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The (Re)Appropriation of the Finnish Baby Box: The importance of sociomateriality in designing interventions for infant and maternal health and well-being.

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ABSTRACT: This article discusses the global spread of the Finnish baby box, highlighting concern that the Finnish concept and model of the box is being introduced uncritically in a diverse number of countries, spaces and places without concern for local historical, social, cultural and material understanding. Such appropriation of a significant cultural and social tool for infant health and well-being risks the material object – the box and its contents – being used to develop western, normative parenting practices whilst maintaining power relations between children, parents, expert others and the global north and south. This opens up potential mediation of parenting and childhood through the operation of bio-power (Foucault 1997, 2007) and as a form of ‘cargo cult’ (Lindstrom, 2004). To explicate these concerns this article explores the recent introduction of baby boxes in the UK before reviewing a design project to develop a culturally sensitive and particular concept of the baby box for street children in Zambia.

Keywords: *Baby Boxes, design, materiality, Zambia.*

Introduction

This paper is based on our experience of working with colleagues from the UK and Zambia on a pilot project focused on adapting and adopting the Finnish baby box in low and middle income countries (LMICs), including Zambia. It reveals aspects of our

theorising underpinning our design approach as we seek to avoid misappropriation of a significant cultural and health care object developed in the Global North for use in the Global South. In doing this, we have critiqued the recent introduction of the boxes in the UK, particularly Scotland, before drawing on this understanding in our work with women and colleagues Zambia.

Interest in the Finnish style baby box has grown in the UK, particularly in England and Scotland, since 2016. At the beginning of that year the Scottish Government developed a trial for the boxes on the island of Orkney and in Clackmannanshire, whereas in England a small number of hospitals in London and the south east of the country entered into a partnership with a US commercial baby box provider. This company has provided over 250,000 boxes across the Canada, UK and USA and has been involved in similar schemes globally, including Africa. Following the trial, the Scottish Government announced in 2017 universal provision of boxes for all new born children and the number of projects involving partnership with the commercial supplier in England has grown throughout England. Both schemes involve free provision of boxes alongside a package of maternity and antenatal care that mothers¹ in particular are required to take part in. Beyond the clinical relationship, between midwife / health visitor and the mother, the commercial company also encourages the mother to participate in an online programme of learning, specifically tailored to local need, if she is to receive a free box. Indeed, the company at the beginning of 2019 entered into a relationship with one of the UKs largest supermarket chains to provide free boxes if customers sign up to online learning. The boxes are promoted as a safe sleep space.

In Finland, the baby box is one part of a wider ‘maternity package’ that includes other health and social welfare provision through a social model that is different to those in England and Scotland. Although the schemes in England and Scotland are linked to maternity and health visiting services the development and provision of the boxes in Finland is particular to that political, social and cultural landscape, including a desire for a society based on social justice following a particular history (Risku 2014). We will argue that the introduction of the boxes in England and Scotland are based on a different set of relations and to align these with the Finnish experience unproblematically risks framing mothers, children and childhood through a biopolitical lens (Foucault 1997; 2007).

We explore the utility of the boxes through understandings of material culture, as significant objects in social life. While health and discipline specific ontologies provide insight into the well-being benefits of the boxes, the social ontology of Theodore

¹ Throughout this article we refer to mothers and children and their relation to the materiality of baby boxes. This is not to ignore that fathers too are involved in their new child’s care and ‘mother’ is therefore interchangeable with ‘father’ or ‘parents’. However, in the UK it is most likely to be mothers who are responsible in the everyday work of intimate care of the infant.

Schatzki (1996, 2002) offers the possibility of understanding their use more widely. This approach works to explain human co-existence, the togetherness of people and the phenomena through which this togetherness can be understood. Schatzki posits a relation between people's doings and 'material arrangements', that is a nexus between people's everyday practices and other people, objects, organisms and the natural world. Therefore, people, their doings, history, intersections with other people, their things and material properties, and the social contexts, spaces and places in which they are actually used are all of interest.

Developed from an understanding of the relation between people's doings and the things, or stuff, of everyday life, our research explores the design development and concept of the box for use in Zambia. Specifically, the box is replaced by a chitenge (a cloth wrap) with visual communication opportunities to become a wearable public health education/ training tool. Traditionally, the universal chitenge has fourteen uses such as a skirt, a barrier carrier and a blanket. Our exploratory engagement meetings in Zambia, (also in Vietnam and Finland) showcased a proof of concept demonstrator to stakeholders to explore its potentiality, transferability and acceptability. Our initial work enabled the advancement of three design interventions that addressing three global public health concerns: reducing malaria in pregnancy, safeguarding support for homeless children and APGAR (Appearance, Pulse, Grimace, Activity, and Respiration) education to reduce neonatal mortality. The development of info-fabric propositions demonstrates and understanding of the importance of material relations in early childhood and the potential to empower when working from the actuality of everyday experience. Importantly, this does not imbue objects with agency; rather social phenomena are constituted through a practice-material arrangement nexus (Schatzki 2002).

Baby Boxes – history, design and sociomaterial relations

In the UK the government at Westminster (for England) and the devolved jurisdictions in Northern Ireland, Scotland and Wales are responsible for health policy meaning there can be differences in each country about the access to resources and services. However, the Royal College of Midwives (RCM), a UK wide professional body, has issued a position paper calling for the universal introduction of baby boxes (RCM 2018) so that they would be made available within each of the jurisdictions as part of a common maternity and infant well-being health policy. Both the Scottish Government and the commercial company promote their baby boxes as being based on the Finnish maternity package and claim that they are an important tool for early childhood well-being and care. However, while the box is a material artefact used alongside clinical intervention and with educational content there has been no empirical research of its relation with the wider societal, cultural and historical context and status of the box as a social phenomenon in Finland.

First introduced in 1938, the maternity package became universal in Finland in 1949, in part in recognition of an increase in infant mortality during the war and as a post-war

policy in securing the health of the nation. An important aspect of this was Finland's political, social and economic move towards a 'Nordic' style of welfare shared by other Nordic countries. In this model social equality and wider social welfare were seen as important to economic development rather than as barrier to competitiveness and growth (Kettunen 2001). Furthermore, the alignment of social democracy, economic well-being and social equality became the normative standard of Finnish society and indicative of a system based on two principles; universal social rights through citizenship, and the understanding that all work should be paid. In this latter regard mother's dual work (in employment and at home) were recognised as equally important.

There are significant differences therefore in the social history of the boxes in Finland and the contemporary context in England and Scotland. In Finland the boxes developed from the role of public health and social welfare in securing national identity, economic growth and social justice. While, integrating the maternity grant scheme into the wider Finnish welfare system and requiring mothers to attend clinical appointments have been essential to ensuring the health and social impact of the maternity package, the development of the boxes alongside the introduction of a 'Nordic' welfare state based on equality, citizenship, social responsibility and rights are central ideals. This is not the same system or the same history as England and Scotland where global, marketised economic approaches are to the fore. Finland's low infant mortality rate, consequently, has multiple contributing factors including the development of the welfare system, involving improved maternity and child health clinic services, progress in the pharmaceutical treatment of life-threatening bacterial infections, extensive vaccination programme, but also higher education, economic and living conditions, and a deeply embedded approach to social justice and tackling social inequality.

Consequently, the use of the boxes in each country is an aspect of particular national or local policy interaction so that a mother's bodily being is subjected to sociocultural practices and actions through the materiality of the box. The moment of a mother's interaction with the box is one aspect of wider 'material configurations' (Schatzki 1996) that link the development of health and welfare systems, medical interventions, concepts of social justice, equality, citizenship, pharmaceuticals, et al. Of course, some of these configurations are global and link everyday mothering practices with the box across multiple sites and countries, for example: international conventions that each country is party to; global education, welfare and health goals; or, the manufacture and supply of pharmaceuticals and a global supply chain. Nonetheless, understanding the local relation is crucial since the mesh of practices and arrangements in different countries are not the same.

This becomes clear in consideration of the design of the boxes in different jurisdictions. A baby box is a cardboard box with a lid of approximate dimensions - 70cm (length) x 42cm (width) x 27cm (height). In Finland the provision of the box is administered by the Social Insurance Institution, Kela. The design of the Finnish box (and the contents) are updated every year. The exterior motif is in colour and is always a theme based on

nature representing the Finnish social and cultural connection to exterior spaces and places and the importance of the natural environment. The Scottish box is similarly printed but in monochrome, this is to encourage older siblings to be involved by colouring the box in. The images on this box include the Loch Ness monster and the Scottish national animal, the unicorn, which is also represented on the Royal coat of arms. The Scottish box also contains a poem written in a Scottish vernacular. The Finnish and Scottish boxes are therefore culturally sensitive and include symbolic representations of place and nationhood. The design of the commercial boxes in England is agreed on a project basis so that the first London box was decorated with the ubiquitous London Transport symbol. The approach to using motif and symbols is common but the choice is particular.

In a similar way, the contents of the box are also important. In 2018 there were 64 items in the Finnish box including, a mattress in the bottom or sleeping, indoor and outdoor clothing, feeding aids, towels, bib, pacifier, sleeping bag, a book, a soft toy and personal care items. The contents of the box may vary annually, for example to include more environmentally friendly objects, a decision made by a committee of experts and Kela Indeed, the colour of clothing changes although gender neutral colours are now always used. Contents of the Scottish and commercial boxes are very similar to those in Finland although vary in relation to local need and circumstances including weather, climate and public health concerns. The boxes are otherwise designed to be used with the advice and guidance of a health care professional and are therefore an educational tool in the particular context of their use. Particularly important in this regard in the UK is the mattress that enables the box to be used as a safe sleep space. This is based on the decline infant mortality rates in Finland, anecdotally linked with the boxes since declining infant mortality rates in Finland, one of the lowest rates globally, correspond to the introduction of the maternity package. However, in 1938 when the boxes were introduced in Finland there was no knowledge of the concept of safe sleep, sudden infant death syndrome (SIDS) or sudden unexplained death in infancy (SUDI). Although high infant mortality was a concern in the 1930s this was primarily due to poor nutrition, birth defects and infectious disease (Statistics Finland 2011). The contemporary focus and emphasis on safe sleep is therefore different to the health and social purpose of the early Finnish boxes and there is no evidence of the numbers of children who sleep in the box in Finland. Furthermore, there is no evidence that boxes reduce the incidence of SIDS, indeed, *'rates in neighbouring countries, such as Sweden and Denmark, are equally low, despite them not traditionally providing boxes'* (Blair et al, 2018, p.1).

Nonetheless, the RCM (2018) and Scottish government (2017) emphasise that families living in poverty and with high levels of deprivation are particularly at risk of experiencing SIDS or SUDI. The contemporary focus therefore from UK clinicians on using the boxes to educate particular mothers on safe sleep and specific parenting practices are an aspect of material culture so, as Bourdieu (1977) argues, they are utilised to implicitly condition women and, in their primary use, are a means by which mothers are socialised as social beings. The experience of mothers, her

practice-arrangement nexus, is therefore one aspect of a chain of action that links her mothering practices to the nexuses of midwifery, public health, social welfare and policy development. Moreover, any targeting of mothers with low economic, social and cultural capital would be of moral concern and highlights how the web of arrangements includes political and ideological power. Consequently, when a mother uses the box her mothering practice is tied to the web of arrangements that have been involved in the design, manufacture, provision and conceptualising of the box (Schatzki 2002). Her practice-arrangement nexus in interacting with the box links from the intimacy of her local being and doings to a wider web of nexuses composed of sociocultural, theoretical and political understandings that promote particular health and well-being approaches.

The boxes and their use are therefore an example of a social phenomenon in the nexus of human practices and material arrangements. Consequently, it can be argued that the boxes are a governing technology aimed at affecting mother's subjective and idealised selves. Indeed, Schatzki (1996), in the early development of his work, drew on Foucault to explore the body's relation with society and how the body is transformed through sociocultural practices and phenomena. The purpose of the boxes therefore, through their design and contents, is in educating about normative parenting practices which is embodied by mothers through the material culture of the box. The box is both an aspect of educational process and product. The intention is to frame certain desired parenting behaviours enacted between child and mother and mother and professionals through a series of encounters. The box is a material object involving people, their bodies, texts, and educational, political and socio-medical technologies in relation with a range of 'material connections through which they become assembled in nets of action and influence' (Fenwick and Richards 2011, p711). In each country mothers are a market to be appealed to and it is this which gives the socio-material relation of the box its politics.

Bodies and Power: A political understanding for the appropriation of baby boxes

Foucault's (1997; 2003) positing of biopolitics is helpful in beginning to unpick the structural power, which frames the box as a governing technology in the practice-arrangement nexus of its use. The introduction of the boxes in Finland can be argued to be an example of the first wave of biopolitics since the boxes emerged at the same time as the Finnish state began a programme of modernisation from an agrarian to industrialised society. There was a political movement aimed at developing and strengthening the Finnish indigenous population and language through a form of centralised population management. However, as Finland has subsequently moved to a more socially equal democratic society base on 'Nordic' welfare principles, biopolitics has developed to mean a form of governmentality, specifically, the intellectual framing of the social world and issues within it as something that political technologies can mediate and change (Lemke 2001). This framing is different between Finland, England and Scotland. While Foucault (1997) argues that the process of mediating people's behaviour to something to be desired is an exercise of knowledge, power and control, how this relation manifests is contextual.

Knowledge and power and the process of biopolitics is vested through nexuses of practices and material arrangements, so that in the project areas in England and Scotland, class and poverty were aligned with the particular needs of the elite. While the Scottish Government can argue that the provision of the Scottish box is universal, the aims of the pilot phase in Orkney and Clackmannanshire, from January to March 2017 included:

reducing socio-economic inequalities by ensuring every family with a newborn has access to essential items, and, informing parental behaviours that will positively impact on outcomes for the child, including safe sleeping practices, attachment and parent-child interaction (Scottish Government 2017, p.i).

The focus on parental behaviours and on socio-economic inequalities is not surprising since both the Organisation for Economic Co-operation and Development (OECD) (2001) and the United Nations (Unicef 2017) argue the early years is significant in the foundation of knowledge, skills and learning necessary for economic prosperity and a key component of a successful educational, social, and family policy agenda. Indeed, it is difficult to argue against the need for a good start in life as necessary to achieve positive later outcomes, however, the evidence is sometimes thin. Indeed, there is no empirical evidence of a correlation between the boxes and improved outcomes for children. As highlighted above, the appropriation or mis-promotion of evidence is of concern and has been challenged. For example, on the boxes as a safe sleep space, Kela are concerned about the claims being made in Scotland and beyond (Carrell, 2018a) and Professor Peter Blair revealed to the Guardian (Carrell 2018b) that he advised the Scottish Government:

baby boxes should not be promoted as a public health strategy without the evidence being in place... Claims they helped cut cot deaths in Finland are based on 'tenuous' and unproven evidence contradicted by the experience in other Scandinavian countries.

Furthermore, attachment theory has been criticised for being parochial and essentialist (Burman 2008). The embeddedness of the theory in developmental psychology and its relation to normative parenting practices treats mother's every day experiences of child care as an aspect of individualistic ability and cognition. There is a danger of pathologising those women and groups who do not meet the idealised requirements of the theory as 'other' (Buchanan 2013), rather than developing an understanding from their experience of their capacity and the social, cultural and material milieu in which it is mediated. The concern is that the evidence to support attachment theory is particular since it ignores other possibilities. In this regard the evidence is being used for the purpose of supporting a policy initiative and of strengthening the theory's own claims, it comes from a weak ontological position (Smith 2005). Care should be taken as it is possible, to misappropriate the box, to frame mothers, as potentially harmful to their

child's development through interpretative work that reduces the mother to an essentializing and individualizing 'I'. We would argue this is contrary to any purpose that is claimed to be based on collaboration, the redistribution of resources, social justice and participatory parity (Fraser 1995, 2007).

Finally, on the aim of enhancing parent-child interactions the Scottish Government's own review (2017) says remarkably little. Focused on reading and play the review comments on the provision and use of reading books and a play mat, highlighting that for some parents it did encourage engagement. It does acknowledge however that the parents would interact anyway. There is no empirical evidence of the process of interaction, the context of the interaction, for example of the people, artefacts, organisms or things of nature that constitute material arrangements (Schatzki 2002).

The introduction of the boxes without empirical evidence or consideration of a wider social ontology amounts to hopes and aspirations for the boxes as a clinical intervention. It sets clinicians in a particular position of deciding needs and how they should be met. In particular, there is a concern that 'intelligibility' (Schatzki 2002), that is, the practical use of the box based on its design, properties, contents and ease of use are mediated through a biopolitical lens. A key question arises of the link between the sociomateriality of the box and learning, since learning not only involves gaining competence but 'attunement', or even interruption, (Fenwick 2015) to the desired practices in the mother's practice-arrangement nexus. This raises questions of the use of what Foucault calls pastoral power (Dreyfus and Rabinow 1982). Pastoral power, at a most basic level, is about the power of care, following the argument that some people, for example clinicians through their knowledge and position, know more of what's good for you than you are able to discern for yourself. This establishes a position of power since the person who knows is in a caring, or pastoral, role and it is anticipated the person cared for will follow their guidance.

Pastoral power in the context of an uncritical approach to the introduction of baby boxes creates subjects of mothers, who are expected to engage with the materiality of the box, under the direction of a knowing other, and to be submissive to its aims and objectives. This includes an element of self-control and surveillance and, while it involves a relationship between one person and another, the power is exercised by an organisation, the health service, as an aspect of disciplinary power and 'subjectivation' (Foucault 2007) so that the person cared for is made aware of normative practices and expectations of the state. The evoking of pastoral power in a context of infant and maternal well-being can be argued therefore to be an example of biopower since it involves state actors focused on people in their everyday lives with the intention of people taking responsibility for their practices within a particular politico-medical moral frame.

Developing Culturally Sensitive Practices

The developing discourse of baby boxes as a safe sleep space and an essential tool in addressing concerns about infant mortality ignores that knowledge and understanding are relative to historical and social contexts and is derived from a particular ontological standpoint (Alanen 2017). The assumptions about the potential of the box use to underpin its introduction outside Finland are based on notions of western child development theory and normative standards for attachment, growth and well-being. The argument isn't that baby boxes won't help, it is that this needs to be based on empirical evidence and an understanding of how needs are being identified, assessed, met and by who to what ends. This includes explicating both ontological and empirical claims. In her critique of western developmental psychology, which includes attachment theory, Burman (2001) raises concerns about the power of scrutiny and judgement based on narrow definitions of what is required. This she argues is of moral and political concern since it is typically those in positions of power and privilege, not the child or the mother, developing the moral position. This 'morality of exclusion' deals in partial or 'fictional fantasies of childhood' which normalise 'the heteroerotic character of intimate physical caring between parents and their small children' (Burman 2001, p.19). This is because of the focus on the individual child and on individual relationships when child development and developmental psychology involve an historical array of knowledge and learning from a myriad of sources and places, although particularly western in origin.

Child development is based on a synthesis of evidence of multiple children and childhoods (a web of practice-arrangement nexuses) yet through the box it is reduced to a specific child and specific mother at a specific time, place and position. This particular arrangement ignores other ways of doing things that are relevant in different cultures and for diverse peoples. There is an ontological and theoretical move from description and multiple practices to prescription that ignores the social and wider relations and reduces the complexity of knowledge to a set of 'natural', measurable practices against which people can be assessed. Their introduction of the boxes into the everyday work of mothers is political and there is a need to develop an understanding of the concept of care and well-being which the box seeks to achieve, through re-appropriation involving intimate understanding of all stakeholders, including those mothers who are intimately involved in its use.

Concerns about the transfer of normative parenting guidance and practices between western contexts is amplified when these are unproblematically transferred between the global north and global south. We should not assume that the concepts and approaches inherent in the materiality of the box are immediately apparent to others, nor that the politics is the same (Grimes, Sayarath & Outhaithany, 2012). This is also relevant to us in our work with partners in Zambia since we should not assume that understanding of research, including research ethics is shared (Israel, 2017). To do so risks developing a form of 'cargo cultism' (Lindstrom, 2004) where both the object of research and the researcher attain iconoclastic status. Instead, it is necessary to develop our work from the standpoint of the everyday practices and experiences of the mothers (Smith, 2005) who live on the margins with limited resources.

Working with partners in Zambia, we are exploring the potential of adopting and adapting the ‘concept’ of the Finnish maternity package for local use, particularly with young people, including mothers and their children, who live on the streets. From the outset, we developed an approach to understand these young people’s needs that included the actuality of their everyday experience (Tronto, 1993) involving the familiar objects of everyday use. Their concerns are not those of the UK for safe sleep, rather they are similar to those in Finland when the boxes were first introduced – disease, nutrition, understanding what to do when assistance isn’t immediately affordable or available. This gave rise to questions of the materiality of baby boxes, including their physical qualities, local parenting practices and social and cultural context. Specifically, concerns were raised about the practicality, affordability, sustainability and cultural acceptance of a box as a sleep space. Consequently, we were introduced to the ‘chitenge’, discussed further below, an everyday piece of printed clothing with multiple uses including for child rearing. In seeking to avoid our own misappropriation of the boxes into a Zambian context we began to explore the potential of the chitenge as an adaptation of the Finnish maternity package by drawing on historical precedents and understanding of everyday sociomaterial relations.

Thinking out of the box

Howitt (2012) provides valuable insights in the context of misappropriation of the baby box from the global north to the global south. His study investigated the potential for simple technological interventions to have a significant impact on global health challenges for resource-constrained settings arguing that such interventions do not necessarily have to be complex devices. To validate this claim, Howitt cites case study exemplars that demonstrate the humanitarian and financial benefits associated with adopting a frugal approach to developing innovative healthcare solutions, specifically: ColaLife project in Zambia, the kinetic powered ShakerScope, and Unicef’s bed net programme. Howitt concludes that Ministries for Health in low-resource settings should not try to replicate expensive models of intervention as used in high-income settings, but for local context to be the driver for innovation, and for high-cost providers to recognise the reciprocal benefits from taking such an approach.

But what is frugal innovation? Weyrauch and Hersatt’s (2012) conducted a systematic literature review to identify the attributes and characteristics intrinsic to frugal innovations. Their study reviewed 62 papers and conducted interviews with 45 managers from a range of multi-national companies that operated globally, including Europe, North America, Asia, Australia and the Middle East. They initially identified nine primary attribute categories: functionality, lower purchase price, reduce ownership costs, economical using of physical and financial resources, user-friendly, robust, high value and quality, scalable and sustainable. Further analysis, identified that these noted characteristics could be further integrated into three thematic categories: cost reduction, core functionality and optimised performance. They argue that all three characteristics must be evident for a product to be considered frugal.

Through this lens the baby box merits closer scrutiny. Clearly, it is a product introduced for social good and use of a cardboard box primarily as a functional safe sleep space suggests it satisfies all three criteria. However, its qualification is merely superficial. Its materiality misdirects our senses into believing that this is a frugal solution that can be transposed into alternate geographies. While this cardboard object has the hallmarks of frugality, the system solution it resides within disqualifies it. The box itself is only one component. As these boxes are often supplied with comprehensive maternal packages (£100-500), this makes the implementation and scaling of such an initiative costly for any provider. A four year contract to roll out of the Scottish Baby Box scheme nationally to all expectant parents was reported to be £35.7 million (Scottish Government 2018)

In the global healthcare context, the United Nations Committee on Economic, Social and Cultural Rights (2008) outlines four important assessment indicators in relation to the minimum standards of health service delivery: availability, accessibility, acceptability and appropriateness (quality). More commonly known as the 4As, these like Weyrauch and Hersatt's attributes, are consistent with the expectations of healthcare providers within low-resource settings. Critically, these are also the key determinants that have significant influence on the traction and success of interventionist projects with international, national and regional stakeholders. Furthermore, the process of design is participatory by its very nature and the delivery of global healthcare project often involves a multitude of stakeholder perspectives, involving economic, social, cultural and political needs. The democratic nature of achieving design consensus often leads to a satisfice solution- a minimal viable solution that satisfies the functional requirement sufficiently to achieve the desired goal (Simon 1956).

Steve Jobs, the co-founder of Apple observed, "creativity is just about connecting things" (Wolf 1996). In addition to the theoretical and conceptual foundations informing our work, the seed that was to inform our creative approach was sowed a decade earlier in 2009. Inspiration came from the Wellcome Trust exhibition entitled *War and Medicine* that explored the inter-relationship of warfare, medicine and innovation from the Crimean war through to the contemporary conflicts in Afghanistan and Iraq. Both historical and contemporary accounts were integrated with displays of artistic works and physical artefacts. One healthcare technology resonated beyond all others for its simplicity, honesty and potential impact - Esmarch's triangular bandage. Conceived by Johann Friedrich August von Esmarch, Professor of Surgery at the University of Kiel; in 1870 he was appointed as Surgeon-General and Consulting Surgeon to the German army and widely acknowledged as an early innovator in battlefield first aid. His empathic concern for wounded soldiers led to the development of three important healthcare interventions: the tourniquet, an illustrative triangular bandage and every German soldier being equipped with a rudimentary antiseptic dressing package (Herzenberg 1988). In the bibliographical notices of *The Saint Louis Medical and Surgical Journal*, Linton and Baugarten (1869) provide a review of two essays written by Esmarch. In his second essay, 'First Aid on the Battlefield', Esmarch discussed how the triangular pieces of linen carried by all soldiers might have a greater potential as a first dressing for warfare injuries. To demonstrate his point, in 1869 Esmarch printed on this material object 21 figures illustrating a diverse range of field injuries, and crucially, how this

triangular bandage could be used ingeniously used by service men to address these emergencies. In 1873, a revised version for military use was produced featuring six figures and 31 uses. Printed on translucent cotton and crudely cut out, this three-pointed handkerchief bandage (Figure 1) measured 130cm (length) by 96cm (height)- an appropriate size to ensure it was large enough to be used as a sling.



FIGURE 1 Esmarch Revised Bandage of 1873

The concept of a ‘handkerchief’ bandage was not new idea but had slipped into obscurity. Indeed, both Culter (1838) and Esmarch (1876) himself cited that the surgeon Dr. Mathias Mayor fifty years previously advocated the use of a handkerchief or plain piece of linen that could be folded triangularly to perform the task of a head bandage. However, it is Esmarch’s novel application of instructional imagery that elevates this material object into multi-modal healthcare technology. Critically, it educated and empowered both literate and illiterate soldiers to autonomously administer their own healthcare intervention when none was available. Esmarch (1883) demonstrated the versatility of his illustrative three-corner handkerchief in a series of public lectures and practical instructions known as the Samaritan School, and pronounced, “*What I wish to do is to enable you to give the right kind of aid before the doctor arrives- without which, irreparable injury might be done, and perhaps even a valuable life be lost*” (p.2). The underlying principles of frugal design and the 4As are eloquently embodied within this 150-year object.

Zambian Chitenge

The practicality and versatility of the Esmarch bandage resonates with the traditional *chitenge* found in Zambia. Here, the traditional chitenge is popular and inexpensive garment consisting of a single piece of waxed cloth measuring 108cm (height) x 175cm (length). Hanson's study (2015) highlights insights to the cultural dress practices and attitudes of both male and female Zambians, and reflects feedback to us from women during our pilot. A series of interviews revealed that regardless of occupation and location, there was a mutual concern for colourfastness and fabric quality to ensure that the visual presentation of the garment has permanence. Additionally, Hanson also identified a cultural desire for uniqueness when dressing. To meet this market demand, chitenges are mass produced in a wide range of colours, patterns and decorative prints, as well as commemorative designs and political or conversation slogans. Gronsdahl (2014) describes the adaptability of this garment within Zambian daily life. These applications include the chitenge being used as a bed sheet; rain jacket; beach towel, tablecloth, curtains, headscarf, pillow; a mat for produce at markets; a handkerchief; dish towel; apron; fabric for a cushion; a wall-hanging; head cushion; an improvised change-room in the market and a baby carrier. The chitenge also serves an important role in the cultural practices of Zambian childbirth Maimbolwa (2003). This study investigated birth practices, beliefs and the role played by traditional birth assistants known as *mbusas*. In a rural context, during labour and delivery, *mbusas* will reconfigure a chitenge to form a pressure ring of fabric for the mother to sit on. Chitenges are also used as a medical tool. For example, a village *mbusa* will tie them around the abdomen of the labouring mother where they are pulled from behind to instruct the mother to push at the appropriate moment. In healthcare facilities where resources and supplies were scarce, Schatz (2008) study recorded the improvised use of chitenges by nurses as a protective garment. All of which resonates with the early concept of the baby box.

The coalescence of two catalytic products, Esmarch's 1873 handkerchief bandage with the contemporary chitenge have steered the cultural reimagining of the baby box for Zambia- not as a device for transportation of consumables for new borns but as a social messenger to support the communication of neonatal and post-natal education and care. A responsive innovation strategy that enables the affordable production of bespoke chitenges to be rapidly produced to meet local and national healthcare priorities and the needs of mothers.

Chitenge as a tool for public health education

Mother's in Zambia value the chitenge, understand its use and cultural significance and practicality. This understanding of the relation between mother and object is crucial since the mesh of practices and arrangements is particular to context. It also offers opportunities for innovation and we began to consider the potential of the chitenge, like the baby box, as an educational tool. While the garment has historical and social relations to the mediation of women's work as parents we sought to explore wider practicality in meeting the challenge of parental and infant morbidity and mortality in areas identified by all stakeholders, including mothers.

To explore the creative and educational opportunities that an info-graphic-fabric concept offered, a six-hour design challenge was instigated with a small group of final year students studying BA Product Design, BA Graphic Design and BA Illustration students at Sheffield Hallam University. The creative process for this design challenge observed the principle stage-gates defined by the Design Council's double-diamond model: discover; define; develop and deliver (Design Council 2019). With the challenge open to interpretation, we hoped that this experimental activity would examine the fashion/ health education nexus through the conception of communication solutions that proposed alternate visual/ textual equilibriums. To accelerate the process for the participants three thematic areas identified from consultation with partners in Zambia and distributed to three interdisciplinary teams. The themes chosen on the day also responded directly to the objectives outlined in the National Healthcare Strategy for Zambia 2017-2020 and the United Nations' Sustainable Goal 3. These three themes were:

- Prevention of malaria during pregnancy
- Reducing neonatal mortality through APGAR education
- Safeguarding vulnerable street kids

Students on the day worked collegiately, systematically and imaginatively to produce three design propositions. The first conceived by Block and Dlugosz responded to the issue of reducing malaria during pregnancy. This design consisted of a vibrant repeat pattern featuring citrus fruit and dragonflies. A green vertical band provided an area where useful information for the wearer was located: wear bright colours; cover yourself; presence of dragonflies deter mosquitos; avoid pools of stagnant water; addition of lemon juice when washing clothes can be effective. Furthermore, the chitenge would also be impregnated with mosquito repellent (as applied to interagency bed nets) to provide a new born with an added level of protection when the garment is being used as a baby carrier (Figure 2).



FIGURE 2 Block and Lugosz's chitenge design

Koppel and Sumner conceived a second proposition. Similarly, they too adopted a very decorative and illustrative approach to the theme. Five prominent features represented each assessment element: appearance, pulse, grimace, activity and respiratory. Figuratively, the main feature symbolised the mother and baby with the image formed by intertwining green shoots, buds and the native protea flower (Figure 3). The design also included a vertical band that was designated space for detailed APGAR information.

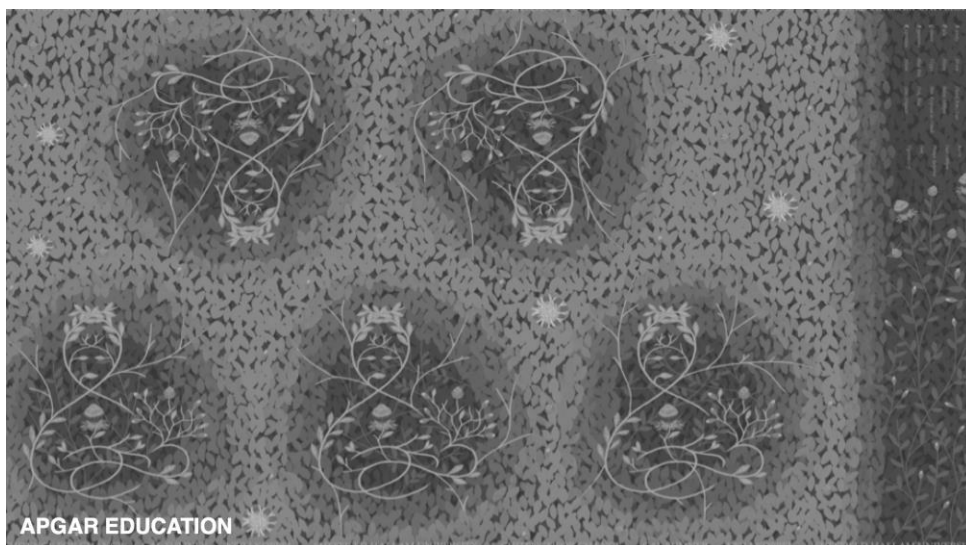


FIGURE 3 Koppel and Sumner's chitenge design

Marriott and Stocks conceived a final proposition that responded to the challenge of safeguarding of street children in Lusaka. From the outset their chitenge was specifically designed with the anthropometrics of young women in mind. By splitting the print area horizontally they cleverly achieved two chitenge products for the price of one, which

required the print design to be repeated. Their striking design depicted an accurate but abstract representation of the major arterial roads found in Lusaka and identified safe locations where help, assistance and medical care could be found (Figure 4).

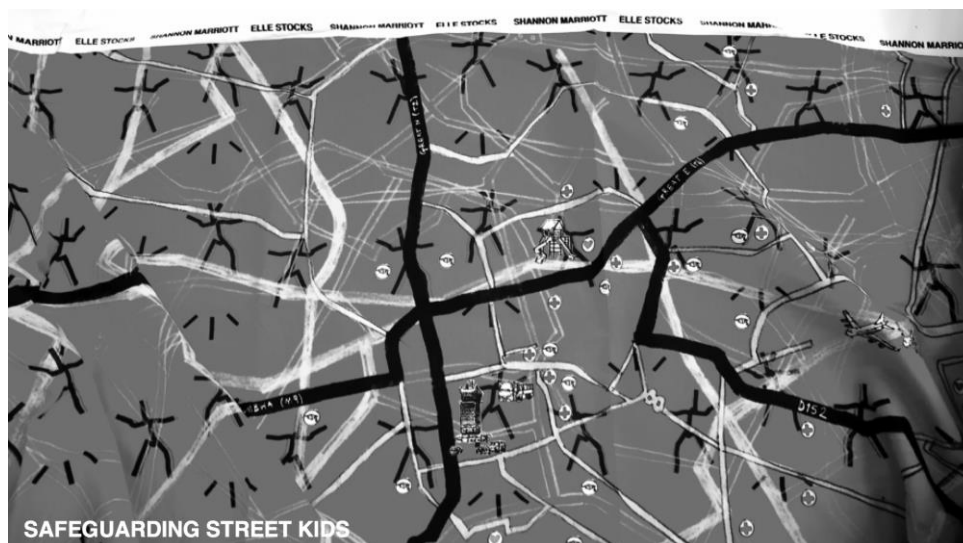


FIGURE 4 Marriott and Stocks' chitenge design

The rationale for the abstraction of information was intentional as it served a specific purpose. Envisaging that these chitenges would be distributed by local agencies, their design discretely camouflaged safe sources of help thereby not drawing the attention of those seeking to profit from their activities. Furthermore, the durability of chitenge ensured that it was a wearable for good that also had longevity.

To support the advancement of the research all three designs were translated into physical specimens that were taken to Zambia to be touched, explored and provoke discussion and debate with future project stakeholders, including mothers. In the spirit of Esmarch, these early proof of concept demonstrators illustrate the limitless potential for chitenge to become an universal public education tool in Zambia and beyond; not only for expectant mothers and families, but more importantly as a child development assessment tool for healthcare workers.

Conclusions

We have raised concerns about the political and commercial misappropriation of the Finnish baby box in the UK and globally, arguing that approaches that fail to consider the sociomateriality of the boxes risks framing mothers as 'other'. The danger is that poor infant wellbeing outcomes is situated within the mother and her practices and not with in wider structuring forces that don't consider complexity, diverse ways of doing things and people as experts in their own everyday lives. Consequently, to simply import baby

boxes as they are currently used in the global north would be to promote western, normative parenting practices and to misrecognise the nexus of practice arrangements that exist within the specific social and cultural contexts, including Zambia.

In developing a project with partners in Zambia that meets the needs of women, children and society it was important to understand the needs of all stakeholders (Tronto, 1993). SIDS is not of immediate concerns to Zambian mothers living on the streets but disease, nutrition and access to safety and healthcare are. More acceptable than a box with a mattress is the everyday chitenge, which is adaptable, familiar affordable and practical. While we have produced a number of speculative designs this was on the basis of enabling discussing and feedback from mothers. Indeed, at the time of writing, we are undertaking co-production workshops with stakeholders in Zambia. Our aim is to demonstrate the appropriateness of the chitenge as an intervention based on the concept of baby boxes but in a context where the 4As (op cit.) are a consideration. Conversely, as Howitt (2012) implies, the satisfice solution we co-create for Zambia may have a reciprocal benefit for a European context; where the baby box is displaced by an educational blanket. Significantly, working with the chitenge enables us to understand and reveal people's everyday practices and their relation to other people, objects, organisms and the natural world. Therefore, people, their doings, history, intersections with other people, their things and material properties, and the social contexts, spaces and places in which they are actually used are taken in account. We aim is to avoid 'cargo cultism', to work with mothers on co-production to develop designs that accounts for their needs not only as mothers but as women.

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