

The Mediality of BIM

La Cueillette as Exemplar Integrated Practice

Introduction

We initiated the *La Cueillette*¹ design studio as an explorative research and learning environment to investigate BIM (Building Information Modelling) beyond its technical and managerial qualities.² As the radical introduction of 4D modelling, time-based performance parameters, integration of knowledge and distributing expertise all seem at odds with the open-ended design studio environment as we know it, we wanted to investigate alternative approaches. By disassembling the basic thinking behind BIM and its related concept of Integrated Practice, we aimed to discover how BIM—as a way of working and thinking—challenges traditional design pedagogy and transforms creative (learning) environments to find out whether and how simulated craftsmanship can become crafted simulation.

The Mediality of BIM

Mediality is the research field that inquires characteristics and properties of particular media.³ Mediality investigates the degree to which a media container communicates its contents. As a field Mediality shifts the focus to the ways and means of mediation. In a 2014 call Martha Rust states that the goal of mediality—as an approach in the discussion of media—“is less to define than to describe medial situations: moments of the in-between, in which something is assigned the function of a medium, and in which mediation occurs or effects of mediating become visible” (Rust 2013). Since BIM is essentially a computer application that enables mediation between different stakeholders we consider BIM as media.

In Marshall McLuhan’s terms BIM can be considered as a medium in the sense that it is an extension of man.⁴ BIM is also a medium in that it represents an *instrumentality*—a means to an end.⁵ But BIM can also be considered as a tool, in the sense that BIM consists of a set of technologies, processes and protocols which enable stakeholders in the design and building

¹ English translation: “The Gathering”.

² La Cueillette is an outlet of the authors’—ReVamp—Academic Design Office, a program funded by KULeuven’s Faculty of Architecture.

³ See: Rivero 2019.

⁴ See: McLuhan 2001.

⁵ See: McCullough 1996.

6 See: Eastman et al. 2011.

process to organise data and to collaborate. BIM, as media, relies on digital technology which models information required for design, construction, and operation tasks, from early inception stages of projects throughout the life-cycle phases of constructed facilities.⁶ When discussing BIM we should make a distinction between (i) BIM as a modeller, (ii) BIM as a simulator and (iii) BIM as a mediator.

(i) The aim of a BIM modelling process is to virtually put together all the objects that make up a building *full scale* and in three dimensions. The resulting three-dimensional virtual replica figures as the building's *digital twin* during its design, construction and operation. In conventional design processes drawings refer to properties or details of a design as a proposition for a building. BIM's digital twin radically bypasses an age old interplay between representation, interpretation and imagination wherein stakeholders abstract knowledge and experiences through design artefacts (drawings, models, diagrams). BIM unilaterally replaces these artefacts and abstractions with one unique digital model.

(ii) The parametric foundation of BIM is able to simulate every measurable aspect of a building's appearance and performance. Conventional design processes required several disparate sets of drawings, physical models and spreadsheets to assess a building's anticipated performance. This assessment relied on loose predictions and strategies based on empirical evidence and calculations. In a BIM environment a building's construction and performance is managed during its complete lifecycle, from conceptual design over maintenance into operation.⁷ Where drawings froze a moment in time, the BIM model is the equivalent of a building's *digital twin* from cradle to grave.

(iii) BIM modelling and simulation facilitate its unprecedented quality in mediation. Where conventional design processes required continuous negotiation between all parties involved, BIM enables every party to insert knowledge—as data—into the evolving model. Every insertion immediately makes its technical or aesthetic consequences visible and accountable in the evolving *digital twin*. To make this distinct process work, BIM requires a different kind of interaction as everyone becomes openly responsible for the organisation of the design and building process as well as for the building's further lifecycle. In that sense BIM seems to replace the (arguable) age old divisions between architect-client-contractor with a workflow that aims to reach a shared goal by collaboration. This led architect Randy Deutsch to observe that BIM's concept of *integrated practice* is about “sharing risk and reward, among other benefits that attempt to resolve efficiency and waste concerns and overcome historically adverse relations while creating the most value for the owner in the resulting project”.⁸

Evidently BIM answers a growing evidence-based approach to building. It enables all stakeholders to examine ideas and decisions in light of future behaviour, performance, maintenance, replacements and/or demolition. BIM also promises a swifter building process, healthier buildings as well as perfected energy and waste management. The downside is that some of these

7 See: Deutsch 2011.

8 Ibid., p. XVIII: “Integrated design also implies ‘integration’, connoting a sense of acceptance, even transparency, within the user environment. Together BIM and integrated design support and reinforce each other to mutually beneficial results”.

promises seem to come with a price. As BIM's decision making process is inclined towards a commensurability of technical and budgetary values it appears to leave very little space for experiential, sensory, kinaesthetic and ephemeral qualities which characterise human interaction with buildings and spaces. Adopting to a BIM process apparently obliges everyone to accept its rationale. Any idea which lacks quantifiable proof of performance tends to be the first one that ends up in a virtual waste bin. Doing so threatens to ignore the kinds of spatial knowledge that refuse to be scripted into data. This oversight challenges architectural practice as well as its education. So-called tacit knowledge and expertise which used to be articulated in drawings and artefacts suddenly need to be computationally scripted. In other words, what used to remain hidden in the architect's creative mind suddenly needs to be measured and formulated—even if this implies quantifying the unquantifiable.

Based on these observations we wondered whether discarding the messy and fuzzy logic of abstraction and representation is actually a good way out. When we accept the BIM model as a virtually functional *digital twin* at a one-to-one scale, we disregard the power of looking for metaphors, references, precedents or preferences in a “this stands for that” discourse. Favouring scripted comfort and performance ignores qualitative and experiential properties which ultimately make buildings and neighbourhoods inhabitable.

The mediality of BIM challenges us to elaborate upon what previously remained hidden in representation and abstraction. We argue that BIM urges us to explore the properties of spatial reasoning in ways that are able to steer the data driven processes of BIM. If, as anthropologist Tim Ingold argues, creativity can be regarded as the result of the combined activities of “perceiving, remembering and imagining”⁹, our ambition should be to study how this combined activity augments spatial reasoning: in other words, analysing how *perception*, *remembrance* and *imagination* can be stratified in a BIM environment. This implies studying the experiential, the sensory and all those things which are difficult (if not impossible) to script into mathematical models. Introducing BIM as media is an attempt to extend its possibilities in creative design processes.

⁹ Ingold 2018.

Introducing La Cueillette

In some French towns, the seasonal activity of going out into the woods and bringing in the harvest is a common civic event. It is both a gathering of goods and a gathering, a coming together of people. This event is called “La Cueillette”, which represents a celebration of resources. In that sense, the overarching studio theme is gathering: gathering data (experiences), people (civic), conditions (context) and materials (circularity).

We found an old cotton warehouse, turned-furniture-warehouse on the undefined boundaries of a neighbourhood, a busy road, a soccer field and the harbour on the outskirts of a historic town. The epitome of a non-place applies there, if there ever existed such a thing.¹⁰ We invited the participants, first year master students in architecture, to become part of a community of

¹⁰ See Augé 1992.

practice as a metaphor for integrated practice.¹⁰ The aim of the community is to work together to find generative and imaginative discourses, possibilities and uses for BIM as media. By collaboratively exploring and resolving design paradoxes and conflicting views, the participants explored ways to investigate and challenge the basic thinking behind BIM. Consciously refraining from establishing a “program-to-design” assignment, we chose to encourage participants to focus on experiential qualities found in and around the centre of our designated (non) site.

Instead of delving into BIM’s properties as modeller or simulator, we focused on the input: what data can be made off. We introduced a high level of abstraction to force the participants to concentrate on their own vivid imagination. By focusing on qualities and hidden narratives we incited participants to investigate the kind of qualitative data which tends to become obscured in translation from idea to computational simulation. We tried to complement BIM, as media, to conventional design tools and strategies. Within the studio we investigated the properties of so-called *unmeasurable* qualities, as a method to explore the role and generative importance of these unmeasurables in preliminary design processes. By exploring these unmeasurable qualities of spatial design we wanted to inquire how BIM can acquire a more supportive role in (preliminary) design processes—as media rather than as a protocol and simulated dataset.

Documenting the Unnamable

The intention of the studio is to focus on early stage simulation and how it can (i) incorporate unmeasurable concepts of value creation, challenge (ii) relations between imagination, representation and simulation and (iii) transform collaboration into integration. To structure our studio and to instigate creative (ab)use of BIM as media we circumscribed a set of physical design-based artefacts. These artefacts were deliberately introduced to organise the participants’ development within both their project and research. The output of the design studio focuses on the creative development of four BIM related documents: an (i) Annotated Abstract, an (ii) Augmented Physical Model, an (iii) Extended Drawing and, a (iv) Tactile Data Sheet.

(i) The Annotated Abstract (AA), in its official version, is a 500-word text that describes the ambition of the proposal and the actions taken to achieve them (fig. 1). Unofficially the AA is a dynamic and illustrated string of documents that contextualises the work and its conceptualisation. During design processes, a number of positions, references, insights, remarks, observations and decisions are formulated. Although these are often crucial for the design ambition and the resulting project, it is not always possible to implement them as ‘objects’ in the project’s *digital twin*. By annotating an abstracted description of a project, the AA aims to track moves and detours that were taken during the design process to highlight what cannot be quantified in a BIM model. By developing the competence of explicating more or less implicit properties of design ambitions and moves the AA prepares and



Fig. 1 Julie Schumacher: Annotated Abstract

introduces the participants to work with the LOI (Level of Information) of BIM models. The LOI refers to the invisible and/or non-geometric part of the model mostly linked to technical specifications. In our studio the AA complements the technical character of the LOI with ephemeral, indirect and implicit properties of a proposal.

(ii) The Augmented Physical Model (APM) is a model, a three dimensional *physical maquette* as a contrast to the concept of the *digital twin* (fig. 2). The APM comes to be augmented through manipulations and, as such, differs from a representational scale model in that the manipulations embody what kind of content or information is expected to be "harvested" and has to remain within a project at all times. Exploring augmentation challenges participants to explore ways of translating crucial design statements and ambitions from one medium (and one paradigm) to another. Exploring the translation of this kind information into a three-dimensional artefact is another way to investigate the rendition of qualitative data into the quantitative logic of a BIM-environment. In that sense the aim of the APM is to bridge a cognitive gap between a physical model and its alleged *digital twin*.

(iii) The Extended Drawing (ED) is, essentially, drawing research. It is a result of a continuous process of layering, mixing and blending of (architectural) media to find new kinds of media (fig. 3). Its conceptual *extension* is borrowed from musical practice where "extended techniques" refer to unconventional, unorthodox, or non-traditional methods of singing or of playing musical instruments employed to obtain unusual sounds or timbres. Extended drawings become extended by virtue of their development and origin, by virtue of their emergence out of a field of previously existing drawings, activities and concerns. Within the studio the ED intends to reveal non-visual, kinaesthetic or ephemeral properties of form and space on a two (and a half) dimensional carrier.

(iv) All too often, in practice, data remains, well, data. The ambition of our studio is to explore ways to make data *tactile* (fig. 4). Research into possible emanations of the Tactile Data Sheet (TDS) revolves around the axes of simulation and imagination. The TDS should imagine, and make imaginable, "data" that was identified with the APM, described in the AA and imagined in the ED.

Along the way we coined the concept of "Sticky Data" to refer to a piece of knowledge that needs to stick to a project, at all times. "Sticky Data" belongs to that class of data that is able to overrule any future decision making that would interfere with its fragile—but nevertheless fundamental—property, insight, resolution or quality. During the studio, "Sticky Data" became the central concept which had to be radicalised during the further development of the design as communicated in the four documents.

By charging common (architectural) media with additional features, participants are forced to re-approach, re-interpret and rethink the status and value of their established creative tools. Iterating between the four documents results in a consecutive series of artefacts which build on acquired

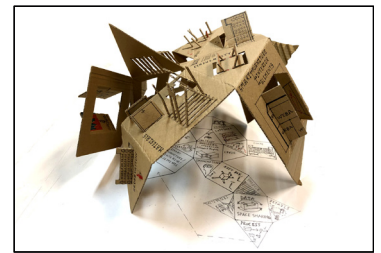


Fig. 2 Ngoc Thanh Chu: Augmented Physical Model

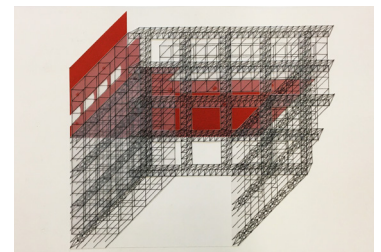


Fig. 3 Jiri Formanek: Extended Drawing

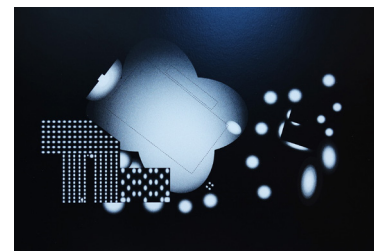


Fig. 4 Léa Daniele: Tactile Data Sheet

knowledge from previous series. This method of stratification and sedimentation aims for a profound set of documents with a rich micro-history of their own production. In that sense the documents are not the result of a project, but rather the project is the result of the development of its documents and the reflective activities that lead to their production.

The documents—as expressive media environments—structured our *Integrated Practice gatherings* (IP). Metaphorically the IP-gatherings intended to turn our habitual review moments into peer-learning activities. Each IP-gathering focused on a certain theme such as: *annotating the abstract, sticky data, extending the drawing*, etc. Within our community of practice, the IP-gatherings aimed to create a space for reflection that thrives on dialogue and the exchange of accumulating knowledge and expertise. The IP's aim was to mimic BIM-team meetings in which different disciplines insert distinct input to be evaluated within the evolving *digital twin*.

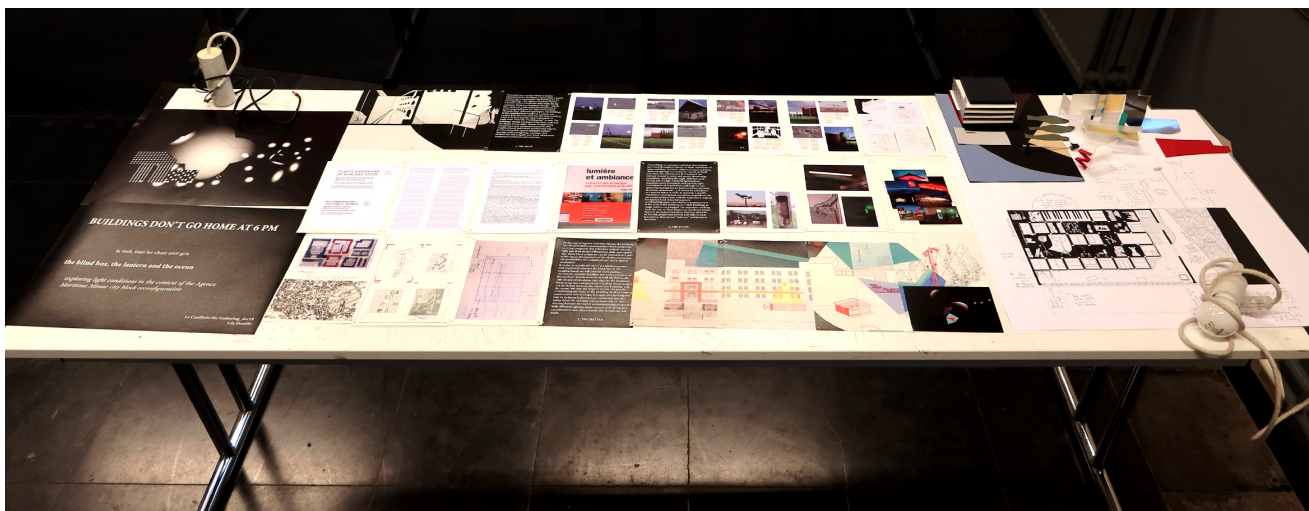
It's only a warehouse ¹²

All visual communication had to depart from one of the four documents and only from those documents! A household door on two trestles, figuring as table, enclosed the area to discuss the evolution of the documents. Upon the limited space of this table the performability, expressive qualities, erasures and additions slowly revealed a collection of informed and well crafted artefacts. By the time the studio reached its finish, the tables became the subject matter for the studio's conclusive symposium (fig. 5).

From the outset participants struggled with our refusal to approach both site and production from a practical or programmatic point of view. Introducing a kind of indeterminacy was a method to direct participants' attention to embedded qualities in and around the (non) site rather than to “business opportunities” derived from the qualities of the old cotton warehouse. This obliged the participants to leave the known and established design strategies and delve into the unknown to find something new and unexpected.

12 The title refers to one of our participants reflections about the project questioning the costly maintenance of old buildings in light of neighbourhood renewal and progressing diverse and poor neighbourhoods.

Fig. 5 Léa Daniele: Table Presentation



As programmatic considerations stopped being relevant, participants had to invent a new kind of language which they had to translate into data representations without having any clue of how to do so. This led to an investigative community of practice gathering around the questioning of the obvious, directed at describing the exceptional and remarkable. Exploring unknown parameters and fuzzy goals also triggered cooperation. Since everyone looks for something which has not yet manifested itself, all accumulation of singular expertise starts to be potentially meaningful to the group: as a community of practice.

During the course of the studio we continually challenged the participants to inquire about the description of criteria for intervention, as opposed to shaping them into forms. To structure this process, we changed the focus from conventional imagery and representations to the analysis and description of the essence of ideas, qualities or properties crucial for the position of a designer towards the project's environment. From that analysis the participants had to discern possible translations into one of the four documents. The development and manifestations of the four documents heightened the participants' awareness and triggered reflections about the status, value and relationships between abstraction, data, simulation, representation and imagination. The studio's document descriptions intended to confront the participants with the fact that a medium is essentially a way of thinking, in the way that BIM was introduced. The challenge, then, was to figure out how a specific document can be (ab)used as a way of thinking. In other words, how such a document is able to express qualities, properties and conditions of an intention or intervention.

The studio as an integrated practice suggests an interdisciplinary community of practice, working together to design, plan and, ideally build. The studio's IP-gatherings were introduced to trigger reflection about integration in architecture and design, and to share and broaden expertise. It was our intention that individual participants would activate their emerging knowledge to enter the dialogue as a distinct expert (i.e. an expert on augmenting models, extending drawings or even in dark programs or urban voids). In retrospect we only peripherally achieved the activation of individual expertise as lenses to discuss and augment peer progress and projects. In exploring integrated practice in teaching environments, we have to keep architect Andrew Pressman's observation in mind that

“perhaps the biggest cultural change is not learning how to use new tools and technology, but rather the attitude adjustment required to collaborate effectively with the entire team from the start” (Pressman 2007).

During the final symposium our ambition to challenge unexpected representations and surprising design gestures was rewarded with a collection of highly unique interpretations, inquiries and results, as well as a group eager and able to engage in evaluating each other's work. Each of the four documents served a specific function within the individual research. Translating

individual intentions into one of the documents heightened the participants' awareness to the qualities, properties and conditions of overarching concepts governing a project as opposed to aesthetic and formalistic ones. In that sense the interaction of the four documents as well as their complementarity proved to be a method to inquire about potential accounts of qualities, opportunities and challenges within each project.

Conclusion

By immersing ourselves in preliminary, open and indeterminate design reasoning we were able to challenge BIM from a design-driven point of view. Considering BIM as a media in a design process has allowed us to unearth and methodologically unpack some of its characteristics, pitfalls and rudiments. During the course of our studio we inquired how BIM alters creative thinking in order to explore how these alterations can be fed back to enhance BIM-processing in creative environments. Our decision to focus on the mediality of BIM created opportunities to fully concentrate on the properties of its data and how qualities and added value (as inherent properties of architectural design) can be introduced into an allegedly quantified design process.

The mediality of BIM challenges design and its pedagogy in several ways. BIM as a modeller questions the primacy of drawing and is able to change the way we draw. BIM as a simulator questions the notion of abstraction and representation. BIM as a mediator questions the compartmentalisation and distribution of knowledge and expertise and suggests a more integrated approach to learning. Far from seeing these challenges as a threat, we should see them as an opportunity to stratify experience: to specify embodied and ephemeral qualities beyond intuition and vague assumptions so that we can (re)claim them as indispensable properties of design thinking. In that way the mediality of BIM urges our discipline—and its education—to focus on voicing, expressing and documenting the properties, extensions and qualities of spatial imagination.

We discovered that being able to specify the unnameable in documented—and well crafted—data is an important prerequisite to be able to substantiate qualities and experiences *in* BIM. During the studio we discovered that looking for the apt account to specify the qualitative and unmeasurable gives substance to its importance. In that way, *La Cueillette* revealed that next to inquiring the technological so-called hard aspects of BIM, we are also in need of a language to verbalise the softer properties of forms and spaces. Analysing these unmeasurable properties is a way to move from *simulated craftsmanship* towards *crafted simulation* and into a *qualitative approach to simulation*.

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Figures

Figs. 1–5 Design studio *La Cueillette*, Robin Schaeverbeke, Tomas Ooms.

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