Models in Architecture Education: an ecological approach

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Abstract: Models are a designer’s currency and so common in the exchange and development of ideas as to feature without attention and are used often without question. For architectural educators models are effective communication tools but for their students they are also the means by which architecture, its processes, concepts, and strategies are learned. Understanding the role played by such tools is important and implies both a user and an environment. If we refocus attention away from the model to the environment then a fuller understanding of the use of models in architectural education can be achieved. The ultimate benefits of this are clear since as educators it is the environment around a model’s use that we provide and control. This paper seeks to explain the ecological approach developed to describe and understand the environment of models in an educational context. Key to this methodology is the development of a set of diagrams to represent complex relationships and information in an effective visual manner. In this sense the paper discusses the notion of design, pedagogy, representation, and human behaviours within architectural education.

Key words: design education, learning environment, representation

1. Introduction

The learning environment has been attached to an ecological metaphor before (Nardy and O’Day 1999 and Looi 2001), where biological behavioural terms are mapped on to learning activities; learner groups are seen as species; and learning is regarded as ‘foraging’. This paper attempts to go beyond general descriptions of the ecological metaphor and to make comparative assessments of key aspects of the environment in which an architectural model is used. Furthermore it includes diagrams purposely developed as an attempt at visualizing the data as an aid to its understanding. A brief explanation of Gibson’s (1986) terminology and how this translates to the larger study is necessary. In the context of this paper it is sufficient to discuss eight key terms: mutuality of animal and environment, scale, layout, nesting, permanence and change, meaning, affordances, and tools. Gibson defines ‘environment’ as that which surrounds an animal that perceives it and behaves within it. The two are defined as mutually necessary. An environment presupposes an animal and an animal necessitates an environment. An environment is part of the physical world that is inhabited by an animal or organism. In Gibson’s view it is not possible to have an animal without an environment, nor is it possible to have an environment without an animal. The ‘layout’ of an environment directs us to those properties of the environment that are meaningful rather than simply the physical structure and components. ‘Nesting’ is an important aspect of the units with which the environment can be measured in that smaller units are embedded within larger ones, thus objects and events are nested. ‘Tools’ are defined as detached objects that are
graspable, portable and manipulatable. The ‘affordances’ of the environment are what it offers the animal for good or ill. They are specific to the animal but external to it, residing in the environment and directly perceived.

2. Method
With this ecological terminology in mind let us now reconsider the environment of architecture students and tutors. During a typical tutorial a tutor is available to discuss the development of the student’s design and offer advice. In this context an ‘explorative’ model is created by the student as a response to the design brief and therefore its primary function is to enable the student to communicate his ideas to the group and use the model as a sacrificial tool in which certain aspects of the design may flourish whilst others are refined or perish. For the student and tutor within this scenario there are many similarities in their environments; their environment surrounds them; the environment contains a number of objects at least one of which is another animal and has its focus of attention on yet another object, the model. The layout of the group tutorial environment will have variants. It may consist of a layout of models brought by the students to facilitate discussion and design development with the tutor. This is not always the case since in some tutorials the focus may be around other types of media. However, the use of an explorative model in this environment is key not only in developing a student’s understanding of the design development process but also in demonstrating his ability to communicate his own design and critically assess the work of other students effectively. It is here that the dual function of the model in this environment is apparent. As a tool used by a student, an explorative model provides a method of communication. When used as a tool by the tutor, an important function of an explorative model is to enable him to assess a student’s ability and learning capacity. Firstly, a student’s model communicates to the tutor what happens in their design, i.e. what they have learnt. Secondly, a student’s model communicates their ability to design, i.e. how well they have learnt. In Gibson’s terms tools are part of the environment. However, both the tool and the environment separately afford learning. Used as a tool within this environment the model affords description, exploration and development of design ideas. Such a model also enables the student to quickly alter their design as they can rearrange and edit their ideas and then study the implications of any change by being able to perceive the direct consequence this has spatially in three dimensions. Therefore as a design development tool, the model affords an effective method of enabling the student to generate architectural form and explore spatial arrangements and their experiential characteristics and relationships.

3. Results
The perceived affordances of the model can be considered nested in a similar way to the events that occur involving it (figures.1a&b). The explorative model first affords visual appreciation of a student’s architectural design (a1) that is subsequently augmented by manipulation of the model (a2) that in turn affords greater understanding of the three-dimensional qualities of the design (a3). This is further enriched since it affords being passed around the environment so that the tutor and other students can use it (a4). Another significant factor of the models in this environment is that they afford dismantling and rebuilding into new configurations (a5). This affords flexibility within the environment since it allows designs to be appraised and developed quickly and immediately. Furthermore, the variety of media used to build the model affords different degrees of information to be communicated from basic formal inquiries to highly detailed models (a6). In addition, a
model is one of the methods by which the design process of a student can be recorded affording reference by the student and assessment by the tutor \((a7)\).

The tutorial \((eT)\) described and analysed hereafter is one in which an explorative model is used so that we may elucidate upon its relationship with the tutor and a student. The first sequence of events involving a model in this environment concerns a student and the tutor. Having built an explorative model, a student presents it to the tutor and begins to explain the design whilst referring to it to augment the explanation \((e1\), figure.2a\). Once holding the model, the tutor manipulates the model to visually examine the spatial qualities and other architectural properties of the design. In this type of dialogue a student may go on to present the next model in their design development process that will usually be a distillation of the best aspects of the previous model along with some additional considerations they have been exploring \((e2)\). This explorative model is also passed to the tutor who manipulates it in a similar manner to the first model and the development of the design is discussed with advice given as to how the student should progress. This verbal advice is typically reinforced with reference to architectural precedents from books and journals in tandem with quick freehand sketches by the tutor to clarify a point or to resolve a design problem \((e3)\). During this type of tutorial, this sequence of events involving the use of a model is recurrent, with each student taking it in turn to explain the development of his scheme to the group. Concurrent to this sequence are other events nested within the group for example; a student may refer to additional material \((e4)\), or design dialogue occurs between a pair of students \((e5\), figure.2b\). Occasionally, a problem or aspect of the design brief common to several students’ designs arises and as a result the tutor addresses the whole group, typically using a model in a more general sense to explain design ideas and their implications \((e6\), figure.2c\). The flexibility of an explorative model facilitates different design variables to be addressed and discussed. The nature of architecture often dictates that we wish to view it holistically, however, of equal importance is the ability to understand its constituent parts. As the nested event of dismantling a model occurs \((e7)\) within a discussion between a student and tutor, the tutor or student may rearrange the components of it to explore new design possibilities. Figures.3a&b summarise which types of event are nested or occur concurrently, which are reversible, and the incidence of different events enabling us to see the frequency, duration and number of animals involved in each event.
Figure 3a Reversible and nonreversible events during tutorial $eT$.

Figure 3b Incidence of events during tutorial $eT$.

4. Conclusions

When a physical model is used as a tool in a design tutorial there are interesting issues related to the behaviour of its users. What might first appear as complex relationships within a learning environment can be seen to have much more structure when described ecologically. The generation of a methodology to formalise this description enabled analysis and synthesis of events and behaviour in a larger study involving models across different contexts (Dunn 2007). Key to this methodology is the set of diagrams developed to represent relationships that would be difficult to communicate using text and photographs. This novel methodology may be applied in future ecological research as these diagrams offer a dual purpose being both a flexible descriptive and analytical research tool and an effective visual format. In this example the layout of the environment affords sequences of events to recur and the majority of events are nonreversible. This suggests something about the nature of the design process as it appears far more useful to use the model sequentially in one direction since this affords easier discussion of design development. Most of the events and affordances involving a model within the environment are nested and sequential. Consideration of the incidence of events illustrates that those concerning the model, the tutor and a student are typically long in duration and involve the majority of the group. By contrast, the events that only involve students are relatively short in duration and may occur more frequently and concurrently. This emphasises the dual function of an explorative model in this environment: as a tool used by a student it provides a method of communication, and when used as a tool by the tutor it enables him to assess a student’s ability and learning communicating both what and how well they have learnt.

References


