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Towards a Typology of Design in relation to Prisons

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Abstract

This paper addresses a gap in design knowledge, and contextualises UAL prison design initiatives by carrying out a global systematic review of contemporary design practices and the academic literature of design in relation to prisons. The result is a six-fold 'prepositional' typology that articulates where design positions itself in relation to prison systems, and highlights different dynamics for design to transform the lives of prisoners and the role of prison itself. The first finding is that a socio-material approach to design has the potential for systemic changes to both. Key to this is shifting the location of where design operates, from the designer as an external agent to one of being closely involved in the implementation of design. The second finding is that technology in simple forms, such as internet access, or in more profound concepts like the 'digital prison', are at the core of enabling new educational and vocational potential for inmates and the transformation of the prison system. This study highlights the notion of 'design as prison', where technology-based design is increasingly reshaping the lives of prisoners to the point where design is assuming the role of the prison system. Finally, the review identifies untapped potential to use design not just for vocational training but to involve inmates and staff in the co-design of the digital systems that operate prisons.

Introduction

Since the early 19th century, prisons have been looming structures, full of people incarcerated at a vast financial and social cost to the wider population. Not much seems to have changed in the appearance or function of prisons since then. The defining text on design and prison is still Michel Foucault's 1975 book *Discipline and Punish: The Birth of the Prison* (Foucault, 2020), which examined the way structural design was used to enforce societal values in early prisons. Today, design is a vibrant profession and discourse that has changed beyond recognition since the 19th century and become a driver of social and technological change. The last two decades have seen the emergence of the maker movement where "makerspaces are informal sites for creative production where people of all ages blend digital and physical technologies to explore ideas, learn technical skills and create new products" (Sheridan et al., 2014, p. 505). Key to this process are technologies such as laser cutters and 3D printers, proclaimed as democratising platforms that enable everyone and anyone to take part in designing and 'making' (Goudswaard et al., 2018).

This study was initiated by the Design Against Crime Research Centre (DACRC)[1] at University of the Arts London (UAL), who asked me as a researcher from the Social Design Institute (SDI) to identify significant prison design projects, design research, human-centred social innovation and service design in prisons. Given DACRC's interest in participatory design making and thinking projects (like its Makeright initiative), they wanted to find out whether there were any operational makerspaces linked to global prisons. These questions arose because, since 2016, DACRC has been advocating for maker learning and co-production for prisoner education as well as for prison industries as an approach that could lead to systemic and transformative change (Design Against Crime Research Centre & National Institute of Design, 2016; Gamman & Caulfield, 2021; Gamman & Thorpe, 2015, 2018, 2019).

What is the current state of design in relation to prisons? In the UK context, there have been a number of large-scale reviews that have analysed the role of the arts in relation to prisons, such as "Doing the Arts Justice" (Hughes, 2005). While the report lists a broad variety of cultural practices, design is strikingly absent. Similarly, the Arts Alliance Evidence Library,[2] which is an important UK-based resource of evaluation reports of creative projects in prisons, features only a single report about design (out of 105 reports) — the Making for Change project.[3] While the creative arts have achieved a clearly defined role in relation to prisons, it appears that the same is not yet true for design, with significant projects, such as InHouse Records[4], Open Book[5], Makeright[6], Stretch[7] and Cell Furniture[8] not being given the same level of recognition. This study is an attempt to address this gap by providing a global overview across design practices with a specific focus on maker design.

Why a Typology?

The aim of all typologies is to highlight difference. In this case, the goal is to illustrate how different design approaches create distinct potentials for the role of prisons and the lives of prisoners. The study uses Actor Network Theory (ANT) (Latour, 1987; Mol, 2002) to understand design as a 'socio-material' practice that interweaves

physical and social relations. ANT argues that agency is distributed across humans and non-humans who act together to transform the world, and draws attention to structures that create dualistic claims that divide between inert material and agential human minds (Latour, 2004). This approach has been used previously to highlight the materiality of criminal settings and point to the design of courtrooms as active agents in shaping criminal justice (Duff, 2012; Grommé, 2015; Holligan, 2015). The intension of using ANT theory as part of this typology is to make the powerful claim that different socio-material arrangements create different everyday realities (Mol, 2002) and that design can open-up and foreclose certain realities (Nold, 2018). There are a number of general-purpose typologies of design (Andreasen et al., 2002; C. H. Dorst, 2006) that classify design practices as part of grand theories of design based on notions such as 'object', 'actor' and 'context' of design activity (C. H. Dorst, 2006). In contrast, the aim of this typology is more specific: that is to articulate how different design approaches create different systemic relations for prisons and inmates. To my knowledge, this study is the first systematic review of the design/prison literature, and thus this typology should be treated as an exploratory mapping that prepares the ground for further design studies of prisons.

The Typology

The typology (see Fig 1.) defines a series of ideal types as an analytical construct that does not encompass any specific project, case study or practice. Rather the types are idealised abstractions intended to highlight specific aspects of design approaches. The six types are not mutually exclusive; thus, design practices and case studies can overlap different types. The intention is not to celebrate or denigrate specific design approaches but to offer the typology as a tool that is analytically useful for constructing an argument about where design could or should be positioned. The typology is based on a prepositional distinction as to where design is acting in relation to prisons. It distinguishes between design 'of', 'for', 'from', 'in', 'beyond' and 'as' prison. The notion of a typology based on the prepositional location emerged from trying to reconcile the radically different scope and framing of design problems observed in the corpus. Some design approaches focus on single objects or activities while others engage with physical prison structures or behaviour modification systems.

Each type starts with a short definition followed by several examples and discussions about the cultural context of the particular design approach. Each type finishes with an analysis of its significance, its transformational potential as well as how it is distinct from the rest of the typology. The differing lengths of the descriptions are not indicative of their importance or the amount of literature in a category, but reflect the conceptual complexity and contentiousness of the type being discussed. This is concluded by a discussion about the typology, which makes observations about overlaps and gaps, and the potential offered by this analysis.

Design **OF** Prison   Design **FOR** Prison   Design **FROM** Prison
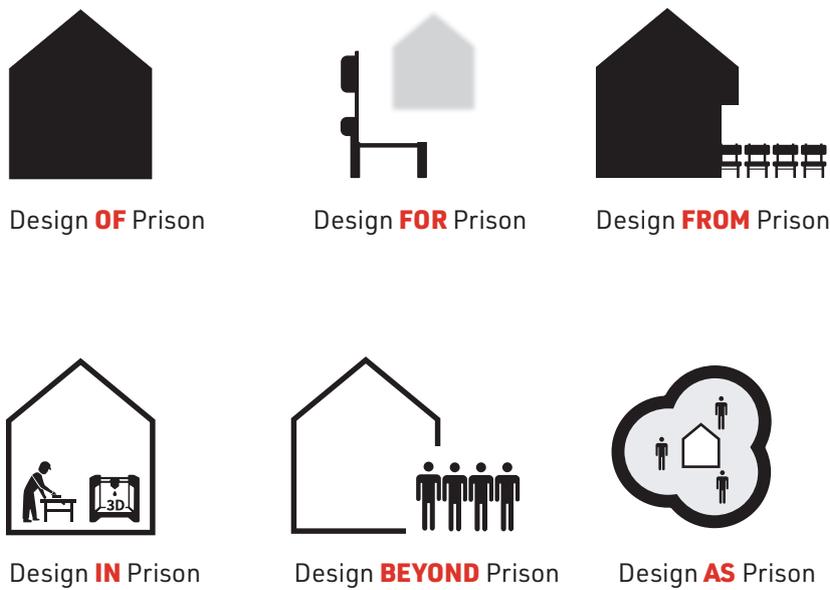
← Fig 1: A six-fold prepositional typology of design types in relation to prisons: 'design OF prison', 'design FOR prison', 'design FROM prison', 'design IN prison', 'design BEYOND prison' and 'design AS prison'.

Design **IN** Prison   Design **BEYOND** Prison   Design **AS** Prison

Methodology

The literature review has identified a corpus via systematic text searches as well as expert recommendations and interviews. In particular, the study sought to identify design/maker/Fab Lab projects across the world, but with a focus on the UK (where the author is located). The systematic searches used Google Scholar as well as social media (Twitter and Facebook) and design journal searches. Search terms focused on "design + prison" and "design + correction facility" as well as searches such as "creative + experiment + prison - stanford" (in order to exclude the 1971 Stanford prison experiment). This identified academic texts across multiple disciplines of design, architecture, sociology and computer science as well as design mentioned only in grey literature, such as newspapers, personal websites and social media. In addition, expert recommendations were sought from Lorraine Gamman and Adam Thorpe from DACRC, as well as other experts across Europe who were asked about design projects in relation to prison. These contacts were useful for gathering design references but also for identifying the scarcity of 'making' projects in prisons.

Using an ANT-inspired situational grounded theory approach (Clarke, 2003), the study uses 'theoretical sampling' to identify as many distinct theoretical positions and sensitising concepts as possible rather than a representationally exhaustive sampling. In terms of criteria, the study used a holistic notion of design that included creative practices on the margins as well as participatory art and ecological making practices. Key inclusion criteria included 'prison' as a recognisable component of the design activity/project. This means the review covers makerspaces targeting ex-inmates as well as prison labour even though they are often not framed as design. It does not cover community projects with generic 'at risk' teenagers or the strategic design of legal systems, since in neither case is there any direct presence of prisons. For each of the design projects/practices identified, the review process involved gauging the longevity of the project, the impact on inmates and potential systemic changes to the prison system itself. In addition, the aim was to capture the

cultural discourses around these design approaches while paying particular attention to disagreements. The gathered corpus was categorised using situational mapping techniques (Clarke, 2003) to cluster together design practices as well as sensitising concepts to establish categories and analytical frames at the same time. These types were refined and refactored multiple times to emphasise their distinct analytical properties and arrive at the six-fold typology (Fig 1.), as well as the overall argument.

Study Limitations

This review has two key methodological limitations related to granularity. Firstly, the study focused on literature that uses search terms such as "prison" and "correctional facilities" but does not distinguish between adult and youth correctional facilities. There are clearly vast differences between correctional facilities in the USA and Scandinavia, as well as Supermax prisons and facilities for low-risk youth. Thus, the resolution of this study is not sufficiently granular to capture such specificities and societal differences. Secondly, the literature around design and prisons is largely written by designers or academics, or is policy-related; it is rarely written from the prisoner's point of view. Therefore, this review captures the discursive notion of 'prison' rather than the embodied experience of design in prisons from an inmate's point of view. Yet, there are a number of publications such as *Prisoners' Inventions* (Temporary Services & Angelo, 2005), where a former inmate narrates and illustrates, often illicit, design objects made in prison. There are also ethnographic and participatory action research accounts that highlight voices from inside the cell (Fine et al., 2003; Fransson, 2018; James, 2018; Moran & Jewkes, 2015). A follow-up study could integrate a more granular analysis of design through empirical observations in prisons via design ethnography.
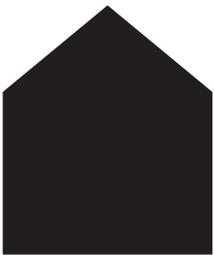
Design **OF** Prison

Definition: This type frames design as having a bird's eye view of the structures of prisons. This approach aspires to reform prisoners through physical infrastructural design. This framing is the most publicly visible of the types, yet discussions largely take place within the disciplinary context of architectural forums.

Discussion: Karthaus, Block and Hu offer a short history of prison architecture from 19th-century attempts to project ideas of justice in material form, such as Bentham's Panopticon (Foucault, 2020), which used centralised visibility to instil psychological regulation through its design. They argue that, in the 1990s, such architectural objectives were "stripped away" by private finance initiatives (PFI) that created prisons as "'non-places for non-people' and likened [them] to the pure logistical concerns of an 'Amazon warehouse', with associated dehumanising effects" (Karthaus et al., 2019, p. 198). They discuss the *Learning Works: The 21st Century*

Prison (Cottam, 2002) proposition as one of the last attempts at large-scale architectural transformation, where inmates would live in separate house structures, arranged in a chequerboard pattern to facilitate social integration. Yet, such utopian projects have proved difficult to implement and the paper argues that "despite progressive shifts in attitude regarding the purpose of prison, little has fundamentally changed in terms of how prisons are designed and built" (Karthaus et al., 2019, p.199). In contrast, contemporary discussion about the design of prisons tends to have more limited ambitions: "architects may be very limited in what they can do to be rehabilitative, but by instilling concepts in the design, such as trust and respect and dignity, they can help people on their journey and invest in their futures" (DesignCurial, 2019). In this framing, design is seen as rehabilitative by embedding values into architectural structures. The "Wellbeing in Prison Design" report (Bernheimer et al., 2017) uses insights from environmental psychology to point to the importance of the lighting and ventilation of buildings, as well as landscaping of grassy areas, as structural elements that can improve prison wellbeing. Reducing reverberation times in prison spaces is seen as a way to alter the "'shouting' culture, which makes for a highly stressful environment" (Bernheimer et al., 2017, p.107).

Notably, within architecture, there are discussions about the ethical dimensions of designing prisons (Moran et al., 2019). For example, the group Architects, Designers and Planners for Social Responsibility supports an amendment to the architectural ethics code that states that "members shall not design spaces intended for execution or for torture or other cruel, inhuman, or degrading treatment or punishment, including prolonged solitary confinement" (Greenspan, 2013). Yet, calls for "trauma-informed prison design" (Jewkes et al., 2019) suggest the need not just for ethical guidelines but fundamental changes to design conceptualisation:

> Architects are self-referential in the sense that they tend to be heavily influenced by their previous work and have difficulty envisaging something radically different from what they have been asked to produce before, or what they 'know' prisons to look like from experience. The emphasis tends to lie on the perceived need, or symbolic desire, for the security paraphernalia that denotes 'this is a prison' and women's prisons, therefore, tend to look like men's prisons, despite the very different experiences and needs their occupants bring to custody with them. (Jewkes et al., 2019, p. 9)

Disciplines such as design anthropology challenge assumptions about the structuring power of architectural buildings by suggesting that wellbeing is actually co-constructed by its users, often in opposition to architecturally designed spaces (Pink et al., 2020). Fransson argues that what is needed are methodological approaches that position the researcher differently: "to approach how prison architecture affects prisoners, we have to use other methods than asking people. As researchers we have to put ourselves in situations where we become affected, we have to look for and search in hidden places and allow ourselves to transcend the knowledge that is often taken for granted" (Fransson, 2018, p. 179). Using an ethnographic approach, Fransson offers the novel observation that physically open spaces, such as the lunchroom, can be emotionally constraining, while closed cell doors can create relational dynamics between inmates and staff.

Analysis: The 'design OF prison' type takes a bird's eye view of prison design and sets its problem as rehabilitation through the creation of physical structures. This approach imagines design as a physical force that lies beneath social relations and is dualistically separate from them. This separation is also methodological in the way that it positions the design of prisons as taking place remotely via computer software. The result is that ethics discussions take place at a distance from the practice of prison design. Yet, there seems to be potential for a cross-fertilisation of methods from ethnography to experience architecture from the prisoner's point of view.
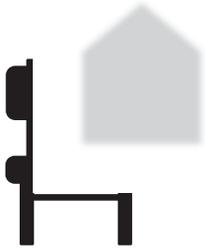
Design **FOR** Prison

Definition: This type captures design as the making of discrete objects or interventions for insertion into prisons or for making inside prisons, and has a compartmentalised perspective that aims to support individual prisoners through design products. This focus may make it difficult to engage with prison as a systemic issue.

Discussion: 'Design FOR prison' is the most visible approach in product design and design education, premised on professional designers working outside prison to create artefacts for insertion into prison, with different amounts of input from prison staff and inmates. Designs often focus on inmates manufacturing furniture within prison, such as Tora Schei Rørvik's "Day bed" (Sabina Aouf, 2017), while Giovanni Pezzato's "Jailbird Manual" (Pezzato, 2015) and the "Choice Within The Making" manual (Rygh et al., 2013) are Ikea-style instruction guides for furniture making. The last manual is interesting for framing furniture production as a reflective process for inmates to focus on their personal choices in order to support self-rehabilitation. Many designs explicitly target the affective dimension of inmates, such as Amanda Ivarsøy Kovacs' chair, designed to alleviate anxiety through a soft 'huggable' tube attached to the chair (Sabina Aouf, 2017). Similarly, Karl Lenton's mobile "Seed" therapy spaces aim to increase the experiential comfort for inmates by enabling meetings inside giant egg-shaped structures that are sound-proofed to "mask [the] external sounds of prison life, so conversations can take place inside Seeds without people having to raise their voices to be heard" (Emma Tucker, 2015, para. 5). Yet, it is hard to judge how many of the above went beyond being conceptual protypes to being manufactured and deployed in prisons. The Cell Furniture project is interesting because it used a participatory design approach with inmates and officers to create furniture for prisons (Gamman & Caulfield, 2021) and for the way the design process uncovered the systemic constraints of designing for prison. A paper by Doruff et al. (2021) shows that designing for prison faces systemic problems, such as an ideological distrust of prisoner behaviour, risk aversion and institutional hierarchy, as well as pragmatic problems such as long-term supplier contracts that do not incentivise innovation or prisoner wellbeing. The paper suggests that democratic innovation and distributed design for prisons requires a fundamental paradigm shift within the prison system.

Analysis: This approach is focused on the design problem posed by a singular design object, which results in a compartmentalisation that makes it difficult to analyse the relational impacts of these designs or transform the systems that these design artefacts operate within. It would benefit from cross-fertilisation with the 'design OF prison' type to see how the focus on inmate wellbeing can be scaled to engage with the wider criminal justice system. In addition, participatory design that involves direct contact between designers and inmates is rare, and there could be many benefits in the broader adoption of making approaches from the 'design IN prison' type.

Design **FROM** Prison

Definition: This type frames design as the production and sale of goods manufactured within prison. In contrast to 'design IN prison', the focus is on the products rather than the educational activities or experience of the inmates. One of the tensions here is to what extent this kind of vocational work supports inmates or, alternatively, exploits their labour. This framing is particularly visible in policy reports and crosses over into a public debate around the ethics of prison labour.

Discussion: 'Design IN prison' is typically framed as providing vocational skills for prisoners, since employment has been shown to play a key role in reducing reoffending. A report by the UK Department for Business Innovation and Skills argues that "prison education and vocational interventions produce a net benefit to the public sector ranging from £2,000 to £28,000 per offender" (2011, p.10). Yet, much of prison labour consists of manual labour rather than design:

> Around 70% of work in prison is for the internal prison market (e.g. making boxer shorts, welding cell doors, printing leaflets) with 5% sourced from other government departments (e.g. MoD). The remainder comes from commercial partners. Such commercial work generates income, which is important, but some of it is very menial (rag-ripping and sandbag-sewing are two examples of 'industry' that the panel has seen). In this context, the teaching of routine and getting-up in the morning may have some value for prisoners. (Coates, 2016, p. 53)

Organisations such as the Incarcerated Workers Organising Committee argue that prison labour consists largely of mundane and repetitive tasks, "such as bagging nails, putting bits of plastic in fruit boxes, packing headphones, stuffing envelopes, and assembling simple electrical components" (2020, para. 8). In the US, prison labour functions largely as a commercial penal system which has been described

as a "prison-industrial complex" (Chang & Thompkins, 2002), where prisons function as for-profit commercial entities and prison products are sold at a profit for the prison enterprises, while inmates are often paid at a rate of a dollar a day. This framing of design from prisons has been described as modern-day slavery (Smit & Dünkel, 1999) and resulted in picketing of stores that benefit from prison labour (Bristol Anarchist Black Cross, 2010) and campaigns that argue that "the rehabilitation prison idea is very much a financial idea, with the rehabilitation bit added on as window dressing" (Aviram, 2013, para. 13). In a study of prisons in Australia, which has the highest proportion (19%) of privately operated prisons in the world (Mason, 2013), Hopkins and Farley suggest that "incarcerated students in privatized prisons often complain about the amount of time they are conscripted to industry labour, despite requests for more study time. The corporate line is that prisoners are being prepared for the 'real' world where they must balance full time work with study commitments." (Hopkins & Farley, 2015, pp. 39–40). The researchers argue that there is a fundamental tension between prison labour and educational goals due to "neoliberal undercurrents fueling the vocationalization of prison education". (2015, p. 37)

Beyond the USA and Australia, there are other models focused on more creative prison labour, which result in items handmade by inmates to be sold to the public such as Stripes Clothing[9] in Holland and Made in Carcere[10] in Italy, and Makeright[11] and Fine Cell Work[12] in the UK. Yet, even such creative approaches involve complex labour relations. The Fine Cell Work cushions are designed by professional artists and designers before the kits are sent to the inmates to be stitched. Its website features a cushion that has visual references to prison in the form of striped bars used to mark time in films featuring prisons, and quotes the artist as saying: "I really thought it was an exciting idea to make a stitched relic to represent the time it took Ben in his cell to make the artwork. I believe it took him 180 hours to stitch on top of the screen-printed fabric. In the end we are looking at one thing: time" (Fine Cell Work, 2020a, para. 2). Yet, the inmate states more ambiguously, "I counted tallies for the amount of time it took me to do this piece. But do the tallies in this piece add up to the hours spent creating it and the faded tallies on the walls?" (Fine Cell Work, 2020b, para. 3). These quotes highlight tensions around the division of labour between the design of the cushion as a figurative illustration of prison labour, versus the work of the inmates, who had to manufacture a representation of their labour to be sold as a product. There are parallels with Jean-Philippe Crete's account of artefacts created by indigenous prisoners in Canada as "penal relics" (Crete, 2017), which are used to perform cultural visions of prison. Crete argues that artefacts of prison labour "position punishment, imprisonment and pain as 'remnants of the past', producing a 'social distance' between the prison (including the punished) and the 'penal spectator'" (2017, p. 972). The argument is that the artefacts of prison labour are not just manufactured goods, but carry a specific 'authenticity' by being made in prison, which performs a cultural imaginary of historical notions of prison life. Thus, when a member of the public purchases a prison labour product they become "penal spectators and consumers of the products of penality" (Crete, 2017, p. 984), while 'othering' the makers of the object.

This study's literature search uncovered a surprising quantity of old and disused prisons being converted into makerspaces, such as the Beacon Correctional Facility[13] in New York State, Cascoland[14] in Amsterdam and Blokhuispoort Prison[15] in Leeuwarden, and the Unlocking Pentonville project (Wigglesworth, 2018) in London. These makerspaces are often just small but highly visible components of

large regeneration schemes focused on creating an "innovation hub that brings together business, research and studies" (Aalto University, 2015, para. 2). While there are obvious practical reasons to use disused prisons as makerspaces — such as large amounts of space — Brown suggests a key aspect is the cultural resonance of appropriating dead prisons:

> Dead prisons reconfigure living prisons, not in a clear chain of direct institutional
>
> transformation, but in a larger cultural imaginary and its ability to justify the
>
> pursuit of a proper place of prisons, punishment, and their targets in that chain
>
> of signs. (Brown, 2009, p. 120)

In this argument, building makerspaces within disused prisons is performing a larger imaginary of regeneration that transforms the lumbering historical structures of prisons into new dynamic forms of creative innovation where fluid digital networks and immaterial labour take place. In this sense, it is not only design artefacts of prison labour that perform at a level of a cultural imaginary, but makerspaces themselves becoming emblematic signifiers of design as urban innovation.

Analysis: When 'design FROM prison' is seen through the lens of prison labour, it becomes a commercially as well as culturally loaded product. There are tensions in terms of using inmates' labour at the expense of their education, as well as producing "penal relics" that reinforce cultural imaginaries of prison life. While many of the charitable organisations in this space try to maintain a positive relationship between the consumer and the prisoner who made the item, the focus on the material product of design and the overloaded cultural framing of prisons seems to result in the severing of these relations. Furthermore, the fact that makerspaces are being deployed as symbols of urban regeneration might make it more difficult to get funding for using 'making' for practical purposes.
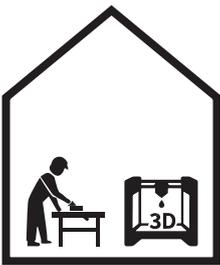
Design **IN** Prison

Definition: The 'design IN prison' type frames design as educational and vocational training taking place in prisons and involves inmates making and designing while being instructed by professional designers or specialist staff who work directly with them. The focus is the rehabilitation of inmates through experiential learning and skills training for employment. While the resulting design artefacts are sometimes commercially sold, this is not the primary goal. There is significant visibility for creative arts teaching in prison, yet this is not the case for these design training activities, which face problems due to the organisation of the prison system.

Discussion: There are a large number of creative arts courses taught in UK prisons. The "Doing the Arts Justice" report suggests that "of the 700 projects run for

offenders by the voluntary and community sector in 2003, 400 were arts projects" (Hughes, 2005, p. 7). The courses cover a large range of activities, including painting, sculpture, drama and music. The argument is that:

> Arts interventions are associated with reductions in re-offending and raising awareness of the criminal justice system, reducing rule-breaking and improving relationships in prison, delivering basic and key skills and developing the prison education system, changing attitudes to offending, building up human and social capital and enhancing the effectiveness of offending behaviour programmes. (Hughes, 2005, p. 10)

Much of the focus is on rehabilitation through a therapeutic model focused on psychological approaches at "affective, cognitive and behavioural, as well as neurological levels" (Hughes, 2005, p. 11). Art therapy is a labour-intensive method that is rarely fully adopted in prison. Instead, arts projects in prisons often use aspects from art therapy such as the idea that "art making is healing and life enhancing and is a form of nonverbal communication" (Nguyen, 2015, p. 29). In contrast to other educational activities, it is seen to access "the unconscious in pre-verbal forms of sensory, kinaesthetic or imaginal cognitions and associated emotional experiences represented in symbolic language" (ibid). There is evidence that art therapy can be effective for prisoners. A 2018 study of the effectiveness of art therapy for adults reported "improvement attributed to the art therapy intervention, as seen in the emotional state of the prison inmates" (Regev & Cohen-Yatziv, 2018, p. 5). The "Unlocking potential — A review of education in prison" report suggests that arts workshops are a useful "first step towards building confidence for more formal learning" (Coates, 2016, p. 29).

In contrast to the breadth and established position of arts projects in prisons, there appear to be few design projects. The Arts Alliance Evidence Library features only a single design report. Google Scholar, internet and social media searches mainly identified isolated short-term experiments, some of which were more than a decade old. Overall, there is no evidence of design being used systematically as educational or vocational training in prisons anywhere in the world.

The Making for Change (Caulfield et al., 2018) and Makeright projects (Gamman & Thorpe, 2018) are two notable contemporary projects focused on design training within prisons for which it is possible to find detailed documentation. Making for Change aimed to teach "high-quality garment manufacturing skills in six months" (Caulfield et al., 2018, p. 28), while the two-year Makeright project took prisoners through a full design process that included professional design methods, such as 'personas' (Miaskiewicz & Kozar, 2011) and 'journey maps' (A. Richardson, 2010), to help the inmates imagine the audience they are designing for. The inmates went from problem definition to problem solving, while allowing space for "'happy accidents' from which learners can draw design inspiration" (Gamman & Thorpe, 2018, p. 95). Gamman and Thorpe strikingly suggest that "design thinking had not been taught in prison before — neither within prison education, nor within prison industries — and we wanted to see what effect the design processes we introduced might have on inmates" (Gamman & Thorpe, 2018, p. 96).

As seen from these two examples, one of the key distinctions of this approach from creative arts courses is the focus on directly applicable vocational skills. Gamman suggests that "unlike art, design doesn't allow you to design just for yourself, you're designing for another, it requires communication and empathy" (Lloyd-Jones, 2016, para. 4). In contrast to the therapeutic inward-facing approach of the creative arts courses, design is outward-facing and focused on external relationships with the world. This potential of the embeddedness for design can be seen in the way the Makeright project offered the copyright for their bag's design to the inmates on their release so that they could exploit their own work. Yet, evaluating the vocational impact of this work is difficult. Both projects used short-term evaluations, adopting semi-structured interviews to identify "improvements in mental health and well-being, social skills and confidence and improved aspirations" (Caulfield et al., 2018, p. 3). Yet, with both projects, it was impossible to carry out long-term tracking of inmates beyond release due to security and confidentiality rules (Gamman & Thorpe, 2018, p. 108). The Innovate Inside project (Design Against Crime Research Centre & National Institute of Design, 2016) suggests that it might be possible to translate the Makeright approach to other contexts, such as India.

The most cohesive body of evidence for design as an educational practice within prisons comes from papers focused on the notion of makerspaces and Fab Labs. A key historical case study is the Constructionist Learning Laboratory, which took place at a residential facility for adjudicated youth in Maine (USA) in 1999–2002. It was created by Seymour Papert, one of the pioneers of artificial intelligence, and the constructionist movement in education and resulted in a number of papers that have been influential in establishing a link between makerspaces and prisons (Cavallo et al., 2004; Stager, 2013). The key aspect of this study is that it theorises 'making' via constructivist pedagogical theory (V. Richardson, 2003) to point to egalitarian social arrangements where "students assumed the roles of teacher as well as learner" (Stager, 2013, p. 488), and where "no piece of knowledge is more valuable than another" (2013, p. 489), as well as physical arrangements where design tools are integrated with a library of texts as well as toys and games. The argument is that this combination allows direct experience, hands-on projects, tinkering and invention, where the object practice is critical for facilitating long-term engagement: "when you build a guitar, you want to learn to read music, play the guitar and score your film" (2013, p. 500). Making is presented as a socio-material arrangement where collaborative learning (Dillenbourg, 1999) is done both by the learner and the teacher together, based on empathic relations (Gamman & Thorpe, 2018), while requiring specific physical arrangements of the makerspace (Cavallo et al., 2004). The INNOVATE inSIDE project (Makeright Design Academy at HMP Thameside, 2016) shows that it is possible to set up ad hoc design experiments with inmates in prison. In makerspaces, 'making' is often presented as an end in itself, without a taught design programme, yet this can still lead to "learning-through-design" (Ching & Kafai, 2008). Papert's project with adjudicated youth has inspired a number of related constructivist education experiments in makerspaces (Becker, 2016; Gruen, 2018; Lahana, 2016; Somanath et al., 2016). Gruen suggests that "the focus on process can build adult learners' capacities to problem-solve using technology and other modes of learning. Finally, the hands-on act of making representational models can increase adults' motivation to participate in educational contexts" (2018, p. 136). Furthermore, Somanath argues that "the introduction of maker culture to education can encourage students to become designers and producers of materials and resources, and enable them to apply their experiences within various educational contexts" (2016, p.156).

A key aspect of design in prisons is the role played by design tools and technologies, such as 3D printers and laser cutters, which have become the distinguishing elements of makerspaces and Fab Labs. The Change Hub Innovation Centre in Kenya teaches design thinking, web design and 3D printing to women in the country's largest women's prison, and describes itself as the "first-ever makerspace in a maximum-security women's prison". In the Change Hub, technology plays a key role for vocational as well as empowerment reasons:

> There was one inmate who was very good with the 3D printer early on. She
>
> was so good that she started troubleshooting the problems by herself when
>
> the machine malfunctioned. The scared-ness is gone, they're no longer
>
> scared of computers. (Mcdevitt, 2016)

Reports about the project demonstrate the transformative nature of introducing these tools when "most of the women who are now programming had never seen a computer before" (Raju, 2017, para. 7). Yet, maintaining this programme has proved difficult due to a lack of suitable laptops, problems with funding and with teacher retention, since they could be paid more in the commercial sector (Raju, 2017).

Bringing innovative technology into prisons was also one of the key reasons for the success of the Fab Lab project set up in Northern Ireland at HMP Maghaberry in March 2017 (Thenervecentre, 2017), which included 3D printing as well as laser and vinyl cutting. According to the founder, who was in touch with the Fab Foundation in the USA, this was the first Fab Lab to be located in a prison (author interview). The project was a week-long pilot that demonstrates the importance of technology for this design approach. In contrast, craft and learning courses such as pottery, woodworking or brick laying had trouble attracting students at the prison and were not seen as attractive: "they still would rather stay in their cells on lockup than come down here regularly for the training" (author interview). Yet, in contrast, 3D printers acted as a 'honeypot' for attracting the inmates to get involved and the workshops were seen as a reward for good behaviour amongst the prison population. For the inmates, it is the digital aspect that differentiates this activity from other forms of making, such as wood working or pottery. The prisoners were concerned that they might be left out of the societal digital changes taking place, and the 3D printing technology promised relevance, unlike traditional courses. The project founder suggested that 'making' is hands-on and has a novelty that is attractive both to inmates and prison governors interested in innovation as well as jobs. Furthermore, in the context of Northern Ireland, this new technology was seen as a neutral space that allowed different sectarian groups to work together inside prison. According to the project founder, this meant that the project had a 90% retention rate, compared to only 60–70% for more typical educational classes (author interview).

There are also some examples of technology-based service design in prisons, such as InHouse records, a commercial record label releasing music by inmates from within prisons as an "intersection of design thinking, social change and enterprise" (Armani, 2018, para. 1). The designer created the project while studying on the Service Design MA programme at the Royal College of Art and suggests that "whilst there is nothing unusual about setting up a record label, the application of focusing on prisoners' experiences is ground-breaking. We focus on what's strong — not what's wrong — and we use 'restorative storytelling' to help prisoners make sense of their

lives by framing it all with music." (Armani, 2018, para. 3). An evaluation of the project suggests that there were behaviour benefits for inmates: "there had been a reduction in negative entries on their personal records by 30%, almost 40% fewer adjudications and a 42% increase in positive entries in the prison log" (Leon et al., 2018, p. 145).

There are also some older landmark examples of technology-based design in prisons. In the UK context, the Barbed design company, in HMP Coldingley in Surrey, was an important experiment that resulted in significant news coverage and two reports (Esmee Fairbairn, 2008; Green, 2010). What was innovative about this project was that, unlike most prison labour, the inmates were carrying out design work for commercial clients, and were being paid the minimum wage as they would be as free citizens in the outside world. For the inmates, this fair payment was seen as an incentive for participation and differentiated the project from prison labour (Aitchison, 2007). The argument made for the project was that this kind of normalisation of work is a key part of reintegration upon release. Interestingly, the main reason for the demise of this innovative project was the inability at a governmental level to resolve the problems of paying tax for this work. The legacy of this project is a follow-up design company called Wolf Design,[16] which continues to operate with ex-inmates. In addition, HMP Coldingley is still running innovative design workshops, inviting professional designers to visit the prison to run design workshops with inmates (Daniel, 2015). In a US context, there are two current projects, The Last Mile and Code 4000 (Code 4000, 2020), which involve teaching prisoners in high level software development skills while also carrying out commercial programming and design work. Code 4000 has spread to the UK, where it is currently being implemented in a Teeside jail (Pidd, 2019).

As these examples have shown, the two key factors that differentiate design from creative arts in prison are hands-on 'making' and new technologies such as laser cutting, 3D printing and software development. Such technology-focused design relies on extensive technology support in prison. The Constructionist Learning Laboratory recommends "a technologically-rich environment with a greater than 1:1 ratio of computational devices to students" (Cavallo et al., 2004, p. 113). In the UK, the challenge for this kind of design in prison using new technologies seems to be the structuring of the prison system itself. Pike and Adam identify a tension in UK prisons between 'learning' prisons, which tend to be higher security private prisons that are provided with good resources, and, on the other hand, 'working' prisons that are poorly resourced and do not value independent learning. "Within these 'working' prisons, there is a devaluing of technology-enhanced, higher-level education as only of recreational value. Digital inclusion in this context will require a culture shift at the very heart of the prison system in order to encourage an environment which values all learning" (Pike & Adams, 2012, p. 374). This suggests that using technology-based design to combine educational with vocational goals faces challenges at the organisational level of the prison system, which largely separates these goals. Furthermore, in a study of three UK prisons, Reisdorf and Jewkes identify that, on the whole, prisons have no, or extremely limited, internet access leading to "digital exclusion during incarceration [which] may have compound effects and lead to supercharged digital and social exclusion" (Reisdorf & Jewkes, 2016, p. 771). The issue of restricted internet access for prison education is also raised by the UK Ministry of Justice itself (Coates, 2016). The European Commission funded a report titled "Competence framework for 3D printing in jail" (3D Jail, 2019) which identified 3D printers being used in one Belgian, two Greek and three Italian prisons, as part of educational programmes that offered certification on completion of the programme,

rather than for the manufacturing of commercial goods. The report notes that the main challenges for 3D printing in prison are the cost of setting up the laboratories, security concerns, low public awareness of these technologies and a lack of knowledge about the education content of these technologies (3D Jail, 2019, p. 8). The lack of teaching expertise in supporting new technologies is amplified by the fact that, in the UK, teachers in prison are paid less than in mainstream education (Coates, 2016, p. 22). This will make it harder to find qualified teachers for technology-led design in prison.

Analysis: 'Design IN prison' appears to offer strong transformative potential for the lives of inmates since it is outward-facing and combines pedagogical and vocational elements. By taking the designer into the prison, this approach enables relational proximity to inmates as well as illuminating the systemic complexity of using design within prisons. The constructivist pedagogical approach also offers a theoretical basis for 'making' as having unique qualities that support collaborative learning as well as inventive physical design. The new technologies of 'making' also offer specific potential for motivating inmates, in contrast with more traditional skills, such as carpentry, since they offer social and cultural inclusion in a digital society as well as vocational relevance for computer-based jobs. In these ways, 'design IN prison' offers unique capabilities when compared to creative arts approaches, which are framed primarily as therapeutic. Nevertheless, the requirement for new technologies presents a systemic problem for expanding makerspace design within the criminal justice system.

Design **BEYOND** Prison

Definition: This design type is focused on design projects with ex-inmates, after their release. It frames design as a practice of building human capital and entrepreneurship. Like 'design IN prison', its focus is on the vocational skills potential of design training, uniquely for systemic projects that work at the level of the wider context of the prison system.

Discussion: There are examples of programmes targeted specifically at ex-inmates to support practical access to materials and space. Most of the examples are located in the USA, perhaps due to the large number of makerspaces there. A successful rehabilitation story is from the City Mission project[17] in Schenectady. In this example, an inmate progressed from doing prison labour, "sewing in prison, taking the green prison uniforms and altering them" (Nash, 2019) by, upon release, joining a makerspace to become a fashion designer. This story emphasises the importance of the makerspace providing physical access to sewing machines upon his release: "City Mission did that, providing [me with] space and equipment to sew [...] They allowed me to utilize my creativity. I couldn't have [gotten] this far if it wasn't for them." Similarly, UK projects such as Open Book (Mehay, 2017), Poplar Works,[18] MAKE @ Story Garden[19] and Playground,[20] offer opportunities for prisoners to learn design

skills outside prison as part of lifelong learning. Yet, from my interview with the founder of the Fab Lab project at HMP Maghaberry, there is a significantly different social context to makerspaces beyond prison compared to within. From the interview, there is anecdotal evidence that one of the participants of that project joined a makerspace on their release, but found the lack of structure outside of prison difficult.

Other projects, such as the Mission: Launch project,[21] provide training for ex-inmates, such as hackathons, but they also work with a variety of actors around the criminal justice system. They describe themselves as "connecting together the different criminal justice stakeholders […] community of coders, lawyers, former prisoners and advocates to come together to create new ways to rethink criminal justice" (Singareddy, 2015, para. 7). Thus, not only is the organisation providing vocational training for ex-inmates, but it is also bringing them into contact with wider systemic prison actors to intervene in the criminal justice context, such as creating the Fair Chance Employment tools, which enable governments to enforce fair-hiring legislation for those with convictions. They describe this approach as a "backbone to service providers who are helping people. We're at the intersection of civic engagement and civic technology to make re-entry more productive and efficient" (Singareddy, 2015, para. 8).

Other projects take a strategic, pre-emptive approach, such as Makerspace in the Hood, organised by the Urban Farming Guys,[22] which is focused on the poorest and highest crime neighbourhood of the Kansas City area. The idea is that introducing food growing, and 'making' opportunities, can prevent people from entering prison at all. As well as a social argument, the team makes an economic argument for the project: "you can spend millions of dollars on the prison time in this community, or you can help us get this match [funding]" (LeVota, 2016). In this way, the project makes a direct link to academic research of the Million Dollar Block project,[23] which identified that US prisoners originate from highly localised neighbourhoods where "the concentration is so dense that states are spending in excess of a million dollars a year to incarcerate the residents of single city blocks" (Center for Spatial Research Columbia University, 2020).

Analysis: 'Design BEYOND prison' offers much of the same potential for inmates as the 'design IN prison' approach of educational and vocational training. While less accessible to the wider prison population, this approach avoids many of the security and systemic problems of introducing specialised technologies into prisons. One of the unique aspects of this approach is its systemic and strategic potential to bring together diverse actors around the criminal justice system to work together and to use design to make pre-emptive strategic interventions.

Design **AS** Prison

Definition: This type frames design as a means to create services and systems that alter or replace parts of the physical prison infrastructure. It is unique in its focus on the intimate scale of the everyday routines, practices and social relations of inmates. It uses technology, services and protocols to create systems that directly affect the lives of inmates. Aspects of this framing are visible in the Scandinavian approach to prisons, yet there appears to be little design discourse on the practical and theoretical aspects of this approach. Nonetheless, there is significant potential for future impact and research.

Discussion: This is the most novel framing of design and requires the most discussion since it functions as symbolic and affective interventions that are often not physical. Much has been written about the Scandinavian model of prison, which involves open prisons where inmates live in self-organised cottages, and allows them high levels of autonomy with a focus on the normalisation of prison life (Pratt & Eriksson, 2011; Shammas, 2014; Wheeler et al., 2020).

> Inmates work, study, shop for groceries and cook most of their own meals;
>
> they receive visitors, hang out in the library, or run on paths around the island
>
> for exercise. Living conditions are, as far as possible, meant to mirror the
>
> world outside. (Shammas, 2014, p.106)

Many academic papers focus on the cultural and social policy differences between Anglo-Saxon and Scandinavian models of prison (Reiter et al., 2018; Smith, 2012), yet few engage with the design aspects of these prison systems. The report "Rehabilitation by Design: Influencing Change in Prisoner Behaviour" (2016) by Gleeds, a construction consultancy, is one of the few creating a translation between the socio-material theory that has directly informed this approach (Hammerlin, 2018) and the architectural focus on physical design. The report argues that design needs to "align the environment (prison) with the intended process or outcome (taking responsibility, rehabilitation and behaviour change). This can be achieved in a number of ways but, from a design perspective, we recommend 'building in' opportunities for agency and responsibility" (Gleeds Worldwide, 2016, p. 14). While this sounds similar to 'design OF prison', this approach proposes building agency and responsibility 'into' prison as socio-material processes, such as referring to inmates as 'men' (not prisoners) and having 'rooms' (not cells), with staff being encouraged to knock before entering, and allowing prisoners to control the lighting in their own rooms. The Gleeds report does not create a dualistic division between architectural design at a material level, and social interventions, but suggests that design can act on both. The report argues that key to this approach is the adoption of the 'digital prison', which will allow a normalisation of the prison experience in order

that it is not markedly different from life in the outside world. "Unless we embrace the 'digital prison', a profound and unprecedented level of disconnection will continue to exist between [the] prison and society, leading to deep, long-term social exclusion of individuals who have been sentenced to custody" (Gleeds Worldwide, 2016, p.17). The report argues that the key is that each prisoner has access to their own personal internet-enabled device. This focus on the digital prison is interesting, since it shifts the scope of design away from physical structures such as prison furniture, towards the socio-technical realm of digital systems and relational protocols.

Yet, surprisingly there is very little literature within Human Computer Interaction (HCI) that engages with the design of digital prison systems (Ertl et al., 2019; Taugerbeck et al., 2019; Teng et al., 2019). Verbaan and colleagues (2018) argue that this topic is "under-explored from a HCI and Design perspective", and highlight "these contexts as crucial domains for research relating to digital technologies and associated artefacts" (2018, p. 2). They argue that this lack of research is due to the difficulty of empirical design observations in prisons, "without an idea of everyday prison life and [with] a lack of HCI research conducted within the context of prison and the criminal justice system, there is no insight into the usability and usefulness of digital technologies to support [a] sense of self and rehabilitation" (2018, p. 3).

A detailed example of the 'design AS prison' approach is provided by an ethnographic study of a Dutch prison. It describes how: "cells have a kitchen equipped with cookware (including a microwave oven, pans and cutlery). Detainees are personally responsible for heating their meal, washing their clothes and cleaning their cells" (Kenis et al., 2010, p. 316). The prisoners are given the physical freedom to look after themselves, but are monitored continuously via an electronic ankle bracelet. This approach is brought together in a digital system, in which each inmate has a personal screen attached to their bed that allows them to make their own purchases, but also requires each one to prepare an activity plan for themselves for the next day. The system is used to connect together good inmate behaviour with digital rewards that inmates receive on their device to encourage them to take personal responsibility for their actions. Thus, the design of this system regulates both the physical constraint of inmates as well as their behavioural and disciplinary feedback loop. In this example, design choices act as the backbone of the prison system, while the system itself comes to function as a piece of design. In this type, it is possible to see a radical shift away from a classic notion of design as the making of products, towards interventions that operate at a systemic policy level, as well as targeting the intimate experience of individual prisoners. In the UK, currently, the Ministry of Justice has a 30-strong design team, which includes service design and strategic design focused on 'designing for people in crisis'. An article describes how "all our designers have to be able to zoom in and zoom out — service designers have to be able to design really good interactions, and interaction designers have to understand how those interactions happen within the bigger picture of an end-to-end service and a system of interrelated actors and services" (Allen, 2020). What this can look like as service design is illustrated by Lappalainen, who describes using inmate interviews and observation to visualise "the path of the prisoner's experience" and to create "service maps" in order to develop new service interventions (2018).

Yet, these kinds of intimate interventions into the lives of prisoners raise ethical questions of "good design for whom?" (Mohapatra, 2019). In the study of the Dutch prison model, Kenis and colleages outline how such prison-as-service systems can become "a replacement for detainees' general education and working activities,

which are considered by policy makers to be too expensive and unsuccessful for this group of short-time detainees. It is believed that making the detainees responsible for their own conduct would contribute more to their rehabilitation in a society in which encompassing potential can be used to replace the right to education in prisons. Unlike architecture, service and system design have been slow to engage with the ethical specificity of working with prisons (Mohapatra, 2019; Parker, 2009). There is limited research that brings together inmates and prison officers to collaborate directly on the design of prison systems. Aakjær and Brandt used participatory design workshops to "co-create solutions of how to improve the quality of everyday life and practices within the prison" (2012, p. 101). Yet, the study highlights the difficulties of such adversarial co-design of systems, recommending defining the 'rules of the game' and creating "an infrastructure for participants to meet in an open and respectful manner. An important rule to secure this was an agreement that what was said during workshops should not 'leave the room'. In this way, rumours and slander, [which] normally [is] a widespread reason for extensive stress and conflict in the prisons, was avoided" (Aakjær & Brandt, 2012, p. 102). In the context of mental health or addiction treatment, Thom and Burnside describe how co-production projects in the criminal justice system are typically seen as "tick-box bullshit bingo". To overcome this, they suggest good practice, such as "making time to gather advice face-to-face on a research question and methodological design, working with participants and communities with humbleness and caution, and, most of all, showing continual respect to all involved in the research" (Thom & Burnside, 2018, pp. 1262–1263). The Stretch project (Anderson et al., 2018) is an example of a successful project combining arts-based digital storytelling with co-design approaches. Nevertheless, this literature review did not find any examples of the co-design of digital prison systems where inmates were directly involved in designing their own services for personal devices used for day planning or electronic tagging. Using co-design or participatory design methods might be a crucial component for digital systems that aim to design for behaviour regulation (Fogg, 1999).

Analysis: The 'design AS prison' approach is socio-material in that it does not differentiate between design at a physical level, and social interventions. This means that it has strong potential for systemic interventions into changing the prison system as well as the transformation of individual inmate's lives. Key aspects of this are digital systems and services, yet, there are few HCI studies and little co-design in this important and growing area. In addition, the transformational aspects of this approach are so profound that more ethical analysis is needed here.

Conclusion

This systematic review identifies the wide diversity of approaches to prison design, and provides a novel six-fold prepositional typology of design. The prepositional differences point to the fact that design in relation to prisons takes place in very different domains and according to different assumptions, to the extent that some of the approaches might not even recognise each other as being engaged with the same 'design problem' (Bergman et al., 2007). Some designers focus on prisons as large physical structures that can only be understood from a bird's eye perspective, while others focus on designing objects for individual inmates, to be inserted into prison cells. In another framing, prisoners are used to make commercial goods that play on the cultural imaginary of prisons, while others use design as educational

and vocational training inside and beyond the prison. In another, digital systems and electronic tags are replacing physical prison infrastructure to directly modulate the behaviour of inmates. One of the contributions of this global review is to identify the broad scope of approaches and different positions taken towards prison design. The review highlights the key quality of design as being its breadth of scope in contrast to creative art practices, which take place in the designated context of the prison workshop or exhibitions. This difference between design and the creative arts is set to increase as design will be used to define the digital prison future. The growing importance of design — yet the lack of a coherent design discourse on the nature of prison — emphasises the need for the development of relational models of design that can create socially equitable visions of future prison systems. In this vein, the study offers three insights into the landscape of design and the prison:

1 Socio-material design creates potential for systemic changes

In itself, identifying that prisons present a range of design problems is not surprising (K. Dorst & van Overveld, 2009). Yet, what is novel is that these framings of design involve different socio-material positionings for inmates and for the prison system as a whole. If, for example, the problem is the design of a prison bed, the range of variables and agendas to consider is radically different to designing a prison complex from a bird's eye perspective using CAD software. The issue is not that design problems are ill-structured (Goel & Pirolli, 1992), but that they are situated (Suchman, 2007), and bring different actors together whilst excluding others. Amongst the typology, three of the types adopt a dualistic, Cartesian approach that focuses on physical shaping as distinct from the prisoner's 'mind', while the other three suggest a socio-material approach where agency is seen as distributed across human and non-human actors. These different concepts matter in the way that they impact the systemic scope of design, and offer radically different educational and vocational potential for inmates upon their release. Adopting a socio-material approach would mean framing prisons as relational 'infrastructure' (Star & Ruhleder, 1996), where "infrastructure is fundamentally and always a 'relation', never a thing" (Star & Ruhleder, 1994, p. 253). This means that it is impossible to focus only on prisons as physical structures, while building relational infrastructures means facilitating the "demands of multiple groups and making connections between them possible" (Neumann & Star, 1996, p. 234). Working directly in prisons with inmates and observing the implementation of design via methods such as design ethnography (Pink et al., 2020) would help sensitise designers to the socio-material dynamics of prison.

2 Technology as disruptor

As the Gleeds report (2016) suggests, it is impossible to imagine the prison of the future without technology and this might be the key factor in transforming prisons from lumbering infrastructures towards relational systems. Currently, maker technologies such as 3D printing and laser cutting offer excitement for inmates as well as vocational relevance for a world that runs on digital rails. In addition, this study has identified the notion of 'design AS prison' where technology-based design is at the core of the transformation of prison structures into digital services that can reshape the scope and routines of prison life to the point where design is acting as a core part of the prison system. The 'digital prison' is as yet an open

concept that could become a digital panopticon (Foucault, 2020), or a relational care and wellbeing service, as a digital update of the Scandinavian model. Unlike the Victorian prison, the 'digital prison' does not yet have strong cultural imaginaries and relics attached to it and might thus offer a space for designers to present ethical and egalitarian visions. Yet, the increasing use of technology in prisons presents significant structural problems, such as cost and security concerns, as well as mindset problems, such as divisions between learning and working prisons.

3 Co-design of prison systems

There appears to be untapped potential to combine the highly successful co-production workshops seen in the 'design IN prison' approach with the socio-material scope of 'design AS prison'. Using constructivist principles of makerspaces could involve inmates directly in prototyping the systemic construction of prison services, to improve prisons with educational and vocational goals in mind. Using a 'making' approach, where inmates build their own prison system incrementally from the bottom up, might offer a pragmatic and egalitarian way of creating the 'digital prison' of the future.

Contributions

Endnotes

1   www.designagainstcrime.com

2   www.artsevidence.org

3   www.arts.ac.uk/colleges/london-college-of-fashion/about-lcf/better-lives/making-for-change

4   www.inhouserecords.org

5   www.gold.ac.uk/open-book

6   www.arts.ac.uk/colleges/central-saint-martins/csm-public/makeright

7   stretch-charity.org

8   www.arts.ac.uk/colleges/central-saint-martins/stories/prison-cell-furniture-for-the-future

9   https://www.kickstarter.com/projects/1289816673/stripes-clothing-made-in-prison-inspired-by-freedo

10   https://www.storemadeincarcere.it

11   https://www.arts.ac.uk/colleges/central-saint-martins/csm-public/makeright

12   https://finecellwork.co.uk

13   https://hvmag.com/life-style/the-old-beacon-correctional-facility-is-getting-a-major-facelift

14   http://cascoland.com

15   https://www.facebook.com/DLab058

16   http://www.wolfdesignltd.co.uk

17   https://citymission.com

18   https://poplarworks.co.uk

19   https://www.arts.ac.uk/colleges/central-saint-martins/csm-public/make-story-garden

20   https://www.facebook.com/playgroundual

21   http://www.mission-launch.org

22   https://theurbanfarmingguys.com

23   https://c4sr.columbia.edu/projects/million-dollar-blocks

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