour are only theoretical endpoints of a scale", and refer to the interplay between semiotic and instrumental activities as 'complex mediation'. Andy Blunden

(2010: 151) has also rejected a sharp separation, writing that "While 'tool' and 'symbol' have different meanings, there is no sharp line separating them. (…) tool and symbol form a continuum. Whether tool or symbol, the artefact always entails a relation, direct or indirect, to other people".

DOUBLE MEDIATION

I have previously proposed and applied the concept *double mediation* for analysing kinetic interfaces (Eikenes 2010b). The term refers to how kinetic interfaces may function both as tools and signs in instrumental and semiotic mediation respectively. The concept of double mediation has been visualised in a model that indicates the complex relationship between the interface as tool and interface as sign (Figure 2).

Figure 2. An abstract model of double mediation; the interface is seen as both sign (semiotic mediation) and tool (instrumental mediation). The model was developed by Eikenes (2010b).

In this model of double mediation, the tool is enclosed in the sign to indicate that there will always be a process of interpretation to understand the potential use and meaning of an interface before using it as a tool. The process of interpretation then continues throughout use, as the user interprets the results of his or her actions. The degree to which an interface works primarily as sign or tool may vary from one product to another, from one user to another, and from one situation to another. For example, some interfaces put expressive, aesthetic and semiotic aspects at the core, while instrumental aspects and tasks are more important in other interfaces. The sociocultural approach that this model builds on is a dialogical one, which emphasises the interdependency of self and other, the mind and the world. The dialogical is also at play in double mediation; there is a constant dialogue between action and semiosis, between doing and interpreting. It is my aim for this paper to investigate this relationship in more detail, through analysis as well as design.

DOUBLE MEDIATION AS AN ANALYTICAL CONCEPT

In the introduction, I asked how the concept of double mediation could be used for investigating how kinetic interfaces may affect and engage us. I will now consider how the concept may be used as an analytical concept, that is, as a means for reading, analysis and interpretation. I will do so by applying the concept of double mediation to a set of interface examples, bringing attention to the relation between the instrumental and semiotic aspects of these interfaces.

The analytical approach I am taking here is that of *textual analysis*, which is a mode of research widely applied in the humanities. Here, the notion of text is used to describe different media types such as movies, advertising and interfaces. Roland Barthes (1970) developed textual analysis to emphasize the active role of the readers in the interpretations of texts. Following this, I will here present my own interpretations of the interfaces, based on my own cultural background and experiences.

The analysis will focus on one specific device, the Apple *iPad* (Figure 1). There are three reasons for this; first, the iPad presents a kinetic interface in which movement is used in a range of different ways. This is, among other things, a result of the possibility of installing and using a large number of applications, popularly referred to as *apps*. Second, the iPad is a relatively new product that has received a lot of attention in the past two years. Third, many regard the product as a highly successful and commercially important product. While some people tend to describe the interface of the iPad as simple and natural, my aim is to bring attention to the iPad as a complex multimodal text, focusing on its broad use of movement, ranging from the instrumental to the semiotic. I will go through five different examples of how movement is used in the screen interface of the iPad. In the analysis, I will draw on double mediation as well as related terms and concepts.

EXAMPLE 1: OPEN & SCALE IMAGES
The first example is from the Photo application on the iPad, which allows users to see the photos they have saved on the device (Figure 3).

Figure 3. Scale and open images in the Photo app. Video: http://j.mp/figure-3

To scale and open an image in a Photo gallery, the user may carry out what Apple calls a 'pinch gesture', which involves gradually changing the distance between two fingers touching the screen. The interface action of the user here is to open or enlarge the image, and the image is scaled and rotated accordingly. In terms of instrumental mediation, the movement on the screen supports very directly this action. Here, the user is continuously controlling the image, thereby navigating from the overview to the specific image. This is not the traditional way of scaling images on a desktop PC, where one would typically enlarge an image by using a keyboard command or a pointing device to push a button or slider. On the iPad, the user is allowed to scale and open the image in a more direct and playful manner, without using intermediaries such as buttons or pointing devices. The media object itself has become the input device of the interface.

For understanding how this kinetic feature communicates and becomes meaningful to us, the concept of *experiential metaphor* is useful. Drawing on van Leeuwen (2005) and social semiotics, experiential metaphor refers to how we can understand what is happening on the screen based on previous physical and cultural experiences. In this example, I would suggest that we read this movement based on our previous experience of moving and stretching things in the physical world. This is an experience that is shared by most people, and provides a sense of mastering the elements on the screen. However, the interface assumes that the user can provide precise and coordinated finger movements, and thus can exclude certain users with reduced abilities. Further, this kind of movement works well when it responds to

users' actions immediately, but it might result in frustration and irritation when the device gets older and slower, and does not manage to follow the operations of the user.

In terms of double mediation, the instrumental and the semiotic is highly connected here, as the action of opening and enlarging images on the screen is tightly connected to a kind of movement that is meaningful as an experiential metaphor. In my opinion, this movement engages the user primarily through instrumental mediation by enabling and supporting his actions. This has been indicated in the model of double mediation by enlarging the tool area and reducing the sign area (Figure 4, left). The aim is not to specify a precise mathematical relation, but rather to reveal my own interpretation and experience of this interface by making the changing relationship visible.

Figure 4. Double mediation in Example 1 (left) and 2 (right).

EXAMPLE 2: SCROLL IMAGE GALLERY
The second example is also from the Photos application, namely the action of scrolling down a page of images. This interface action is carried out by sliding a finger vertically along the screen (Figure 5).

Figure 5. Scroll the gallery of images by sliding a finger vertically. Video: http://j.mp/figure-5

As the user is scrolling, a small grey vertical line in the lower right corner of the screen indicates how far down the user is on the page. When he reaches the bottom of the page, the line becomes smaller as he

tries to go further. There is a kind of resistance in the page as one tries to continue: it goes on a bit, but then jumps smoothly back. This is an instance of what has been called *virtual kinetics* (Eikenes 2009) – denoting the sensation of a magnetic or physical force, such as gravity, attraction or repulsion. This instance of virtual kinetics supports the action of scrolling by indicating that the user has reached the end of the page. A similar scroll indicator has recently been introduced in Apple OSX Lion, but is otherwise a break from the conventions we know from web browsing and scrolling on PC's and Mac's, in which a page simply stops when you reach the bottom. Consequently, one could argue that this instance of virtual kinetics is not necessary, seen from a purely utilitarian perspective.

When it comes to semiotic mediation, I would like to suggest that this employment of virtual kinetics also could be understood as an experiential metaphor, based on our experiences of stretching something physical, like a rubber band. Here, the phenomenon of stretching has been transferred to the screenspace of the iPad. By allowing the user to manipulate and play with the interface, the iPad enables a range of experiences related to play, exploration and physical manipulation.

In my understanding, the function of this kinetic feature is more directed towards the semiotic than the instrumental (Figure 4, right). This employment of virtual kinetics is not primarily to support the interface action of scrolling the page, but rather to allow the user to experience a sense of resistance and elasticity in the interface, which also in a playful manner tells him that he has reached the end of the page.

EXAMPLE 3: OPEN & SWITCH APP
The third example is related to how applications are opened (Figure 6), and how one can move or switch between applications, popularly referred to as 'multitasking'.

Applications are opened by touching the app icon. In order to switch to other applications that are already open, the user has several options; he can push the physical home button to go back to the home screen and start the app from the app icon; he can open the multitasking bar (by pushing twice at the physical

iPad-button or use four or five fingers to swipe it up) and then tap an app icon; or, he can swipe left or right using four or five fingers to move between open apps.

Figure 6. Opening an app on the iPad. Video: http://j.mp/figure-6

Each of these actions of opening, switching and closing applications have different movements connected to them, which in various ways support the interface actions. As such, this is a typical example of instrumental mediation, in which movement is used to support the actions of the user. However, seen from a semiotic point of view, movement does not only support the actions of the user. When opening an app, the app emerges and scales up from the middle of the screen, as if emerging from the depth of the device (Figure 6). At the same time, it pushes the other apps away. This is a kind of movement may be described as *motional transformation* (Eikenes & Morrison 2010), in which the screenspace is gradually transformed through movement. The opposite movement happens when closing an application: the app retracts towards the middle of the screen and disappears. Interestingly, the app does not emerge from the original icon on the screen, as it does on a Mac. This indicates that the symbol for an application and the application itself are somehow detached: the symbol is not presented as the app, it is presented only as a link to the app.

When switching from one application to another using the multitasking bar, there is a different kind of movement; the previously active application moves a bit to the left before moving away from the screen and the user, into the background (Figure 7). At the same time, the new application appears and enters from the background, partly sideways, on the right side of the screen, before fitting into the screenspace. Considering the interface as a tool, this movement supports the action of switching from one application

to another by indicating what is happening: one application is moving into the background while a new one is brought forward. Semiotically, this may bring associations to the shuffling of cards, with corresponding experiential references to gameplay and social interaction.

Figure 7. Switching between apps using the multitasking bar. Video: http://j.mp/figure-7

When switching from one application to another using the horizontal swipe gesture, the transition that follows presents a radically different spatial relationship between the open apps. Here, apps are presented as being positioned horizontally next to each other; when swiping left the currently open app leaves by moving left and the 'neighbour' app enters from the right, as if they were physically connected or placed next to each other on a wide canvas (Figure 8). When sliding the apps horizontally they are slightly scaled down, as if to indicate that they need to be detached from the 'back side' of the screen in order to be moved.

Figure 8 Switching between apps using the horizontal swipe gesture. Video: http://j.mp/figure-8

The combination of the swipe gesture and the horizontal transition allows the user to move between open 'neighbouring' apps in a manner more efficient than if using the multitasking bar. However, if the user wants to go to an app that is not a neighbour of the currently selected app, he has to navigate past all the apps lying between them. Depending on what the

user is aiming for and what he knows about the open apps and the order they appear in, this navigational feature may turn out to be either emotionally satisfying or highly annoying and confusing.

From a semiotic point of view, it is interesting to observe that the iPad makes use of kinetic features that present two very different spatial 'models' or compositions of open apps. Using the swipe gesture, we get to see the apps placed next to each other as if they are always open and ready for use. In contrast, when switching apps using the multitasking bar, the apps enter from - and disappear into - the dark depth far 'behind' the screen, leaving the user unaware of where the other open apps are located. As double mediation, movement is here used to support the interface as tool as much as it is used for communication as sign (Figure 9, left). The motion is very closely connected to the actions of the user, and supports these actions. However, the movement also communicates semiotically, prompting interpretations and associations to what is happening on the screen.

Figure 9. Double mediation in Example 3 (left) and 4 (right).

EXAMPLE 4: MOVE & EDIT APPS

The fourth example concerns the action of moving and deleting applications on the iPad. In order to do so, the user must tap and hold on an application icon for about a second. As a consequence, all the icons start to wiggle, and apps that can be deleted get a small 'x' in the upper left corner. When this happens, it is possible to move the applications by dragging them around, or delete them by tapping the x-symbol.
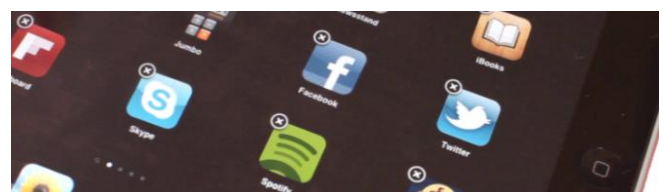

Figure 10. App icons in 'wiggle state', ready to be moved or deleted. Video: http://j.mp/figure-10

The wiggling of the icons indicates that the user can move and delete apps. However, this movement is not really essential for these actions; the actions would work fine without the wiggling. Semiotically, however, the wiggling is communicatively very strong: as I see it, the wiggling indicates something unstable and precarious. The app icons are 'animated' in two senses: they move visually, and as a result they appear to be imbued with life. As such, this is a typical example of anthropomorphism – the attribution of human characteristics to objects. It is almost like the applications are shaking because they are cold and freezing, afraid of being deleted or bullied around.

In my opinion, the function of this kinetic feature is more directed towards the semiotic than the instrumental (Figure 9, right). The wiggling symbols are not primarily supporting the interface actions of rearranging or deleting apps, but rather engage us through the playful and humorous use of animation.

EXAMPLE 5: ENTER BOOK STORE

The fifth and last example is from the iBooks application, which is an app designed by Apple for buying and reading electronic books on the iPad. The books that the user has downloaded are placed on a virtual bookshelf, so that the user can see the front covers of all the books. The action of going to the bookstore is initiated by tapping the 'Store' button located in the top left corner of the screen. As a response, the bookshelf rotates (Figure 11), and the bookstore appears, as if the store is placed on the other side of the bookshelf. While the library is presented as a bookshelf, the Apple bookstore is presented in a completely different manner, using conventions we know from web and PC interfaces.

Figure 11. Entering the bookstore in Apple's iBooks application. Video: http://j.mp/figure-11

In this example I will focus only on the interface action of going from the library to the store. Understood as instrumental mediation, it is clear that the rotation of the bookshelf supports the action of going to the store, but it does so in a rather unusual way, compared to other shopping interfaces. From a semiotic point of view, I find this movement very intriguing. Here, I would like to suggest that the concept of *intertextuality* could help us to understand the meaning potential of this movement. I have previously (Eikenes 2010b) referred to the concept of intertextuality, which is a well-known concept in semiotics and discourse studies, to explain how we always read and interpret kinetic interfaces against other texts, including interfaces and movies. For example, I have seen rotating bookshelves leading to secret rooms and passages in movies like *Batman* and *Indiana Jones*, and such bookshelves are also present in video games like *Myst* and *World of Warcraft*. As a consequence, for me this rotating bookshelf alludes to something secret, magic, and maybe a hidden treasure. Seen from a commercial perspective, such a kinetic feature may put me as a consumer in a more shopping-friendly mood, eventually increasing Apple's revenue.

In my view, this rotating bookshelf engages and affects us mostly through its semiotic mediation, even though it also supports the action of going from the library to the store (Figure 12, left). However, here I would also like to suggest that the degree to which this transition works primarily as tool or sign may change over time. The first time I saw this transition it caught my attention immediately, fascinated me and made me go back and forth between the library and the bookshelf several times. As I have become more used to the transition, it no longer grabs my attention in the same way. As a consequence, I would argue that this movement has become less semiotically rich in itself, and it now feels more naturally associated with the action of going from the library to the store (Figure 12, right).

Figure 12. Double mediation in Example 5. From a user's standpoint, the degree to which a kinetic feature works instrumentally and semiotically may vary over time.

A NOTE ON THE APPLE IPAD

Working as a professional designer I often hear from clients as well as other designers that Apple's products succeed because they are 'simple'. I do not agree. In terms of instrumental mediation the iPad may appear simple – in that Apple makes it easy for the user to carry out a range of activities and interface actions, compared to many competitors. However, through semiotic mediation and visual communication, Apple has developed a highly sophisticated visual language, including gradients and textures, shadows and highlights, and especially visual movement. When it comes to kinetic features, Apple draws on well-known techniques from the art of animation. In addition, the interface of the iPad is highly responsive and quick - at least when the device is new. There is nothing 'simple' about this, neither in its design nor the technical implementation.

It is however also possible to criticise Apple's use of movement. For example, users themselves are not able to decide or change the ways in which movement is used in the interface. This may not be surprising since Apple is known for making decisions on behalf of their users - as if Apple knows what is best for you. As we get more used to kinetic interfaces, there is a potential for allowing users themselves to decide how movement should be used in the interface. This could for example be provided through settings, templates or plugins. That being said, it seems that most Apple users are happy with their kinetic interfaces.

REFLECTIONS ACROSS THE EXAMPLES

The aim of analysing the examples was to consider how the concept of double mediation may be used as an analytical concept, that is, how it may be used as a means for reading, analysis and interpretation. I have analysed five examples of how movement is used on

the iPad, and how motion may engage us through double mediation: motion may be used instrumentally, helping users to carry out specific actions, and semiotically, to communicate and create meaning. The examples differ in their use of movement; in some examples, such as the first and the third example, movement is used very directly to support the actions of the user, and thereby supports the interface in working as a tool in activity. In the second and fourth example, movement is used in ways that do not primarily support the actions of the user, but provides rich semiotic resources that enable multiple interpretations and meanings to be made. Here, the relationship between the instrumental and semiotic is complex and not clear-cut. Importantly, as argued for in example five, the degree to which an interface works semiotically and instrumentally may change over time, affected by time as well as context and previous experiences. Double mediation does not entail a stable or fixed relationship – it depends on the reader or user of the interface, as well as the cultural and historical context in which it is used. What I have presented here is my own interpretations, which may differ from your readings of these examples.

Interfaces are often regarded as either purely utilitarian tools or texts for reading and contemplation. For example, Bannon and Bødker (1991) want to look beyond the interface to the tasks in which it is used as a tool, while Manovich (2001) sees the interface as a medium with strong connections to the history of cinema, print and pictorial art. For the design and analysis of kinetic interfaces that moves us, we need both approaches. The notion of double mediation is therefore important, as it can help us to see both sides at the same time.

DOUBLE MEDIATION AS A TOOL FOR DESIGN

After using the notion of double mediation as an analytical concept for interpretation and analysis, I will now consider how double mediation may be used as a tool for design, that is, how the concept may be used as a means for practical experimentation and actual design production. As Jay Lemke has pointed out, the goal of theory is not to make an account of how things are, but to develop "a critical way of analysing, doing and creating" (Lemke 1995: 157). Similarly, within the

field of interaction design, Kaptelinin and Nardi (2006) has proposed that theory in interaction design should be "descriptive and generalizable enough to be a practical, useful tool in interaction design". In other words, our theories and concepts should not only be useful for analysis, but also for actual design activities. In contrast to many researchers who study interfaces, I am trained and work as a professional designer, and I have previously taken a 'research by design' approach to research kinetic interfaces, drawing on my own designer skills for exploring how movement may be used in interfaces (Eikenes 2009, 2010a).

How may the concept of double mediation, as a theoretical construction, be used as a practical tool for interaction design? To investigate this, I have used the concept of double mediation to carry out a design experiment. During the experiment I have made two different versions of an application for a mobile device, in which the first version focuses on the interface in terms of instrumental mediation, while the other version focuses on semiotic mediation.

THE GIFT PLANNER

The experiment presented here was carried out in December 2010. Considering the time of the year, I decided to make some sketches of an application that would assist people in planning gifts to give away for Christmas. To limit the scope of the experiment, I chose to focus on very few interface actions: add a new gift to a list of gifts, go to overview of the different gifts, and see each individual gift you have registered. Based on this, I made two different sketches, one emphasised instrumental mediation, and the other focused on semiotic mediation.

For producing the experiments I carried out 'sketching through stop motion' (Eikenes 2010b), a technique of

sketching kinetic interfaces in which the traditional animation technique of stop motion is used. The idea of stop motion is to make visual elements appear to move by starting and stopping the camera, and moving the elements between each image. The aim of such sketching is to quickly explore diverse possibilities, and not to produce a detailed and finalized result.

In the first sketch (Figure 13), movement is used strictly to enable interface actions to take place, and the interface works primarily as a tool. In this sketch, I have followed the conventions of the iPhone and iPad, in which new elements often move in from the right as the user carries out specific actions. Gifts are presented in a traditional table grid. There is minimal use of movement, and when it is used it is primarily to support the interface actions.

In the second sketch (Figure 14), I focused on semiotic mediation. Here, the aim was to use the communicative and expressive power of movement, and thereby make a more playful kinetic interface. Following Wartofsky, this was not supposed to become solely a primary artefact, but also a secondary and tertiary artefact. In this sketch, the list view has been replaced by a three-dimensional three, under which the gifts are placed, represented by three-dimensional presents. In addition, an image of the gift has been added so as to put emphasis on the potential of the interface as a multimodal text that can make use of a range of modes and media types in order to communicate. Together, the movement and the visual elements create a more expressive and playful multimodal text. The wrapping and unwrapping of gifts are motional transformations that can be understood as experiential metaphors, alluding to our physical and cultural experiences of wrapping and
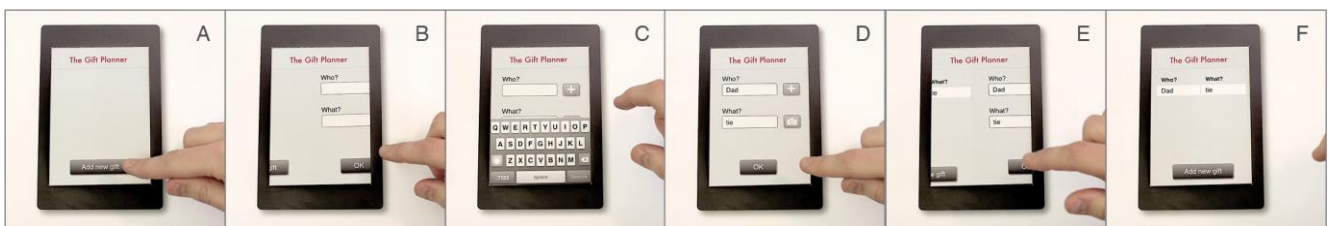

Figure 13. Sketch 1 of The Gift Planner, focusing on instrumental mediation. The user carries out the action of adding a new gift by tapping the 'Add new gift' button (A). As a result, a new view enters the screen from the right (B), in which the user fills out who the gift is for, and what the person will get, using a keyboard that enters from the bottom of the screen (C). After filling out the name and the gift, the user saves the gift by tapping 'OK' (D). The start page moves in from the left (E), and the gift has been added to the list (F). After doing this action of adding gifts several times, the user will end up with a list of people and corresponding gifts. Video: http://j.mp/figure-13

unwrapping gifts. Further, the rotating three may allude to Christmas trees, which for many people carries connotations of joy, family reunion and comfort. However, such connotations and associations depend on a person's cultural background and circumstances of life. For example, some people may associate the traditions of Christmas with loneliness, sentiment or stress, and thereby read and experience the Christmas three in a different way.

These two 'motion sketches' are the result of a design experiment in which the aim was to produce two extreme versions of the same idea. I am not claiming that either of these two interfaces is better then the other. They will probably appeal to different users, as one is more geared towards efficiency while the other interface draws more attention to itself. In order to design interfaces that evoke positive affective responses, designers need to know who the users are, their motives for using the interface, their sociocultural background and the contexts of use.

This design experiment set out to demonstrate how the concept of double mediation could be used as a tool for design. More work is needed if this concept is to become a useful tool for designers, and this experiment has only pointed to the potential of such a tool. However, I do believe that such a tool based on double mediation could be useful for design practice and education by providing a means to describe, analyse and generate kinetic interfaces. For example,

by building a shared vocabulary, such a tool could facilitate communication within a design team and help build a joint understanding of a project and its possibilities. This might further facilitate collaborative and creative design processes, which typically involve diverse people and competencies (i.e. interaction design, graphic design, and programming).

CONCLUSIONS

Through analysis and design, this paper has aimed at exploring how the concept of double mediation might be used for investigating how we are affected and engaged by kinetic interfaces, that is, screen-based interfaces characterised by visual movement. By analysing five examples of movement as used by the Apple iPad, I first demonstrated how double mediation might be used as an analytical concept - as a means for reading and interpretation. The chosen examples highlight the complexity and dynamics of double mediation in kinetic interfaces. Secondly, I pointed to the possibility of using double mediation as a tool for design – as a means for practical experimentation and actual design production. Taken together, I argue that the model of double mediation provides both researchers and designers with a valuable concept, and allows us to see that we need to consider both semiotic and instrumental aspects when designing kinetic interfaces that should engage and affect users.

One might argue that I have stretched the concept of double mediation by applying it onto itself, using it both as a semiotic analytical tool (related to
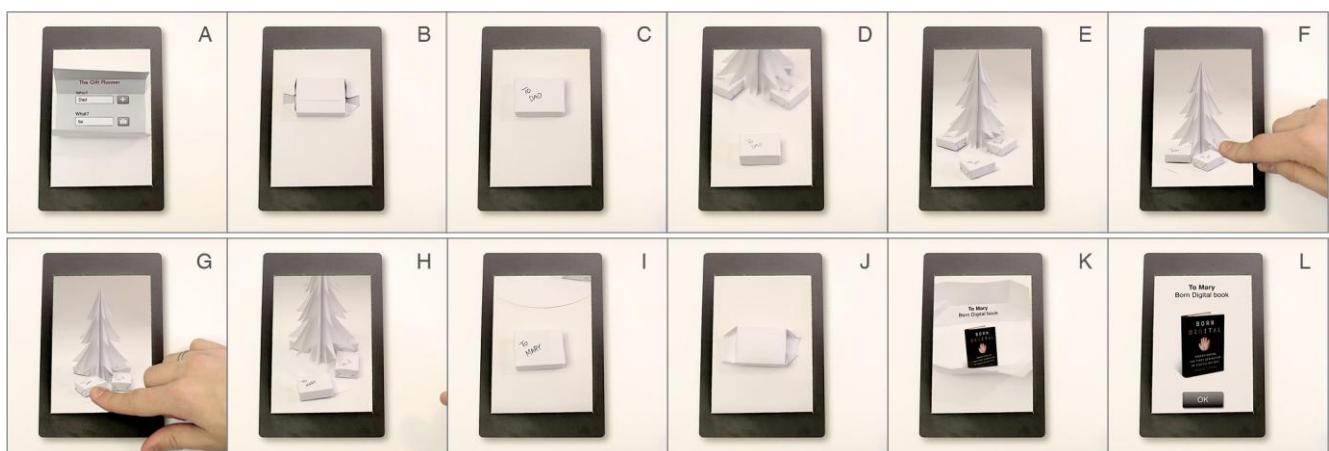

Figure 14. Sketch 2 of The Gift Planner, focusing on semiotic mediation. The starting point for adding a new gift is the same as in the first sketch (Figure 13, A-D). After the name of the person and the gift has been entered, and the user taps the 'OK' button, the elements on the screen become a three-dimensional present through motional transformation (A-C). The present is then placed under a tree (D-E). Further, the user can rotate the tree by touching the screen (F), or open a gift by tapping it (G). The selected gift is then brought forward (H) and unwrapped (I-K), so that the user can see what he wants to give to the person, in this case Mary (L). Video: http://j.mp/figure-14

interpretation and meaning making) and an instrumental tool (related to action and material production). In so doing, I have also made links between research and design, theory and practice. This also points to the possibility of applying the concept of double mediation to other concepts and practices that go beyond kinetic interface design.

Most importantly, double mediation points to the need for designers to understand users' motives and contexts of use, as well as their sociocultural background and cultural frame of reference. In order to create engaging interfaces designers need to go beyond a purely utilitarian focus on usability, ease of use and simplicity, and also consider the interface as a rich cultural artefact in its own right. After all, as pointed out by Norman (2004), interfaces that are playful and fun to use may also turn out to work better.

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