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## Chapter V

# Conversation and Design\*

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### ABSTRACT

*This chapter explores the relationship between the activity of design and conversation—particularly as developed in Gordon Pask's Conversation Theory. Design and conversation are seen as analogous, so that design can be understood as a conversation held, generally, with the self (via paper and pencil). I argue that design has been a conversational activity since long before we started exploring conversation, and that design education is, itself, also conversational. This being so, conversational approaches are already the norm in design education. The benefit of considering design and conversation together in an educational setting is not so much to improve one or the other, but to understand each better through the mirror the other provides. Other aspects of design (such as the social working in the studio) are also related to this conversational understanding. It is argued that design is a powerful, alternative and fundamental way of working and being in the world, not poor science, and that Pask's conversation theory helps us better understand both its power and its validity.*

### INTRODUCTION

Unlike the other chapters in this book, this chapter is not primarily concerned with the application of conversational understandings, in particular Gordon Pask's conversation theory, within a specific educational field (design). Rather, this chapter sets out to demonstrate how design, as an activity and in its teaching, has always been conversational—in Pask's sense. We should look, therefore, not so much for applications as for

parallels. These parallels give added credence to each—to the activity of design and the value of the conversational theoretical approach.

The chapter therefore summarises both critical features of conversation theory (in so doing it may act as an introduction to other chapters) and many facets of the central activity of design<sup>1</sup>, which turns out to be (and always have been) conversational in Pask's sense; demonstrating the parallels and introducing some particular examples, together with one or two possible extensions brought from conversation theory to design.

It is not argued that a conversation theoretical approach is only applicable to design, but that it has always been practised and been validated in this field—long before Pask invented it!

## **INTERACTION**

In an earlier paper (Glanville, 1996), I argued that there are two themes to be found running throughout the work of Gordon Pask. The first is interaction; the second, drama. Paul Pangaro (1993) has written about Pask and the drama. I will here write about Pask and interaction, although the two are interdependent. I will not, however, extend into Pask's late work on what he called the "Interaction of Actors Theory". It is beyond the scope of this book which is concerned with the earlier "conversation theory": and, further, in spite of the claims of some, it is not at all clear what Pask was getting at, and how literally he was speaking, in this later work, which remained, I believe, incomplete and lacking proper articulation at his death.

Andrew Pickering (forthcoming) has been developing a thesis that the quartet of early British cyberneticians, W. Grey Walter, W. Ross Ashby, Stafford Beer, and Gordon Pask were involved in an ontological investigation: that their cybernetics grew from and was based in the actual construction of physical machines that provided the ontological foundation, and model, for both their world views and their cybernetics.

Pask is a particularly interesting example, because his machines were, I believe, different in basic conception and aspiration from the machines of the others. In particular, we can consider two such machines (or families), both of which were built in several versions, both of which worked and were used, both of which are still light years ahead of the competition, not because of their engineering or their computing power, but because of the sophistication of the conceptual frameworks

within which they were conceived, particularly the understanding of interaction.

## **SAKI**

Although SAKI (Self Adaptive Keyboard Instructor) was created after Musicolour, it is much more familiar. Anyone who has used a typing training programme such as Mavis Beacon Teaches Typing will be familiar with SAKI, even if it remains unacknowledged. The SAKI legacy is not in the entertainment aspect or the faux rewards; it lies hidden in the exercises.<sup>2</sup>

In its first versions, SAKI was a trainer for those who prepared the punch cards (Hollerith cards) by which computers were instructed and given their data, in early days. It was vital that these cards were accurately typed: one error and the whole stack of cards that formed the programme and its data had to be minutely examined to find the bug (there was no online programming and debugging in those days).

The cleverness of SAKI lies in the way the exercises are set in the training of the punch card operators, and, later, typists. Rather than continue with set exercises (as in, for instance, the Pitman method, familiar until recent times in secretarial colleges), SAKI measured various parameters and recalculated the exercises to compensate for weaknesses in the trainee's performance as revealed by these parameters. SAKI measured not only the accuracy of typing on individual "target" keys, but also accuracy in sequence and of sequences, themselves. It measured not only in terms of actual key depression, but the rhythm of typing: where there were stutters, gaps, rushes; and the pressure on the keys. Using all these, it would compute exercises that would set the trainee sequences of keys to depress that took into account far more than the individual keys depressions: a sort of gestalt of typing.

This was a quite radical way of looking at the training of keyboard operators, and the process of generating individual sequences of keys that served

as exercises meant it was vastly more effective as a means of training than previous methods. It is an interactive form of training in the manner in which the typist's performance and the goals in the machine intermingle to give new and unexpected exercises through a process of exchange leading to the new and unexpected in what we will later come to call a conversation.

### Musicolour

If SAKI is not very well represented in the literature, Musicolour is even worse off. An early light show to accompany bands (in those days they were jazz combos), its performance is more a matter of legend than academic record. This situation is likely to improve through the current project to recreate Musicolour in digital form that Paul Pangaro and Usman Haque are undertaking.<sup>3</sup>

Its description as a light show hardly makes Musicolour interesting nowadays, although it was ahead of its time, and thus has historical interest. However, its significance is that it is still ahead of the game, even more than 50 years on.

What differentiates Musicolour is that it is a machine that interacts with the musicians. Musicolour projects lights and patterns within a range chosen by the operator. But what is interesting is how it does this.

In effect, Musicolour builds a model of what the performers are playing, that constitutes its understanding and which determines how it behaves. This model is dynamic and if Musicolour does not have reason to change the model it has made, after a time it gets "bored." At this point it begins changing its model itself, eliciting a response from the musicians. The result is that the musicians respond and so the cycle begins again. In effect, the machine becomes another player in the combo. The result is a dialogical performance that results from the individual contributions of all performers, including Musicolour as an equal participant, in a collective performance that is built of the interaction between all, leading to an

act of group creativity that is unpredictable from the contributions of the individual participants, coming from them all.

This is a very radical approach, quite different to the mechanical and man-operated entertainment light systems even of today. Musicolour is far more "advanced."

### Interactive

Having called these two early machines interactive, we should consider what is meant by this term.

The word interactive has been downgraded, as has so much, but the unattained aspirations of the computer industry. Nowadays, interactive has come to mean something rather trivial. This is clearly demonstrated in the definition given in the *Oxford Dictionary of the American Language* that is included in Apple's OS 10.4, "Tiger:"

**in•ter•ac•tive** |*ˌ*ɪntərˈæktɪv|

adjective

(of two people or things) influencing or having an

effect on each other: *fully sighted children in*

*interactive play with others with defective vision*

•(of a computer or other electronic device) allowing

a two-way flow of information between it and a user,

responding to the user's input: *interactive video*

The reader will notice that an engagement involving some active exchange and effective influence in humans becomes, in the world of the computer, simply a stimulus and response system: reactive, but not interactive. Unfortunately, the computing reading seems to have become the one in general use.

The use of the term interactive in connection with the early Pask machines, however, clearly belongs in the earlier, more sophisticated, and elegant interpretation. SAKI does not simply respond from a predetermined selection according to some rules: it makes new data that responds to and models weaknesses in the trainee's performance,

from which unique exercises are generated, which the trainee learns to master, leading to the generation of further data and exercises within the overall framework of an increasing range of competence. Musicolour gets bored when it is faced with such repetition that it does not have to change its model of (learn) what the musicians are doing, and starts modifying its model, “hoping” to get a response from the musicians such that what they are doing aligns with Musicolour’s new behaviour; but it only does this if it is not having to reform its model because of the changes in the playing of the musicians. In this case, the behaviour of either can drive the other, with the result that there is a sort of conversation between the human combo and the machine, just as there is a sort of conversation between the individual members of the combo.

It is, therefore, important to consider Pask’s work as an instantiation of the interactive. And, of all the interactive situations we are familiar with, it is the conversation that is quintessential, and which became Pask’s metier when it came to working with education rather than training.

## **LEARNING**

If Pask is known for one academic achievement it is probably as the father of computer aided learning. Note that this is not teaching or instruction. Pask first despaired of and then became furious at the transformation of learning, in the computer/educational technology world, into teaching and instruction (Pask, 1972). The sophistication of SAKI as a tutorial device and of Musicolour as an environment for shared, interactive, creative co-operation, clearly point to an interest in the difficult question of the learner as opposed to the teacher (learning is harder to “automate” than teaching since we are not in control of other people: in teaching we can set the environment and conditions for others, in learning only for ourselves: so computer aided learning is much

more difficult to consider than computer aided teaching or instruction).

Pask’s view of learning was that it is individually performed and accomplished by learners, rather than being forced into/onto learners by teachers (spoon feeding, rote learning). He regarded multiple answer questions, for instance, as spoon feeding. The problem, therefore, in assisting learning through the use of computing technology is firstly to present the material in a manner that suits the learner (rather than the teacher) and secondly in confirming that the learner has indeed learnt.

The first problem (presenting the material in a manner that suits the learner) he dealt with through his invention of entailment meshes and their personalisations by the act he called pruning into entailment structures; and his recognition that there were different ways of learning (he was one of the earliest to explore the concept of learning styles). Although these are central to Pask’s understanding of how to create environments in which people can learn, they are not the focus of this chapter. Others in this volume deal with them, and they are discussed in Pask and Scott (1973) and Pask, Kallikourdis, and Scott (1975), and in simple form in Glanville (1997). This area concerns, primarily, what there is to learn and conditions to facilitate learning.

The second problem (confirming that the learner has indeed learnt) lies at the heart of Pask’s understanding of what it is, to learn. For Pask-the-educator, to learn is to create a (viable) understanding that can reproduce a topic (that is, something that is to be learnt). The understanding is created by the learner and is the learner’s. This understanding forms a piece of knowledge within the learner’s knowledge scheme.

It is because the understanding is personal to the learner that the question arises of how to confirm the learner has actually learnt: that is, that they have created a (viable) understanding. And it is in this area that we find not only a supreme example of Pask’s inventive genius (and another example

of Pickering's ontological machines) but also that aspect of his work that is of greatest significance to the learning and practice of design.

### How to Test Knowledge

Paskian knowledge extends from the viable understandings that learners develop. These understandings become knowledge when they enter the public sphere: that is, when they are articulated and stored accessibly.

The question is how to test the understandings that learners develop as they learn, to test that they are indeed viable. This is not an easy matter, when understandings are taken to be personal and individual. Above, I referred to Pask's fury at multiple answer questions as a way of testing what learners have learnt. Perhaps some of the reason for his anger will now be, or become, clear.<sup>4</sup>

There is a way of testing individual understandings that has a long history. Pask referred to it as *teachback*,<sup>5</sup> with its obvious reference to cybernetic feedback. In *teachback*, a learner demonstrates his understanding (of something) by explaining his view of what it is and/or how it works, in his own words. The concept of "own words" is very important because if the learner just quotes back the original, unchanged, all he has shown is that he is a tolerable parrot.

Thus, if a teacher, or a computer aided learning environment "explains" (makes available) some topic to a learner, the simplest way (in principle) to test whether the learner has built an understanding that works is to get the learner to explain in his own words what he understands, and to ask for demonstration by exemplification, perhaps even by extension into some new (knowledge) context.

This form of "assessment" of a learner's knowledge has a long history, even if it is nowadays frequently rejected in favour of the new rote learning and the standardisation of possible answers that defines the universe as both finite and highly limited.<sup>6</sup> In this manner, our responses are

controlled by removing variety and impoverishing our worlds—but that is another matter. What is relevant here is that Pask embraced exactly this approach as allowing him to interrogate learners to discover if they did have viable understandings. And now the meaning of the word *viable* becomes apparent: an understanding is viable while it stands up to testing, most usually through explanation to an expert or by application in a new context.

### The Modeling Facility

Pask's work on learning was concerned with learning in principle (in general) rather than learning in a particular situation, and could be applied to either human/human learning or human/machine learning—where machine is understood as a computer driven learning environment. We have some sort of historical agreement on ways of learning in human/human situations. The new element is the computer, and how to learn in an environment where the computer is part of the "teaching team." Pask worked hard to find ways of learning with the machine, and to this end he identified several questions that, while relevant in human/human learning, were more or less assumed to have been dealt with and had drifted into a safe background, becoming invisible (and hence unquestioned).

The question that again becomes apparent when using computers is how to accommodate *teachback*. Pask was working on the problem 35 years ago, at the start of the 1970s when computing was not where it is now, but we still have essentially the same problem: computers remain poor at natural language and at interpreting drawings and diagrams. They are also poor listeners except under very restricted conditions.

Pask's answer was typically inventive: he constructed an analogy machine, which he called "the modeling facility," from the base of which the explanations that communicate the *teachback* are developed: as Scott puts it (personal communication), "Building a model is the base level in

an hierarchy of explanation by teach back. The next level is the story that goes with the model (George 1961), 'A theory is a model together with its interpretation.'" This same notion of levels is discussed in the section titled "Characterising a Conversation".

Why analogy? Analogy is at the heart of teach-back: for how is the explanation of another (the learner) to be evaluated other than as an analogy to the understanding of the inquisitor—that is, the teacher. Teachback is essentially based in the construction of analogy.

So the question shifts to how to make an environment in which analogies can be constructed and validated—that both the human learner and the computer based learning environment might "understand."

Pask's "modeling facility" was a piece of electronic equipment through which the learner built models of his understanding by creating circuits that formed hard-wired analogies made at the moment of testing: it was, in effect, a special purpose plug board computer. The wiring represented the form of what the learner understood in an environment shared by both the computer aided learning environment and the learner. The modeling facility is, thus, a device (piece of equipment) for negotiating an agreement in the construction of a shared, viable analogy that brings together two understandings, through the means of mechanical representation and embodiment. It is the negotiation of an analogical agreement in sharing understandings between teacher and learner that affirms the viability of the learner's understanding. The understanding is represented as hard wired!<sup>7</sup>

## **Conversation**

The use of the modeling facility to construct basic analogies (and as the basis for teachback explanations) involves the process of negotiation. For Pask, negotiation is the means by which we reach an agreement (in the case of the previous

section, establish a viable analogy). Pask accepts that agreeing not to agree is an agreement, thus neatly side-stepping the problem of intransigent disagreement: as we say in the vernacular, "then we must agree to disagree."

And here is the key insight. We already have, in everyday use, approaches and methods that help us. We can say that we agree to disagree if in a process of attempted negotiation, we cannot reach agreement, and by that conceit we can go on.

Hidden in the process that leads up to such a point that the options are to agree to disagree or to go into an endless loop of confrontation and disagreement is the process of negotiation which involves a process of exchange and potential difference (error) reduction that is both inherently cybernetic and familiarly everyday.

What is the form that this everyday takes? The most familiar is the conversation. In a conversation, we exchange understandings in a common and shared communicational environment. In an everyday conversation we talk and listen, trying to grasp what the other participant (a minimum of two are required) is saying. We listen and build our own understanding, and then we present this back to our conversational partner: it is perhaps simplest to grasp this by thinking of what happens as we talk together when a visit to a pub, bar, or coffee house.

The form of a conversation involves the participants in listening and speaking (or drawing, or...). We do this in such a manner that we build understandings of what our conversational partner says and then present it back to them, just as they do from our utterances. We also negotiate between (presentations of) our own understandings, and the understanding we build of what we take to be the understanding of our partner. We never (directly) access the understanding of our partner, we just build (through these presentations) our understanding of their understanding: thus, understanding can remain personal and individual, yet, by means of conversation, we can communicate: not meanings, but our ability

to build our own meanings “in parallel” (analogically) with each other.

It is through this mechanism and medium of conversation, this worldwide, common, everyday, vernacular, shared activity that we may negotiate.

### Characterising a Conversation

Pask took up the notion of conversation (explicitly) around 1970.<sup>8</sup> He was not the only person working on understanding conversation at the time (Grice was another), but Pask was unique in his consideration of the mechanisms needed to support (i.e., account for) conversation as an activity. Unlike Grice, he was not talking about the quality of the content and experience of conversation but of the necessary formal structure for communication to occur through conversation (and the consequent character of that communication)—and hence for the development of understandings that may be taken to embody learning, and testing that learning—that is, conversation as mechanism. It is this understanding of conversation as a mechanism that allows Pask to develop conversational machines and learning environments.

What are these basic requirements for a conversation? I will summarise some of them (in conversation theory, Pask (1975) erected a vast and complex edifice, and this is no place to try to summarise extensively even one aspect of it):

- i) A conversation requires (at least) two participants. These participants do not have to be identified with bodies: there may be two participants in one body, and there may be several bodies in one participant (as a group). Without at least two participants there is no conversation. These participants Pask calls P-individuals (P is for psychological).
- ii) A conversation consists of an exchange of representations—representations of individual understandings (meanings)—with the intention that we can “share” understandings, see viii).
- iii) A conversation has a topic (or sequence of topics). This topic is (often tacitly) agreed and held as shared. To arrive at this agreement and sharing, a conversation is held: that is, conversation is recursive, to the point of agreeing to converse.
- iv) A conversation exists on several levels at one time. Pask argues for two, a meta-level above that on which the conversation takes place, to allow the critical redirection, as well as the level of the conversation. I would add a level below, a substrate that carries context.
- v) The levels of a conversation can shift: the meta-level can become the level of a conversation, for instance, when talking about how to redirect conversations: there will be a new meta-level above this and which we discuss how to redirect our conversation about redirection.
- vi) All meanings (and understandings) are personal and individual to the conversational partners, understanding in their own way. Meanings are made by individuals. In a conversation, meanings are not transferred; they are made, separately, by each participant within the conversational process.
- vii) A conversation ends when we reach an agreement. The agreement to disagree is an agreement.
- viii) In an agreement, I represent to you the understanding I have made of an understanding you initially represented to me, in such a manner that you find a close similarity between your original understanding and the one you construct from my understanding of your initial understanding (as communicated through the acts of representation). This is the process of sharing understandings. We do not actually share the understandings, we construct defensible analogies.<sup>9</sup>
- ix) i) to viii) do not need to occur step by step in the conversational cycle: they can be suspended over several cyclic iterations.

This happens in a normal conversation (in everyday life). A Paskian conversation is tighter, about learning specific topics within a computer aided learning environment, so such suspension is less common but is by no means excluded.

There is a squabble that concerns conversation in contrast to coded communication. The Information Theory view of communication (Shannon & Weaver, 1949) is concerned with the unambiguous transmission of messages which are taken to communicate meanings between different people (and/or machines) that are identical. This is a code. Conversation theory, assuming that meanings and understandings are individual, does not accept the linear transmission of information, or the identity of the meanings we individually construct.

The argument is often put forward that we need coding to develop conversation, which is just impoverished communication. I argue that the opposite holds: we need conversation to establish a code (even a code we “find” in “nature”) and we have to negotiate “fixed” meanings such as those we assume in the short-cut convenience of every day language as being attached to particular words (etymologically and lexicographically). We cannot assume, a priori, that meanings are the same: to establish this we have to negotiate in a conversational manner. Thus, conversation has precedence over coding: we cannot establish that there is a code in operation without agreeing that it is so.

## **COMMUNICATION WITH ARCHITECTS**

Pask had a lifelong connection with architects. This association began when he worked with Cedric Price on Joan Littlewood’s legendary Fun Palace Project, and continued, largely through a lasting association with the Architectural Association School of Architecture in London (AA). At

the time he died, he was still on the staff there, working with John and Julia Frazer, well known for their foundational and radically innovative work in computer aided design. A large proportion of his doctoral students had previously been architects. I was amongst those who met him through the AA. After he died, the event to commemorate his life was held there. The connection is, thus, apparent. But his interest was not confined to architecture. He was a regular lecturer at art schools (the tele- and Internet art theorist Roy Ascott being a particular fan along with Ascott’s (art) student turned musician, Brian Eno) and he also drew and painted himself, illustrating books (for instance Pask, Glanville, & Robinson, 1980), and even painted murals.

Pask himself had to learn to communicate with architects (and as he did, his examples and his thinking were reciprocally influenced by this connection).

## **Communication with the Client**

In the late 1960s the AA was a major venue for the exploration of the counter culture. One of the remarkable events that took place there was a series of lectures, seminars and debates on science, scientific method, research, and design organised by Royston Landau. Amongst those who took part were Popper, Lakatos, Feyerabend, and Gombrich.

Pask also took part, and out of this grew a paper, “The Architectural Relevance of Cybernetics” (Pask, 1969). In this paper Pask explores the circular, feedback nature of cybernetic systems of communication<sup>10</sup> and discusses in particular, the problem of how architect and client communicate. He argued for a system of communication that was not a one shot command (the briefing document) but rather a continuing, conversational form of communication that continued throughout the design process. At this point, the notion of a continuous form of communication, the conversation, makes its first major appearance in his work

(although there were references to conversation in, for instance, his early book “An Approach to Cybernetics,” Pask, 1961; Glanville 2005).

### Conversation and Teaching

In an important and revealing paper Pask’s student Mike Robinson (1979) used Ashby’s measure, Variety, to demonstrate how, in traditional classroom teaching, we set about reducing the options for students, obliging conformity and, in the worst cases, regimented rote learning. As we have seen, Pask was concerned to create alternative, computer based learning environments that responded to differences in student approaches, where a conversational model of operation was the norm.

Traditionally, the teaching of design has followed a different model that is both non-classroom and non-classical. Artists and designers (amongst them architects) are taught in what is called the “studio.” This is a particular learning environment which is informal, hands on, co-operative and social. It is also, in the conventional sense of the word, conversational. People talk, wander round, look at each other’s work, offer ideas, opinions and criticisms. Teachers join in, and a tutorial takes place, typically at the drawing board or easel. Teachers may even add their own contributions and corrections to drawings as part of the exchange. Other students may gather round, and “stealing” the ideas of colleagues (by looking at their work in progress) is legitimate and normal! Work is examined in a public presentation and criticism forum where students present their work to a panel of their peers, teachers, and (often extremely distinguished) outsiders.

The description given shows that studio teaching is inherently conversational in both the vernacular sense and the more particular and rigorous formulation that Pask gave to the notion in his conversation theory. The studio works at least in part because there is an opportunity for both student and teacher to learn about and from

each other, about their different views and ideas, and to consider how to develop these in the presence of the other. While, officially, the aim is to develop the student, this cannot be done without the teacher developing too, as any studio teacher will confirm.

Anecdotal evidence suggests that, as this way of teaching became better known outside the creative arts, university teachers from other disciplines indicated a strong interest and there were even plans to change the teaching of other subjects to this model, cut short by the invasion of the education-as-business model of the university.<sup>11</sup>

### Conversation and Design

For many years I have insisted there is a clear-cut analogy between cybernetics and design that makes each a very good equivalent of the other (Glanville, 1999). In several recent papers I have argued this case much more explicitly, pointing to the structure and constituents of the analogy. I will not repeat these arguments here, simply summarising them instead.

The analogy lies in the circular organisation of both. Cybernetic systems are, according to the thematic declaration of the Josiah Macy Jr., conferences (where much of the developmental thinking that lead up to the publication by Norbert Wiener of his eponymous book, *Cybernetics*, Wiener, 1948, took place), concerned with “Circular causal and feedback mechanisms” (Foerster, Mead, & Teuber, 1950). Feedback mechanisms are, necessarily, both circular and purposive: and the determination that these should be recognised and studied was a brave move in the 1940s. Conversation is necessarily circular. Design is not only taught in a conversational (and hence circular) manner; the act of designing is itself also based in a circular form. The process of improvement and enrichment by the inclusion of more, and the discovery in work of aspects never anticipated as the work was being done, is inherently circular,

as is shown in the next section. The designer proceeds by holding a conversation with himself, using paper and pencil.

### Conversation with the Self

In English, the word design is both noun and verb. Here we are concerned with the act of designing: design as verb.<sup>12</sup> The central act of designing is what we will refer to as “drawing.”<sup>13</sup> And at the heart of this act of design, drawing, is the type of drawing known as a sketch or doodle. These drawings may often appear insignificant and trivial. However, for the designer (and the artist) they are a major well-spring of creative behaviour. In what manner?<sup>14</sup>

Conversation, at least in a Paskian understanding, is based on the recognition that each participant will understand any utterance in their own way: they will create their own understanding—meanings are personal. Since the purpose of a conversation is to build such (individual) understandings, and since my understanding of your understanding is my understanding (and not yours), every time I build an understanding of your understanding I am creating differences from my own understanding: your understanding is taken not to be mine, and my understanding of yours is neither your understanding nor my original understanding, but my understanding of your understanding of my (original) understanding: so there must be difference.

This means that, in any conversation, what you tell me leads not to what I understood before but an extension of this, and there is thus not only difference, but, in the context of this discussion, a high likelihood of novelty. In other words, when I create my understanding of your understanding (of my understanding), I am making something that was not my original understanding, but which extends that understanding through the process of my creating the second understanding in response to yours. Participants in conversations reach agreements in which we believe we understand

the other, but where there is no absolute “right.” A conversation is a means for understanding others, and not for insisting on correct and proper outcomes. Thus, in design, conversation does not lead to mechanically generated, correct projects, but rather to good and imaginative ones. This is not a determinist dynamic!

So conversation is a source of potential novelty, and hence is necessarily tied up with creativity. This is familiar: when we converse with others we find, first, that the conversation moves to completely unanticipated (and unanticipatable) areas; and (as a result of this), second, that we, ourselves, have new ideas. Of course, this use of the term conversation excludes the sort of controlled and lead activity that is aimed at the imposition of one view over others; which is not, in any but the most Orwellian (double speak) sense, a conversation: but we like to use comfortable euphemisms to mask activities and actions we construct as uncomfortable.

### The Mechanism of Conversation with the Self

As described here, the conversation (in Pask’s sense) always involves at least one other participant. And, as has been recounted, design is typically carried out as a social activity in a social environment. But, while the studio is normally a social environment that encourages sharing and exchange, design is not dependant on this. The studio is a means that assists designers to design through holding conversations, but it is not quite the central conversation that takes place in designing: the central conversation in designing is more private.

Designers always work by themselves. In saying this, I do not contradict the discussion of the social environment that has gone previously. But that is an extra, a benefit that enriches. The essential act of designing, however, can be carried out by one person acting alone.

How is it possible to hold a conversation without a conversational partner? It is not. If, then, the conversation is at the centre of the act of design, and if it can be held with only one participant, that is, the self, where is the partner?

The answer lies in the roles that are involved in conversation. There are two, and normally both participants take both roles. The roles are (giving precedence to the aural metaphor):

listener (viewer)  
speaker (drawer)<sup>15</sup>

In a “normal” conversation each participant listens to others and speaks to them. But there are conversations in which one participant talks to himself. What is important in the conversation is not that there are two participants but rather two roles: that there is a listener role and a speaker role.<sup>16</sup> One participant can switch between these roles. When a participant does this, he takes the form of the self-reproducing entity I have called an “Object” (capital initial O):<sup>17</sup> that is, the fundamental form we can assume the observable to take in a (second order cybernetic<sup>18</sup>) universe of observation. It is the role change between self-observing and self-observed that allows Objects to be taken to exist just because they are taken—as a matter of explanation—to satisfy the criterion of observability through observing themselves.

It is this form that allows a conversation to take place with only one participant, for the participant can fill both roles in alternation (if he fills both not in alternation, he is not one but two). And, as we have seen, to make a conversation we need not so much two participants as two roles.

This is the sort of conversation the designer holds with himself, in which he switches between the two roles, and which is central to the act of designing.

In Pask’s terms, each role is a separate P-individual. Pask insisted that P-individuals are not restricted one to a body (the most normal home of the (mechanical) M-individual in which P-

individuals are situated). A single M-individual may have many P-individuals in conversation with each other—and a P-individual may be situated in a super-ordinate M-individual such as a crowd, containing many other, individual, human M-individuals, which allows a P-individual to form a group intelligence. How Does This Conversation Work?

Typically, the designer looks at a blank sheet of paper and acting as a drawer makes a mark of some sort with a pencil.<sup>19</sup> Having made this mark, he then looks at it. Although he may have had some particular intention in making the mark, it is possible he did not even have that, but is “just doodling.” What is important is that the drawer, when viewing, is able to explore the mark made in such a manner so that, as the viewer, he may have a very different intention. This viewer intention allows the viewer, switching to drawer, to draw, again, based on that new (viewer) intention. Having, as a drawer, made another mark or having modified what is there, the role switch again allows a new intention to be found by the viewer, with the result that the drawer has the opportunity to again modify the drawing by adding new marks. And so on. The process is potentially endless, although it generally tends towards a coming together, which is what would in a verbal conversation be called “reaching an agreement.” The coming together may be at a great remove from the first mark. It is also possible that the process does not work, at which point another start is made. This is so familiar to designers that some would define design as an activity that can be characterised at one level by the failures and throwing away of ideas that goes on both in the role change, and when the interaction of the viewer and drawer leads down a dead end.

This process can take place with the roles switching so fast or perhaps with both roles co-existing, so that the process seems continuous, the switching seamless. It is also open to other people joining in, as is so familiar in the design studio, and, because it is open to new participants,

it allows the introduction of new topics: thus, not only may others become part of the process, modifying the resulting design, but problems and concerns can also be introduced so that what is being incorporated in the design can be constantly enriched. In this manner, designers can start by dealing with one aspect of a design and move on to consider other aspects (all the while returning, as necessary, to those that have been designed).

The importance of the role switch cannot be over-stated. This is how one person can achieve the variety that in the more familiar verbal conversation normally comes about through the differences in personal understandings that are taken to be essential when there are different people. It is through the taking of the two roles turn and turn about that interaction is possible even when there is only one person, and it is through interaction that we find surprise, as Pask showed us already in his epic machines of the 1950s. It is the origin of at least significant aspects of the designer's creativity,<sup>20</sup> and it is an approach to problem solving that is very different to the ones we are normally presented with, albeit that it is also far more common than we realise. (It has been argued that the most elementary of all cognitive activities, as defined by Piaget, is a design activity; Glanville, 2006), in which case it is fundamental to our experience: we are designers). At the heart of the activity of design is a circular process of drawing and viewing and redrawing and listening again.<sup>21</sup> As Samuel Beckett has it:

*Try again. Fail again. Fail better.*

## BRIDGE

The purpose of this chapter is perhaps not like the other chapters in this volume. The other chapters are concerned with applying conversation theory and other related approaches to subject areas, and to talking about improvement. In the case of design, no application or improvement is necessary:

the argument made here is that conversation is central to the process of design. You cannot add it and you cannot improve by adding it, for it is already there. The point of the chapter has been to show, therefore, how design is conversational, in Pask's sense, by explaining what designers do (and that design is a verb), and by giving an account of conversation theory that is hopefully both a clear exposition for the unfamiliar, and presents it (without undue distortion) in a manner that brings out the connection with, and parallel to, the activity at the centre of design. At one level, then, this chapter is finished, its purpose served.

But there are two strands that should still be elaborated. The first concerns what has come to be known as reflective practice; the second to look as specific conversation theory practices that may be highlighted in order to clarify, improve, and justify certain aspects of design practice.

## Reflective Practice

The mainstream scientist often first credited with taking what designers do and how they do it seriously is Donald Schön. In several studies of how designers work and the functioning of the (design) studio, Schön came to talk of "reflective practice" as characterising many key aspects of design activity (e.g., Schön, 1983).<sup>22</sup>

Schön belongs to the tradition that comes via John Dewey from, I believe, the largely unacknowledged German Swiss educator Friedrich Froebel. These people are characterised by a liberal approach to education that sees error and surprise as positive—in contrast to the more normal (and normative) view of education as a control activity (see Robinson, 1979).

Here is Schön describing the key actions he has observed in professionals, especially designers, in his 1983 book, "The Reflective Practitioner":

*The practitioner allows himself to experience surprise, puzzlement, or confusion in a situation which he finds uncertain or unique. He reflects*

*on the phenomenon before him, and on the prior understandings which have been implicit in his behaviour. He carries out an experiment which serves to generate both a new understanding of the phenomenon and a change in the situation.* (Schön, 1983)

I maintain that the similarity of this description to the description of the conversation that the designer is involved in should be clear. Schön's description of reflection itself reflects exactly the change between listener/viewer and speaker/drawer that has been discussed as leading to a new action; and the elements of surprise, puzzlement, or confusion together with the uncertainty and uniqueness are exactly what designers look for and expect as part of the design process and as an indicator of their status as a designer: to a designer, novelty is a major indicator of success.

What Schön is doing is placing the notion of reflection at the centre of professional activity (particularly the designer's). In so doing, he is both showing how all professionals are designers, in the sense we have referred to in this chapter in relation to Piaget; and, secondly, he is giving credibility to this activity and way of acting. He also brings reflective action, the looking and wondering and changing and acting, to the forefront of human ways of acting, explaining, and legitimising it. Further, he provides a new notion of how to carry out research, that is, to think of research as a reflective practice, and the researcher as being a reflective practitioner, both involved in a circular activity of conversational design that leads to discoveries and to (better) actions. In doing this, he also gives a name to a type of learning: learning by reflection.

There have been disagreements with Schön's findings since 1983, some of which he dealt with himself. But no disagreement I have seen denies the value of Schön's model in how it relates to the conversational form of design argued in this chapter. In effect, Schön's reflective action is a conversation—a slow conversation with the self.

## Implications from Conversation Theory for Design

Although as stated the purpose of the chapter is achieved in showing the connections demonstrated between conversation and design, there are some specific techniques that derive from the practice of conversation theory that have lessons for design, just as there are common practices in the teaching of design that reflect a Paskian conversational approach. As a final component of this chapter, we will explore some of these.

## Studio and Teaching

We have already discussed the notion that the studio is an environment in which conversational exchange between different people is both encouraged and the norm. There is no need, therefore, to further pursue this topic: the point of mentioning it again, here, is to indicate what conversation theory brings to this approach, which is the notion of teaching as inherently conversational, and even mutually beneficial.

The normal approach in conversation theory, as presented by Pask, is for the teacher to be present through association with the position of "subject matter expert."<sup>23</sup> The conversation in conversation theory is active in the learner learning the topics that are to be learnt. There is a conversational form of testing (teachback). The teacher is little in evidence—indeed, one of the aims of Pask's work was to create computer assisted learning environments.

The studio, another sort of learning environment, offers an opportunity for a conversation in which the (human) teacher is both present and involved: the teacher is less the expert and more a (co-) learner with the (primary) learner, albeit that the main concern is for the (primary) learner's talents and interests.<sup>24</sup> In this manner, the teacher becomes more part of the loop, and we have a more second order cybernetic system. (See endnote 18.)

## Sharing Ideas

The process of design, the holding of a conversation with oneself, is a particular type of conversation that takes the form of an Object. But the sort of conversation that is at the heart of design is not the only type of conversation relevant to design. The use of the studio as an environment for design (learning environment) is itself a gesture to conversation, providing an environment to support and promote conversation.

In terms of conversation theory, we can consider these conversations as facilitating the making of the new and the enriching of proposals: thus, as central to notions of creativity.

A Paskian conversation theory approach recognises the importance of the openness of a conversation (see Glanville, 2004) as a source for both the generation of new ideas (resulting from the essential and necessary difference in understandings of each participant/role) and in the enriching of the number of requirements taken into consideration within a design project. It encourages the improvement of proposals through the sharing of ideas, confirming this as a central aspect of how we may be together.

## Teachback

As already claimed, one of the cleverest devices of Pask's conversation theory is teachback, and the medium in which it occurs, the modeling facility. This allows the construction of hardwired analogies that a computer can test, because they are hardwired.

In terms of the teaching (and the public presentation) of design, a form of teachback has long been standard. The presentation of projects is typically in front of a jury (also known as a critic or a review panel) and the form of presentation is to talk to the drawings (and models, etc.) that indicate what the project will be and how it will be made. In this ritual, the members of the jury offer their assessments and comments back to the designer in a literal form of teachback.

What Pask's teachback technology allows is the possibility of a more precise form of critical evaluation, depending on a more precise initial presentation in a form more open to precise evaluation. However, it may also be that some of the value of the (design) jury as an effective teaching process lies in the imprecision and flexibility of the normal presentation.

## Design as Another Way

Design, as explained in this chapter, gives us another way of working, of solving problems (see Glanville, 2007) and of understanding our thinking processes (Glanville, 2006).

Insofar as this way is conversational and insofar as Pask's arguments hold, design acquires any credibility that conversation theory has. Given the way that design is often talked down, and current problems faced by designers within the worldwide research assessment culture of university funding, this credibility may be enormously important to designers, validating what they do and how they work—and even providing a basis for arguing that research is a form of design (and not vice versa) (Glanville, 1999).

## Design is OK!

Finally, and almost repeating the section on Design as another way, design is ok! For many years, designers have been overawed by science and the achievements of scientists, to the extent I believe, that they have lost their way, and, more importantly, their confidence.

The alignment of design with Pask's conversation theory brings both into positions of mutual benefit and increase of credibility.

## CONCLUSION

This chapter has concentrated on how conversation theory and design mirror each other. Rather than showing how design can be improved by

the use of notions from conversation theory in, for instance, design education, design, and conversation theory have been placed in a context relative to each other in which they are shown to be both parallels (similar) and to have the ability to benefit each other, sometimes by one borrowing from the other, but mostly by using the authority of the other, reflected into the one.

In order to make this argument, fairly elaborate characterisations both of certain concepts central to those aspects of conversation theory relevant to design, and of design as a conversational process, have been made.

### **AFTERWORD: FUTURE RESEARCH DIRECTIONS**

It has been argued in the main body of this chapter that design and conversation are analogous, and that both design practice and design education have traditionally, and for a long time (hundreds of years) been carried out in a conversational manner. In a sense, then, there is little research to do!

However, there is potentially much to be gained from the examination in much more detail of what exactly happens in design conversations held with the designer's self as both listener and speaker.

Research into architecture and design has tended, traditionally, to be carried using the methods and concerns of other subjects: nowadays, as well as the traditional subjects of history and (design) science, these would include cultural theory, psychology, and management studies. The alternative, as pointed out by Gedenryd (1998) (amongst others), is to study design in its own terms—to study design through the processes and concerns of the subject it self, that is, designerly research into design. Clearly the approach that I have used in this chapter belongs to this second school.

This approach is often associated with the work of philosopher/educationalist Donald Schön, who introduced the concept of reflective practice.

Reflection is another name for the process of listening to what we do, and thinking about it, possibly coming up with a completely unexpected, new insight. So Schön's (1983) reflective practice is essentially a designerly way of researching in that it also reflects the conversational process I have argued is at the heart of designing.

The process of reflection is a difficult one to map, especially because it is intentionally internalised, carried out by the practitioner as a critic of/researcher into his own work. It is often hard to both be involved and to watch as we are involved. However, recent developments in teleworking and collaboration across the Internet have led to the generation of new material. My colleague, Leon van Schaik, and I encourage our masters and doctoral students at Royal Melbourne Institute of Technology University to reflect on their practice. Where our practitioner students are involved in teleworking with each other (in their practices) we have begun to be presented with material which, because they work together while physically separate, takes a form that is permanently recorded as part of its transmission in the conversation that makes up the group as well as the individual design process.

This material that is produced in recorded form through the use of the Internet (and other electronic media) as a means for teleworking provides us with an extraordinary resource, and, as we look at it, we will be able to understand better the nature and detail of the design conversation, and whether there are any constants that we can find repeating (perhaps taking the form of zones of proximal development—learning plateaux—Vygotsky, 1962) drew to our attention, and like the stages of Piaget's (1995) developmental psychology).

At the same time, this material allows us to explore the nature of a conversation (in this case a design conversation) to better understand how we carry conversation and to learn from this, quite probably making understandings that help us act within the educational conversations that are the basis of the design studio.

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Glanville, R. (1997). *Gordon Pask*. Retrieved April 21, 2007, from <http://projects.iss.org/MA-ain/GordonPask>

*This site has further suggested reading.*

The best general sources of material on Pask by other scholars are: the festschrift published for him:

Glanville, R. (Ed.). (1993). *Gordon Pask*, a festschrift. *Systems Research*, 10(3).

And the two commemorative volumes:

Scott, B. C. E., & Glanville, R. (Eds.). (1999). *About Gordon Pask*. *Kybernetes*, 30(5/6).

*The festschrift and commemoration have attempts at full publications lists. A newly published book marking the opening of the Pask Archive at the University of Vienna contains several introductory papers:*

Glanville, R. & Müller, K. H. (Eds.) (2007) *Gordon Pask, Philosopher Mechanic: An Introduction to the Cybernetician's Cybernetician*. Vienna: Edition Echoraum.

## ENDNOTES

\* I should like to acknowledge and thank Dr. Bernard Scott and Prof. Geoffrey Broadbent for their reading of the text and many helpful suggestions. Errors, of course, are mine, all mine.

<sup>1</sup> Although many disagree with me, I include architecture within design.

<sup>2</sup> For Pask's own survey of SAKI technology, see Pask 1982.

<sup>3</sup> Musiccolour is poorly reported. It gets a significant mention in Pask's paper for Jascia Reichardt's (1971) book following up the Cybernetic Serendipity exhibition (Pask 1971).

<sup>4</sup> With Pask, I understand the pragmatics of the situation, but I detest the epistemological position of defined, finite and limited options placed on offer by others, and, let's be honest, the aesthetics of such a situation.

<sup>5</sup> In a personal communication, Scott tells me that he initially suggested to Pask the notion of teaching back and Pask generalised this to teachback. This reveals two aspects of Pask's way of working. First, that his work is actually often the work of a collective: Scott was Pask's laboratory director for many years. Second, that Pask often took notions from others, turning them into part of his theorising in his legendary all-night working sessions.

<sup>6</sup> And, being akin to a menu in a restaurant, reflects the taste of the chef.

<sup>7</sup> The modeling facility is not the only form of testing: another comes from tracing paths followed by learners through entailment meshes.

<sup>8</sup> I have argued, in a paper that discusses Pask's early book "An Approach to Cybernetics" (Pask 1961) that the major themes of Pask's later work are already discussed and taking form in his earliest work. See a German

- translation in Glanville (2005) (which also appears in Glanville and Mueller, 2007 in the English original). This includes the notion of a conversation, which is well developed in the book (although still quite informal).
- <sup>9</sup> Interestingly, Pask referred to cybernetics as the art of the defensible metaphor.
- <sup>10</sup> Remember Norbert Wiener's characterisation of cybernetics in his eponymous book, subtitled "Communication and control in the animal and the machine".
- <sup>11</sup> For a discussion of the studio and its effectiveness, including a discussion of Schön's work (1985) on the potential of the design studio, and the follow up work of Broadbent, et al. (1997).
- <sup>12</sup> Design is also a difficult word in other languages than English.
- <sup>13</sup> I am not arguing about computers, pencils, tablets, ink, and so forth. The normal expression in English involves paper and pencil and is called drawing, sketching, and doodling. I chose to use the terms I use here as a convenience, not to exclude the others a priori. This has provided a strong thread on the PhD Design list (PHD-Design@JISMAIL.AC.UK). The roots of the word and the history of its development as a concept is an important constitutive element in the new e-journal, *The Radical Designist*. (<http://www.iade.pt/designist/jornal/jornal.html>). My contribution is to trace Inigo Jones's comments on the use of the word in Palladio's *Books of Architecture*, found under Jones's name in the zero issue of this journal.
- <sup>14</sup> There is a vast literature on the power and value of sketching and on how designers use sketches. Many scholars are agreed, however, that a seminal text is Gedenryd's doctoral thesis. Gedenryd died shortly after his defence of this thesis, but it can be found on the Web in many locations including: [http://lucs.fil.lu.se/People/Henrik.Gedenryd/HowDesignersWork/index.html](http://web.archive.org/web/20020805004451/http://lucs.fil.lu.se/People/Henrik.Gedenryd/HowDesignersWork/index.html) and <http://www.chrisrust.pwp.blueyonder.co.uk/academic/resources/gedenryd.htm>
- <sup>15</sup> I have given preference to the listener/viewer intentionally. In our culture we value the speaking rather than the listening, but without the listening there is no conversation. It is conceivable that a conversation can take place because of listening without talking (picking something up in the environment), but not that a conversation can take place because of talking without listening. The artist Joseph Beuys realised this: "Beuys' primary requirement for true communication was the existence of a reciprocal relationship between individuals. 'For communication it's necessary that there be someone who listens...There's no sense in a transmitter if there's no one who receives.'" (Panel entitled "Communication" at the Joseph Beuys Exhibition, Royal Kilmainham Hospital, Dublin, read on June 2, 1999.) Further, it is through the listening that we can build our own conversational understandings, not through the speaking, which depends on us already having these understandings.
- <sup>16</sup> I am not aware of Pask ever distinguishing the participants and the roles, or talking of the conversation with the self, the self taking both roles essential for a conversation to work.
- <sup>17</sup> This is not the place to go into my Theory of Objects. Some simple references will guide the interested reader: Glanville, 1975, 1988, and so forth. It is perhaps worth noting that these Objects turn out to have many surprising behaviours and to account for much more than was originally intended or suspected.
- <sup>18</sup> Second order cybernetics is the cybernetics of the observing (as opposed to the observed) system. The inclusion of the observer is what

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makes second order cybernetics such a good model for systems of action.

<sup>19</sup> Other media may be used, although there is a question surrounding computing media and our ability to sketch using them that may have serious implications. This matter important is beyond the scope of this chapter.

<sup>20</sup> In this case, I am taking it that artists are designers. This is not an argument about who is the more creative!

<sup>21</sup> The value of talking with oneself was contemporaneously explored in a different context by Ryle (1971).

<sup>22</sup> He generalised from his studies of design to education in general.

<sup>23</sup> Over the years I have become less and less happy with the notion of the subject matter expert, just as I have become less and less enamoured of the notion of teacher as anything other than a better paid student (see later in the main text). In my thinking, the aspect of conversation theory that is concerned with the generation of the vast entailment meshes of the knowable, ThoughtSticker, is better thought of as an authoring tool than one that elicits knowledge: under these circumstances, the student becomes an (other) author.

<sup>24</sup> Except when talking of an apprenticeship

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