Diagrammatic thinking – complexity handled between knowing and feeling

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ABSTRACT: This paper explores a dual position of the diagram through Deleuzian theory and the theories of Frederik Stjernfelt and C.S. Peirce. I will try to demonstrate how diagrammatic drawing can take an intermediate position between knowing and feeling. For architects and designers, thought is continuously formed by drawings in an intuitive and sometimes unpredictable, but nonetheless intentional, manner. Such a thought process I have termed *diagrammatic thinking*. Through a deeper understanding of diagrammatic thought, tactics with which to approach architectural development can be articulated and thus in the end taught or exchanged. In this paper the tactic of abstraction is investigated and presented through the drawings of architecture students at Department 6 of the Danish Royal Academy, Architecture School. My findings are based on studies I have made of the drawing praxis at the department in 2011. Department 6 has an approach to architecture that does not only deal with environments that are to some extent already built upon, but also with elements that are not traditionally architectural, but connected to alternative organizations of urban flows, thoughts and memories. I present the notion of the fictive diagram as a model to understanding how this very aesthetic diagram praxis works.

KEYWORDS: Diagram, architectural drawing, iconicity, diagrammatology, Stjernfelt

INTRODUCTION

Architecture has perhaps always been a syncretic profession, but it certainly is becoming increasingly more complex with a growing number of disciplinary connections. This complexity has an impact on how we approach architecture as a discipline itself, but it also affects the teaching of drawing in architecture. Drawing is not simply putting onto paper an already formed thought. Architectural thinking is formed and informed by drawings or models in an intuitive and sometimes unpredictable, but nonetheless intentional, manner. My research work centers on the formation of knowledge through drawing, and to be more specific, how you as an aspiring architect create experience through drawing. This thought process I have termed *diagrammatic thinking*.

My findings are based on studies I made in 2011[i] of the praxis at Department 6 of the Danish Royal Academy, Architecture School. The theoretical work that I will here put forth is a sense-making model of the drawing praxis I found at the department and is aimed at giving a better understanding of the students' design process. Why and how is it you can learn something about a building or a place by drawing it? The diagrammatic drawing praxis found at Department 6 is interesting because it crosses between intuitive and intellectual design strategies. Theoretically I therefore position myself between the Deleuzian notion of diagram, mainly as found in "*Francis Bacon – The Logic of Sensation"* and the diagram of C.S. Peirce that I explore through the Danish researcher Frederik Stjernfelt's work *"Diagrammatology"*.

Firstly I would like to present to you briefly some background knowledge about Department 6 and the Danish architecture schools and the key findings of the small study. Then I will demonstrate how the drawing praxis functions in the instance of it that I have called a mapping tactic and finally present my model for *diagrammatic thinking*. The case study of Department 6 is a case study of a particular and rather distinct praxis and the findings cannot therefore immediately be generalized or seen as applicable for all architecture students, but I hope that you will recognize potential in the theoretical framework put forth and in the material see connections and similarities to common and well-known situations.

1.0 Diagram Praxis at Department 6 – a study

The two Danish architecture schools (Copenhagen and Aarhus) both have a strong artistic tradition and are both built on an academy practice rather than a polytechnical one or affiliated with a university. This has fostered an emphasis on artistic qualities that is reflected in teaching approaches and student output equally. It results in design and teaching practices that from the very beginning of a student's studies aim higher than already formalized knowledge or 'best practice'. The Copenhagen school, KARCH, in 2011 had 9 study departments with different profiles and 4 institutes (design and communication, building culture, technology and planning). The departments all had different profiles and focus, but they all qualify for the same degree as architect after five years of successfully completed studies. After their admission to KARCH, students choose which department they want to be connected to. The department of choice is hereafter responsible for the daily education and training of the student, who spends the majority of his or her education at the department engaged in project based studio-type learning. The institutes are responsible for lectures and a few mandatory courses.

Department 6 is profiled as the department for 'space and form', which on a more concrete level has developed into an abstract and expressive form of drawing with a strong emphasis on experimental topology and morphology. The kind of architecture taught and drawn at Department 6 seems to grow organically out of a certain place and not only does it deal with environments that to some extent are already built upon, but also with elements that are not traditionally architectural: alternative organizations of urban flows, thoughts and memories. It is to a certain extent the urban complexity that the department aims to tackle in their approach to project development and teaching, where the drawing takes center stage.

The high artistic and creative ambition of the studio work does, however, have complications with regards to formation into an actual design methodology. Perhaps exactly because of these artistic ambitions, discussions of methodology are often shunned or passed on to students through rather vague or very complex theoretical reflections. The 2011 project focused on collecting and putting into words the knowledge and approaches that the students in Department 6 exhibited and then structuring and focusing this to make theory and practice comparable.

The data gathering consisted of semi-structured interviews with a range of students from all levels and two teachers as well as observations and the collection of a diagram archive. The interviews were of approximately an hour's length and based on 20 questions, which especially targeted generative and creative phases. Interviews were tape recorded, anonymized, transcribed and thematically coded where after they where made available to the department faculty as a resource. My interest in the drawing praxis of Department 6 stemmed from my time there as a student and my view was thus a critical and inquisitive one from the inside rather than that of an outsider. It was my assessment that this position facilitated the interviews both because of my knowledge of the terminology, but also because the students seemed eager to volunteer information to someone whom they trusted would understand the way they worked without passing judgment on their drawings.

Students were asked both how they perceived their own drawing practice as well as to talk about a couple of drawings of their own choice. The diagram archive consists almost purely of digital diagrams, which wasn't the initial intention. The collection method chosen was to let the students select the diagrammatic drawings. This was done to not force my own notion of diagram on them and remain open to their definitions. The difference between analogue and digital diagramming was addressed in all of the interviews but is beyond the scope of this paper. Suffice it to say that I observed that the students utilized the digital diagramming's capability of copy/paste and undo/redo tactically in their work. Although most of the interviewees worked digitally they all also drew by hand and some even spoke of changing between the analogue and the digital as a way of avoiding creative impasses.

1.1. Observations

The two key observations of the study were:

- The diagram as a drawing tactic was crucial in their project development. The diagram was used as a tool and its defining characteristic is therefore that it is operative.
- The students describe their work as a constant change between two phases in the drawing process - reflection and creation. In the creative phases uncontrolled developments occur in the drawings.

2.0 DRAWING TACTICS: ABSTRACTION

Figure 1: Left: 2nd year student drawing. Right: 3rd year student drawing[II]

The study uncovered five diagrammatic tactics, but in this paper I shall focus on only one: abstraction, which is inseparable from all diagrammatic drawing. The abstraction tactic most frequently takes form as a mapping. All of the students in the study, barring one first year student, made use of this tactic. The mapping was though, carried out in varying ways. Compare for instance figure 1 left and right and figure 2. Where the diagram in figure 1 left maps an interpretation of a place through transparent overlapping layers, without any visible sub layer, the diagram in figure 1 right is an expressive sketching of perceived relations in lines that at times break from the underlying drawn up conventional map only to relate to the map in other points. The diagram in figure 2 also performs a mapping, but here the mapping consists of a montage of aerial photographs, reproduced multiple times with the effect of layering in the drawing.

Despite the diverse methods of carrying out the mapping, the abstraction/mapping tactic has the common feature that it is ”drawing over something”; adding a new layer to an existing sub layer. The sub layer is not necessarily a conventional map, although the most frequent use of the tactic is in contextualized diagrams. Even more importantly the diagramming process in this drawing practice is not simply a mapping, but form generation. To capture this difference in diagrams I differentiate between referential diagrams, abstract diagrams and fictive diagrams, as will be described later. The fictive diagram is where the mapping goes hand in hand with the emergence of new structures. Let us first though examine more closely what a diagram is.

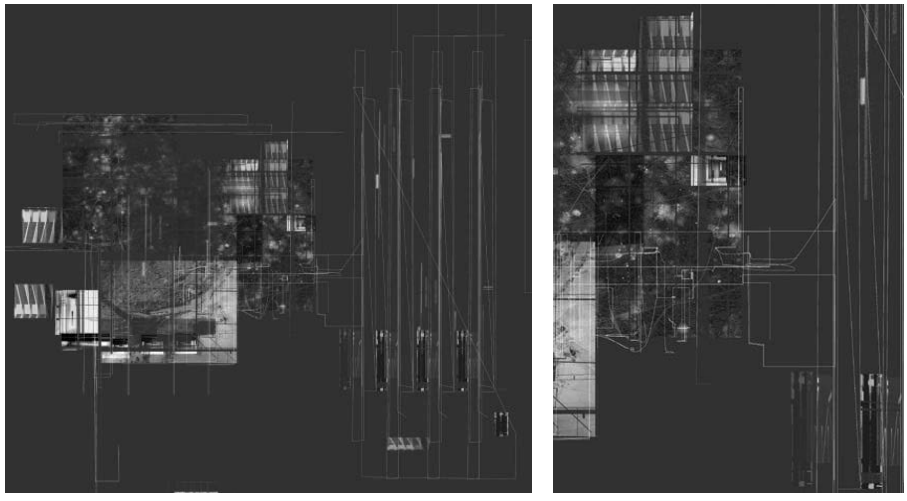

Figure 2: This small scale reproduction hardly does the complex drawing by the hand of a 4th year student justice, but shows an interesting hybrid technique using both lines and aerial photography. Left: Detail of same drawing.

3.0 THE LOGIC OF THE DIAGRAM

In Diagrammatology, Frederk Stjernfelt, who is a Danish scholar working within the field of semiotics, explores the diagram theory of C.S. Peirce and although he does not approach it from an architectural viewpoint, his reflections are still applicable to the present investigation. The diagram in Peircean semiotic theory is part of the system of signs – more precisely it is an icon. For brevity I will not lay out here the entire Peircean semiotic system, but skip right to the characteristics of an icon. Icons are similar to their objects in a way that does not rest on them *seeming alike* but *behaving similarly*.

”it does not matter whether sign and object for a first (or second) glance seems or are experienced as similar; the decisive test for iconicity rests in whether it is possible to manipulate the sign so that new information as to its object appears.” (Stjernfelt 2008, 90)

A diagram and its object do not necessarily look alike but they *act/react in a comparable way*. This points to that their similarity shouldn’t be seen as a core around which changes occur, but rather as a pattern or structure, that change similarly under similar transformation rules. Because of this *operational likeness*, which can only be grasped through deduction and not through experience, for Stjernfelt the icon and thereby also the diagram are closely connected to reasoning (Stjernfelt 2008, 102). The similarity simply only occurs through deduction and therefore the relations that a diagram produces are understood through reasoning. The diagrammatic reasoning is a softening of deduction, however, because it is also dependent on observation. Stjernfelt uses the following model for diagrammatic reasoning:

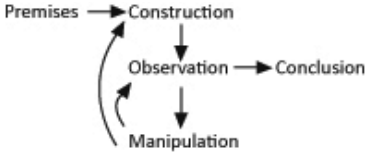

Figure 3: Model for Diagrammatic reasoning (Stjernfelt 2008, 104)

The model shows how a construction, which is first observed and thereafter manipulated, results in a new construction or an observation and so forth in a process that continually moves through construction, observation, and manipulation until a conclusion is finally

reached. The model in this way closely reflects the thought process respondents at Department 6 described in their drawing process. It is experience formation that happens through drawing and the interchange of observing and constructing it.

3.1. Diagram, experience and imagination

The special ability of the diagram is that it with real tangibility demonstrates an outcome of a scenario:

”It is, therefore, a very extraordinary feature of Diagrams that they *show*, - as literally *show* as a Percept shows the Perceptual Judgement to be true, - that a consequence does follow, and more marvelous yet, that it *would* follow under all varieties of circumstances accompanying the premises.”(Stjernfelt 2008, 93)

In the above quote from Peirce it is evident that you in the diagram can literally see the similarity with the object. To return to the diagrammatic drawings; it is in other words of not important whether elements in the drawing look like the reality to which they point, but that they behave in similar ways – the diagram is operational and not representational. All diagrams are in this way abstractions, which do not seek a mimetic relation to their object but rather to sketch structural elements. In this we find a general legitimization of drawing as an experiential tool.
The reason that architecture drawing is important in the training of architects is because the students gain experiences from the drawings that they transfer not only to other drawings, but also in the end to buildings. Here we can, as Stjernfelt does, lean on Husserl’s idea that we through ideation can intuit pure essences in an adequate way; we can gain experience even through free fantasy (Stjernfelt 2008, 185).

It is a sort of basic premise for drawing that the experiences made through the diagram are similar to those one could get from the object of the diagram. For architecture this type of ideational experience is particularly necessary as it would be practically impossible to get the same experiences from the objects of the diagram. It would not be possible to build and rebuild entire cities or even houses merely to acquire experience or observe changes. Architects both in training and in practice rely heavily on the experiences they can acquire through diagrammatic thought. But the model as yet presented does seem to lack a good description of how the creative act is performed.

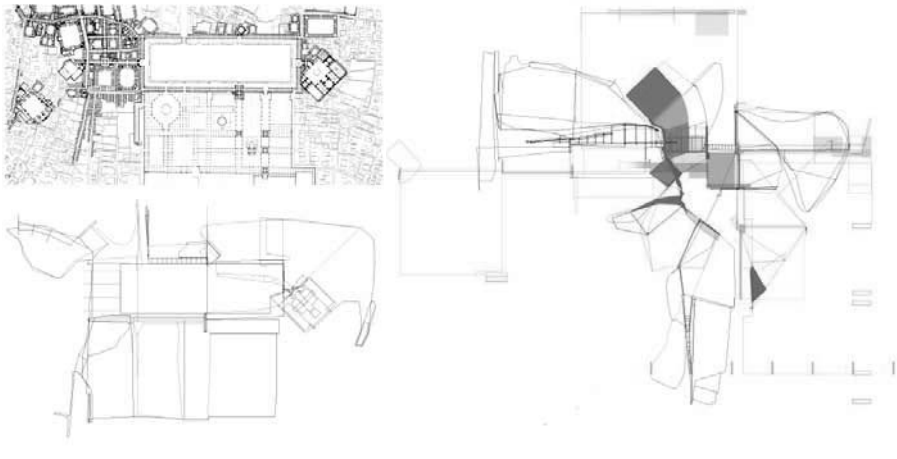

Figure 4: 4th year student drawing: Left: The Square in Esfahan, Iran. Right: Hierarchies in the square and detail

3.2. Sensual logic: The Deleuzian Diagram

If we return to the student diagrams using the abstraction tactic the problem with the Stjernfeldian notion of diagram will become apparent. The diagrams of the Square in Esfahan demonstrate with all desired clarity how through the diagram the student at the same time both maps and generates. At the top of figure 4 left is a conventional map of the square. It is in its own right a diagram – the kind of diagram that I have called an empirical diagram, because it relates in a direct way to physical reality. Underneath a sort of plan drawing of the square becomes the first loosely abstract analytic drawing. But in figure 4 right the diagram has freed itself from the ties of any empirical origin, and, although one recognizes many of the previous elements and proportions from the other two drawings, other elements are also introduced in the drawing material. From what do these elements develop?

The problem is the genesis of form. If you want to go beyond "form follows function" and "form follows style" paradigms, how does form take shape? Both in drawings like this one and in the drawing process described by other respondents there seemed to be developments not described through the very rational logic of the Peircean diagram. For Deleuze a diagram is basically showing relations between forces – that is the definition he gives in his book on Foucault. The drawing of "forces" and "relations" correspond well with the abstraction that the diagram has in Stjernfelt's work. The diagram is though much more than just abstraction to Deleuze. In The Logic of Sense he describes the paintings of Francis Bacon as a particular form of diagram between abstraction and abstract expressionism; code and sensation. The diagram that emerges is a catastrophe – irrational free and involuntary, says Deleuze (Deleuze 2003). But at the same time in Bacon's diagram the sensation is checked by the coded dimensions – they challenge and inform each other.

In the students' diagrams you find precisely such constructs; not only physical and factual structures, what we could call an intellectual coding of a place, but other elements added to the abstraction. The diagram in figure 4 right – the student explained – was constructed according to the hierarchies that dominate around the square (Christensen-Dalsgaard 2011, 25). They are though also marked by an imaginary act, as these hierarchies are interpreted through sensual drawing elements, e.g. the red shapes in the diagram. These elements are ideas that meet empirical elements and are shaped in the drawing. The diagram holds a double in-between position, between the real and the imaginary but also between the known and the felt.

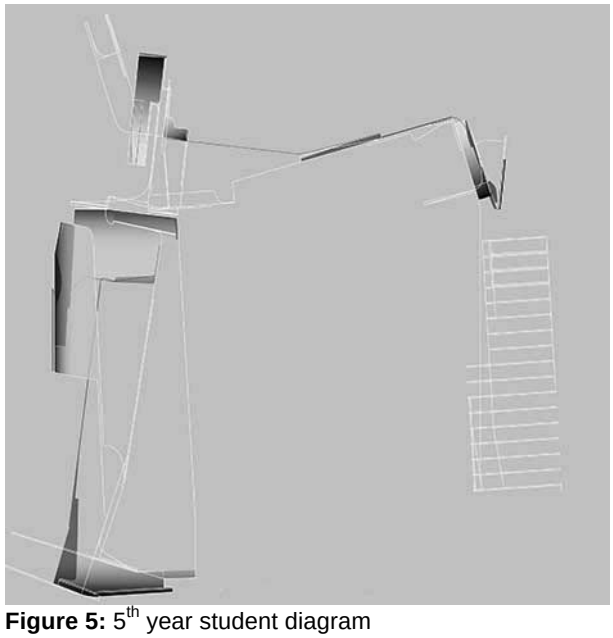

Figure 5: 5th year student diagram

3.3. A synthesis of oppositions

What I propose as a model for the fictive diagram is in many ways a synthesis of the diagrams of the Stjernfelt tradition and Deleuze tradition, which are two theoretic traditions in open opposition. Stjernfelt attacks irrational vitalism and wild intuition (Stjernfelt 2008) whereas Deleuze and Guattari write that semiotization – i.e. the diagram as a sign, which is the core of Stjernfelts argument – isn't really a diagram, because it precludes the creativity of the diagram (Deleuze and Guattari 2004, 159). Still the diagram as we find it in Stjernfelt is not hermetically closed for creative developments. Stjernfelt does approach diagram theory from a logic tradition, but he distances himself evenly from vitalism and reductionist logic. Stjernfelt writes that "Logic is in itself basically iconical" (Stjernfelt 2008, 110), which suggests that there is a need to interpret logic and in such an interpretation of course there is also an opening for different interpretations.

Diagrammatic reasoning is a pragmatization of deduction because it portrays how the deduction consists of a series of observations of change in a material. In other words it is a logic experimental process that has to be open to intuition as the background for doing certain manipulations, the result of which only being clear after the manipulation has set an effect in the material. It does also not seem to be an impossibility to have sections governed by cerebral code in a Deleuzian diagram – in the Bacon readings it is exactly the balance between code and sensation that renders the pictures diagrammatic.

4.0 THE FICTIVE DIAGRAM - BETWEEN THE IMAGINARY AND THE REAL

Stjernfelt differentiates between pure diagrams and empirical diagrams (Stjernfelt 2008, 99). Pure diagrams refer to an idea or a concept, whereas empirical diagrams refer to an empirical symbol in an actual or at least possible reality. The common denominator for all of the diagrams using the mapping tactic is that the structure of a place is constructed and in this they are similar to Stjernfelt's empirical diagrams that also have a signifié in reality. There are, however, two kinds of empirical diagrams: those that refer to a material existence that doesn't actually exist (fiction) and those that refer to a material reality. Here we uncover the possibility of fiction in the diagram, midways between reality and the imaginary.

The literature scholar Wolfgang Iser suggests that in literary fiction the fictional is not completely arbitrary, but it points to a reality within itself. The diagrams found in Department 6 can be said to be fictional as well because they map imaginary as well as factual relations. They contain traces of imaginary dimensions at work but are not pure imagination – as we saw with the abstraction/mapping tactic. One can build a house, plan out an area and rearrange in the real world by directions given in drawing, but although the drawing has this characteristic of a "recipe for spacial action" it is not in itself an actualized reality. It holds several possibilities for actualization. The Department 6 diagrams are also both pure and empirical diagrams in Stjernfelt's terminology because they perform a trialectic mapping of reality. The tangible and factual merges with ideas, emotions and dimensions with no tangible or physical reality, such as the perceived hierarchies in the square of Esfahan.

I propose a sort of scale for the diagram that goes from the referential diagram through the fictive diagram to the abstract diagram.

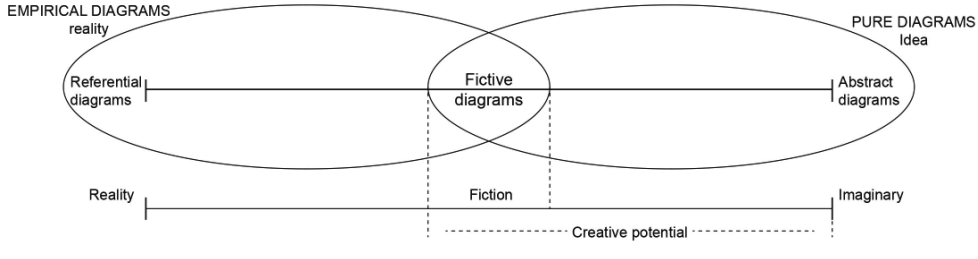

Figure 6: The Fictive diagram between the referential and the abstract diagrams or as the overlapping zone between empirical and pure diagrams. Model by (Christensen-Dalsgaard 2011)

All three types of diagram consist of elements that with their relations to each other create a structure. The referential diagram always points to something else in a direct manner as it is intended for reading and communication purposes and not for creative development. The referential diagram is exemplified in the engineer's drawing of machine parts or the map of a metro. The abstract diagram has no signifié in the real world. It is a pure concept and can be exemplified by a triangle or a grid. Between these two we find the fictive diagram – the type of diagram that rises up from a reality but distances itself from the same reality by pointing to a new reality within itself. A fictive diagram embodies its own reality, which doesn't just refer to an outside reality or real objects – and herein lies the difference between the referential diagram and the fictive diagram.

4.1. "Felt logic" of aesthetic decision

It is characteristic that the Department 6 diagrams take a point of departure in empirical data, but that it lifts the empirical elements to a level where they are no longer referring just to a reality, but acquire their own internal laws and regulations. It is what Edward Soya would call a *thirdspace mapping* (Soja 1996) that includes both the subjective and the objective. This is an appealing thought for the architectural drawing as well, because it opens a field between the logically coded and sensation. It holds the power to move as well as inform – to be artful and technical at the same time. The creative potential in the fictive diagram is that it attaches itself to a reality and mutates it. That, however, does not make the diagram a loose or thoughtless operation. It is as demonstrated with Stjernfelt a particular kind of logic; a thought operation in itself that constantly balances control and creation - intellect and intuition.

Diagrammatic work, although seemingly sometimes wildly aesthetic, should not be considered irrational but simply a combination of reason and intuition. The drawers may "feel" rather than deductively reason their way to aesthetic decisions in the drawings, but there is logic in it. Through drawing they explore places in a sensitive way and build up their understanding of a project in a constructed "self-dialogue" which enables them to utilize not only what they know but also what they feel. It is perhaps in many cases an escape from a completely rational and highly technical approach to architecture that favors such an aesthetically driven approach. A goal in my research is to provide a better basis of understanding for the methodology behind such feeling based decisions.

The acceleration in use of diagrammatic drawing in architecture seems to coincide with a paradigmatic change towards an architecture that distinguishes itself from the modernist paradigm. The distinction seems to be brought about by an additive nature - adding to the urban sphere as opposed to tabula rasa constructions - and secondly, being both dynamic and highly complex. The fact is that place and space don't consist of tangible elements alone, and architects need tools where they can engage with the material as well as the immaterial qualities of a place. In fictive diagrams architecture students are given a tool with which they do not just gain experience but also work across a technical and aesthetic divide.

5.0 CONCLUSION

Drawing has a special role in design and architecture education since much of the learning and transfer of knowledge passes through drawing rather than language or alongside the linguistic transfer. Therefore researching how experience is gained through drawing acts is vital for better understanding architectural education. Research of diagrammatic drawing could help bridge the sometimes seemingly insurmountable divide between the technical and the aesthetic skills demanded of an architect. Admittedly, the researched practice at Department 6 seems to tilt heavily towards the aesthetic and I do not believe that the diagrammatic practice at Department 6 fully utilizes the technical and logical potential in the diagram. My research is still at an early stage and the limitation of the theoretical framework presented here is that it has been based on the study of a single studio. The 2011 study is intended though to function as a basis for a broader study on diagrammatic thinking that I am conducting. The model here put forth will thus be challenged by many questions that still remain unanswered: Do less aesthetically oriented students experience and express uncontrolled developments of their material in the same manner? How does the role of the diagram change between different studio practices? And how have diagrammatic drawing practices developed through different drawing paradigms? However, the preliminary findings have convinced me that in

diagrammatic thought there is a potential for a tool that can handle the complexity demanded by architects.

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[i] A note to avoid confusion: the study *The Diagram – Thinking with Drawing in Architectural Education* that I carried out was made under my maiden name Christensen-Dalsgaard.
[ii] All diagrams and models are from (Christensen-Dalsgaard 2011) and reproduced with the permission of the students