# Stimulating Lateral Thinking in the Design Studio

# Testing the linguistic relativity hypothesis



# Howieson S G and Faiella S.

Department of Architecture and Building Science, University of Strathclyde. Howieson is a Senior Lecturer and Director of the Masters course in Integrated Building Design. His research interests are design methodologies and the impact of indoor air quality on respiratory health. "Lateral thinking is closely related to creativity. But whereas creativity is too often only the description of the result, lateral thinking is the description of the process. One can only admire a result but one can learn to use a process. There is about creativity a mystique of talent and intangibles. This may be justified in the art world where creativity involves aesthetic sensibility, emotional resonance and gift for expression. But it's not justified outside that world. In order to be able to use creativity one must rid it of this aura of mystique and regard it as a way of using the mind a way of handling information. This is what lateral thinking is about",

"Design is a highly complex and sophisticated skill. It is not a mystical ability given only to those with recondite powers but a skill, which, for many, must be learnt and practised. Edward De Bono, who coined the term 'lateral thinking', observed how both deductive and inductive logic are concerned with concept forming.

> "Lateral thinking is concerned with concept breaking, with provocation and disruption in order to allow the mind to restructure patterns",.

The term lateral thinking ideally describes the movement of our thinking process. De Bono describes inductive and deductive thought as *'vertical thinking'*, the difference between the two being that vertical thinking is selective, lateral thinking is generative.

"Vertical thinking moves only if there is a direction in which to move, lateral thinking moves in order to generate a direction...Scholars are too busy learning about the thinking of others to do any thinking for themselves",

Deduction and induction are the most common teaching and learning methods used in architectural design studios. Such methods have inherent problems.

"Culture is concerned with establishing ideas. Education is concerned with communicating those established ideas. Both are concerned with improving ideas by bringing them up to date"<sub>s</sub>.

De Bono observes how this change is only obtainable through 'dialectic conflict'. What he means is that the only way for changing an idea is through the confrontation of the new information with the old idea. The result of this conflict should produce the new idea.

> "Education is based on the safe assumption that one only has to go on collecting more and more information for it to sort itself into useful ideas".

The conflict method for generating ideas would work perfectly if we were able to judge it or evaluate it in an objective manner. But this is exactly where the problem lies. As the only tool available for evaluating the new information is the old idea itself, it does not facilitate innovation.

> "Instead of being changed the old idea is strengthened and made even more rigid. The Western habit of argument and dialectic is defective because it leaves out the generative and creative. Critical thinking is fine for reacting to what is put before you, but does nothing to produce proposals".

Lateral thinking, or abduction, does not supersede vertical thinking - deductive trial and error or inductive precedent. Lateral thinking and vertical thinking are complementary; lateral thinking is simply the method to adopt to make vertical thinking more effective by adding creativity.

## Language and thought

Thought should not be viewed as some mystical inner activity distinct from language and therefore design should not be seen as a non-linguistic activity. Although a solution might be drawn, the job the drawing does is the same job that language could do. Drawing is chosen because it is quicker, simpler and less tedious. It is important for designers to understand that drawing is a substitute for the underlying linguistic criteria and not the other way around.

There are two main theories in this field. The first one sees thought as being dependant on, or caused by language. This theory is usually identified as the Sapir-Whorf<sub>s</sub> Linguistic Relativity Hypothesis. The second one, known as peripheralism, was in the main developed by Piaget, and advocates that language is dependant on and reflects the level of cognitive development.

As an example of the linguistic relativity hypothesis, the English language has only one noun for snow. The Eskimos have more than twenty nouns (fluffy snow, drifting snow, packed snow and so on). The Hopi Indians use the same word to describe 'insect', 'aeroplane' and 'pilot'. The Zuni Indians do not make a verbal distinction between yellow and orange. All these differences according to Sapir and Whorf, determine differences in how native speakers think about, perceive, and remember the world. The world can therefore appear to be different according to what language we speak or perhaps more accurately, the language we 'think in'. Although different languages perceive and relate differently to objects, actions and time, it is still arguable, from evidence produced by tests<sub>10</sub> carried out using the Sapir-Whorf hypothesis, that there is a universally shared knowledge of the world, which is independent of the particular language in which it is expressed. An important study that strongly supports language in its central role in cognitive development, was carried out on a pair of 5-yearold identical twin boys from Russia by Luria and Yudovich,... The children came from an unstimulating home environment, played almost exclusively together, and had a very primitive level of speech development, which was only fully comprehensible by the twins themselves. This syncrapaxic speech - as described by Luria and Yudovich<sub>12</sub> - lacked any complexity. Terms were always changing in their meaning and speech could only succeed in describing concrete situations. No abstraction was possible and the twins never described objects or events. Although the twins seemed normal in every other way and not mentally retarded, they never played with other children and their own interaction was always very primitive and monotonous. They never attempted to build or construct things.

"Their language deficiency seemed to underline their backwardness in powers of abstraction and generalisation that are so crucial in the organisation of planned complex activity"<sub>13</sub>.

Later the children were separated and put into different nursery schools, where they underwent differing remedial treatments. The final conclusion drawn by Luria and

### Yudovich<sub>14</sub> is important to designers:

"The whole structure of the mental life of both twins was simultaneously and sharply changed. Once they acquired an objective language system, the children were able to formulate the aims of their activity verbally and after three months we observed the beginnings of meaningful play".

Wittgenstein argued that, "*The limits of my language are the limits of my world*"<sub>15</sub>. To presume that design thinking is a non-verbal activity is to misunderstand the way the brain operates.

In trying to promote the way we think from 'passive vertical thinking' to 'active lateral thinking' two key elements of language must be taken into consideration. In English, nouns denote objects and events, while verbs denote actions. Nouns represent our passive frame of mind. Every time someone talks about an object (therefore using a noun), the pattern system in our brain immediately intervenes to form an association. De Bono claims that the 'first thing that comes to your mind', is simply the most deeply 'engraved'' concept. Verbs on the other hand, are active words, they describe an action and a process. The concepts of 'chair' and 'to sit' represent this crucial difference. If designers think in nouns rather than in verbs they will not proceed down the same route in the efforts to achieve a required design outcome.

#### Limitations of Existing Route Maps

In his analysis of route maps for the design process, Lawson<sub>16</sub> concludes quite negatively on the topic.

"We have examined the design process as a sequence of activities and found the idea rather unconvincing. Certainly, it is reasonable to argue that for a design to take place a number of things must happen... The idea however, that these activities occur in that order, or even that they are identifiable separate events seems very questionable".

Lawson's observation is almost entirely based on an analysis of the Marcus-Maver route map (Fig 1) which he interprets, correctly, as a simple deductive process based on trial and error.



This representation clearly shows many of the faults that De Bono attributes to vertical thinking. This is a linear process based on critical evaluation where one step precedes the next. Lawson himself is uncertain about such an approach because the process isn't necessarily as rigorous and straightforward as Marcus-Maver would have us believe. The fault may not be with route maps *per se*, but with route maps that fail to escape from the norms of vertical thinking. Crucially the Marcus-Maver route -map ignores the problem of generating ideas.

Design tasks are in the main a series of open-ended problems. When a designer is presented with a given brief (which can of course contain a large number of erroneous assumptions or worse still, the dreaded and primitive 'schedule of accommodation'), they cannot progress in a linear fashion to 'the correct solution'. The designer faces an infinite number of possible solutions and a good designer will norm reference a number of conceptual outcomes in an attempt to achieve the optimum. This may well be a compromise between a number of opposing and competing concerns and drivers. With relatively immature designers, it is rare for them to develop a range of concepts on which such a comparison can be performed. Indeed it has been claimed that design teaching does not encourage such an approach.

> "Normally one is only taught to think about things until one gets an adequate answer. One goes on exploring while things are unsatisfactory but as soon as they become satisfactory one stops. And yet there may be an answer or an arrangement of information that is far better than the adequate one"  $_{17}$ .

Such a trend is typical of the trial and error method; an approach that is endemic in Schools of Architecture. De Bono claims that such an attitude results in creating problems that don't really exist and generating solutions that act as prisons, preventing a more useful arrangement of the information. Hertzberger also supports such a hypothesis,

> "Basically speaking, the deeper a particular form is engraved in our 'tradition' the less reason there seems to be to change it, or rather the more difficult it is to see reasons for doing so"<sub>18</sub>.

Analysis represents the stage that involves accumulating background information (site analysis/precedent studies/ ergonomic data etc). This is an inductive process; the designer learns about the problem through the study of books and other designers' approaches. The designer is then expected to immediately progress to synthesis; the generation of solutions based on the collected information. The problem with this sequence is that it leads us back to the deadlock of evaluating a new idea through the old one, therefore preventing new innovative lateral thinking, which could possibly generate more revolutionary solutions or even the much vaunted, paradigm shift.

Figure 1. An analysis of the Marcus-Maver route

#### Exploration the missing link?

Exploration is a phase of the design process which requires to be undertaken between analysis and synthesis. It is based on the study of verbs rather than nouns and concentrates on the processes involved with a design rather than focusing on the end product. It is the crucial stage in which designers can challenge preconceived ideas and allow the brief to be evaluated and re-formulated without concern for the end product. It is an exercise that is not solution driven. It provides an opportunity to free the mind and produce as many ideas as possible, in an attempt to identify all kinds of design generators, before moving to critical evaluation and synthesis. The designer must concentrate on deconstructing the problem and exploring its component parts in isolation to any notional future concept.

Figure 2 shows how the methodology - although at first sight appearing to be linear - is actually a continuous series of secondary iterative loops.



It attempts to discourage, particularly inexperienced designers, from stampeding to concept before understanding and evaluating a variety of the design 'problem' facets. Synthesis becomes relatively isolated with only one door in and out. The main objective of the route map is to allow the production of as many primary generators that time will allow, before attempting to develop a range of solutions which can then be norm or criterion referenced in appraisal mode. It is not intended that it should be applied mechanically, and is only represented in this way to allow those teaching students to get a better grasp of the principles and differing modes of thinking. All of us have cerebral processors, which will naturally allow this range of mental gymnastics to occur, almost in parallel.

#### **Rules for exploration**

To succeed in exploring activities a series of 'rules' should be followed. Firstly, the brief must be examined to identify all activities to be accommodated. The designer must ask (and answer) the questions: Who? What? Where? When? and Why?. These should be listed and generic client groups identified. Various matrices can be generated for those that like order. Such matrices can show overlaps and complementary activities in terms of activities and timeslots. These activities should then be turned into processes (entering/storing/supervising/communicating etc). A simple way to ensure that this occurs is to start every page of the design sketchbook with a verb (coffee drinking rather than café etc).

Only when each activity has been explored in isolation, should the designer attempt to conjoin any areas where there is obvious symbiosis (2<sup>nd</sup> level exploration). Further inflation/conflation will occur as the exploration develops in breadth and depth (3<sup>rd</sup> and 4<sup>th</sup> level exploration and so on). The initial stages, in particular, can be organised as a series of individual and group brainstorming

sessions. There is no reason to believe that a solitary designer will out perform a group. De Bono claims<sub>19</sub> $t_{hat}$ .

"A single designer will only be able to see one or perhaps a few alternative ways of doing something. But with a large number of designers there will be a large number of alternative approaches. Thus by simply exposing any single designer to the efforts of the others one shows how it is possible to look at things in different ways".

Exploration as a group activity may be beleaguered by the 'old habits' of vertical thinking. Instantaneous critical evaluation is almost irresistible. It is much easier to highlight the weaknesses in another's idea than to produce one of your own. This mind set is however counterproductive. In any brainstorming session, comments such as 'that won't work' or 'you can't do that' are commonplace. Lateral thinking is about generating ideas. Premature appraisal will only serve to inhibit and stultify. Appraisal of the various 'pros and cons' can take place in due course and lead naturally into editing and the selection of primary concept drivers. As it develops key combinations start to appear that can act as design concept drivers. Such an approach can structure the design process and lead to more productive use of time. This is a claim that is testable. An experiment, using a cohort of 16 first-year building-design students, was designed to test the utility value of such a route map.

#### Methods

The participants were given no information about the task they were to perform, other than that it was a design exercise. The students were divided randomly into four teams and given only three hours to complete two separate design tasks which required them to produce ideas for a window shading system and an environment for the care of young children(nursery school). The four teams were placed in similar working environments (lighting, space, etc) in separate rooms. All the participants were equipped with similar tools: an A3 sketchpad and black marker pens. Two teams (C& D) were given an additional one page 'route map' with the design brief. All individuals completed a simple post trial questionnaire to evaluate their experiences.

#### Assessing the results

Although the benefits of any method will ultimately be judged on the quality of ideas produced, it is difficult in such a limited timespan to formulate a robust and reliable set of criteria, in terms of producing a 'design quality quotient'. It is much simpler to measure quantity of output. The following elements were thus recorded: number of concepts/solutions generated; number of sketches/drawings/diagrams produced; total number of words used; number of verbs and nouns used.



Figure 1 represents the sum of the concepts produced for the two tasks.



Figure 2 Teams A and B produced a joint effort of 27 sketches against a joint effort of 64 from teams C & D.



Figure 3 recorded the total number of words used to analyse, describe and highlight



Figure 4, recorded the number of written verbs and nouns.

#### Discussion

The two teams using the 'route map' generated nearly twice as many solutions, drew three times as many sketches and wrote down four times as many words to describe their proposals. They appeared to be able to make use of this simple linguistic based route-map to explore and describe their work. The teams did not use terminology to romanticise, decorate, or obfuscate the product, however, whilst teams A and B's use of words were simply used to 'label' their efforts, teams C and D used language to investigate and describe the process of their work and to communicate amongst each other. An example of this attitude can be found in the output of team D where many ideas or concepts were similar, yet each incremental variation was illustrated and notated in order to reduce confusion within the team and clarify how best to progress.

Group dynamics clearly play a part in any such experiment and the post-op questionnaire was designed to allow students to comment and evaluate their initial thoughts on the exercise. Participants from Team B replying to the questionnaire said that they were not completely satisfied with the quality of work produced, "because there was a breakdown in communication from time to time resulting in a non-coherent work load". Or as another student succinctly put it, "there was too much carry-on and nonsense within the group, so the work load has been shortened and we weren't as efficient as we could have been".

Teams C and D commented in quite a different way to the same question. They too were not satisfied with the work produced, but their dissatisfaction was based on frustration. They felt they could have produced more ideas, but ran out of time. In short, they new

122

where they were going and were motivated to advance down the road.

Even though teams C & D were expressly told to avoid nouns and concentrate on verbs, any increase in the use of verbs appears to produce a proportional number of nouns. This could be an indication that after only six months of design education, the students are already solution driven, or alternatively, there is a natural background correlation in the English language between verbs and nouns.

Interestingly Team C tried to develop a hemisphere-like window inspired by the shape and movement of the human eye. Whether or not such a solution is viable is not important. What may be considered to be worthwhile, is that the use of a simple route map which they had only minutes to digest and comprehend - appears to have encouraged these students to re-explore the concept of the window from first principles. This represents an example of lateral thinking and the mind set required for exploration, which demands a different part of the brain to be stimulated.

Innovation should not be confused with the absurd. To quote the product designer Richard Seymour<sub>20</sub>, "Good design results from the unexpectedly relevant solution, not wackiness parading as originality"

Using the simplistic quantitative criteria Teams C & D clearly outperformed teams A & B by producing significantly more ideas and output in a given - if somewhat limited and inadequate timescale. The possibilities for the design studio may be significant if students can be tutored in the use of such a simple linguistic tool and with practice, it may allow their creativity to be more structured, efficient and rewarding. As Pasteur<sub>21</sub> Maintained *"Fortune favours the prepared mind" however, "when driving for ideas, don't drive with the brakes on"*<sub>22</sub>. NOTES

De Bono E. Lateral Thinking, Penguin Books, 1970, London

2 Ibid.

3 Ibid.

+ Ibid.

Ibid.

\* Ibid

\* De Bono E. Six Thinking Hats, Penguin Books, 1985, London

\* Gross R D, Psychology, The Science of Mind and Behaviour, 2<sup>rd</sup> Ed., Chapter 13 Language and Thought, Hodder & Staughton, 1992, London

· Ibid., Chapter 25, Cognative Developmen

in Ibid., Chapter 13, Language and Thought,

In Luria AR & Yudovich FI, Speech and the development of mental processes in the child. 1971, Harmondsworth, Penguin.

12 Ibid.

D Ibid.

14 Ibid.

<sup>19</sup> Gross, R. D. Psychology, The Science of Mind and Behaviour, 2<sup>rd</sup> Ed., Chapter 13 Language and Thought, Hodder & Staughton, 1992, London

In Lawson A, How Designers Think- The Design Process Demystified, 3<sup>rd</sup> Ed., Architectural Press, 1997, London

In De Bono E, Lateral Thinking, Penguin Books, 1970, London

# Hertzberger H, Lessons for Students in Architecture, 010 Publishers, 1991, Uitgeverji

De Bono E, Lateral Thinking, Penguin Books, 1970, London

<sup>20</sup> Lawson B, How Designers Think- The Design Process Demystified, 3<sup>™</sup> Ed., Architectural Press, 1997, London

n Rawlinson JG, Introduction to creative thinking and brainstorming, British Institute of Management Foundation, 1981, London, p20

22 Ibid.p13