NATURE'S ACADEMY: EXPERIMENTS IN PARTICIPATORY DESIGN/EVALUATION

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ABSTRACT:

This paper is a preliminary report on a research/consultancy project, which forms part of an MPhil research study by Carol Aitken. It is in two parts. The first part describes a practical design study of a vision for a new kind of outdoor environmental education centre in Scotland. This is referred to as Nature's Academy. Three unusual features are included in the design brief in order to embrace the notion of scale-linking. The three features require a participatory mode of thinking by the designer, which we refer to as wider cognitive participation. The second part describes a series of experiments conducted with twenty-seven (27) undergraduate degree students in Interior & Environmental Design. These experiments were designed to elicit individual, paired and group responses in a

<u>participatory evaluation</u> of designs resulting from the design study (Part 1). The experimental protocol is described and preliminary results are included.

AUTHOR KEYWORDS

Design Education, Participatory Evaluation, Wider Cognitive Participation

1. INTRODUCTION

This practical project forms one of a suite of studies being carried out at the Centre for the Study of Natural Design. Other projects are dealing with the theoretical aspects of natural design. Baxter (2005) has recently described the global context for a recontextualising of design in an essentially ecological perspective, suggesting that natural design is central to the convergence of ecological design, ecological ethics and ecological visioning. Wahl (2005) has suggested the idea of natural design as a design movement. He proposes the Natural Design Movement as an integrative concept, which brings together all existing design approaches that aim towards sustainability from a community to a planetary scale. A feature of Wahl's studies has been the notion of 'scale-linking' as an inherent part of natures processes and an aspect, which designers should attempt to emulate through natural design. The now deceased but well respected American landscape architect, John Tillman Lyle has written –

"We need to recognize that every eco-system is a part – or subsystem – of a larger system and that it in turn includes a number of yet smaller subsystems. It also has necessary linkages to both the larger and the smaller units…… Our range of design scales forms a hierarchy that corresponds to the concept of levels of integration in nature or in any organised system. Certain principles of organization link the levels of this hierarchy and provide guidance for design at any given level" (Lyle, 1985)

Thomashow (1999) citing the work of Allen and Hoekstra confirms that –

"For any level of aggregation, it is necessary to look both to larger scales to understand the context and to smaller scales to understand the mechanism: anything else would be incomplete. For an adequate understanding….. it is necessary to consider three levels at once: (1) the level of question; (2) the level below that gives mechanism: and (3) the level above that gives context, role or significance"

Van der Ryn & Cowan (1996) have argued that scale-thinking will have to be a central tenet in designing sustainable solutions. Birkeland (2002) has suggested seven scales of ecological design

as follows – eco-design, eco-architecture, construction ecology, community design, industrial ecology, urban ecology and bioregional planning. There may be/will be more. The central level for the project discussed here is eco-architecture (Birkeland, 2002). This paper will not deal with lower levels i.e. eco-design but will consider how higher levels, the levels that give context, can be embraced in a design briefing. The design brief or briefing is however a dynamic process. In a forthcoming paper, Murphy & Baxter (in preparation) the authors discuss the technique of briefing in a complex, rapidly changing turbulent marketplace environment. They suggest that the notion of the brief should pervade the whole project process and that its measure of success lies more in the way it enhances participation and cohesion amongst all agents (stakeholders) rather than simply its reflection in the final product e.g. building. They refer to the technique as 'pulsing' and this was used in this study.

2. PART 1 – CONSULTANCY

The first part of this research study, referred to as consultancy, was carried out as a feasibility study in collaboration with the Scottish Environmental & Outdoor Education Centres Association Ltd(Scottish Centres), (Baxter, Aitken, Ashcroft &Spence, 2004). The origins of Scottish Centres can be found in The Camps Act, 1939, when it was then referred to as Scottish National Camps Association Ltd (SNCA). In 1987 it became a private company, limited by guarantee, with full charitable status and the continued mission to –

"……manage residential Outdoor Education Centres for the social, physical and intellectual benefit of the community at large, and of children and young people in particular"

It currently has 5 sites, varying from around 10 to 25 hectares in central and lowland Scotland. One of these sites was the location for this project. The centres mainly provide one week long courses to groups of young people (aged 7-14 years) and there is an annual throughput of about 17,000 students with a potential nearer 50,000. The site for this project is located in the Southern Uplands adjacent to a river and in close proximity to a small village. The 16 hectare site is partly wooded and on several levels reaching down to the river. The idea is to develop a new outdoor education centre for the 21st century on this site.

The brief for the study contains three unusual aspects all of which were introduced to enhance scale-linking through 'wider cognitive participation'. In this sense participation is virtual, rather than real and

is an aspect of designer thinking, dynamically encouraged by the experimental technique of 'pulsing' (Murphy & Baxter, in preparation) which, in relation to the briefing process, they describe as follows:-

"…briefing can be located in whole and in part on a communication continuum from precision to ambiguity across which it traverses (backwards and forwards) with dynamic tension, constantly searching for the 'edge of chaos'

The three unusual, though not perhaps unique, aspects of the briefing were:-

(i) Global sustainability statements

(ii) An Operational Philosophy

(iii) A Cost Estimate & Business Plan

The intention of (i) was to constantly remind the designer(s) of scale-linking to larger systems i.e. regional, national and global. Fourteen (14) key statements were chosen (many more are possible) and the designer(s) were continuously reminded by the mantra – Are We Acting Sustainably, Do We Really Care? A sample of six of these statements is shown in TABLE 1.

Sample Sustainability Statements	Scale and Issue
Nearly half of the world's population is still living on less than £1.40 a day.	Global : Poverty
Over 30,000 children die every day from poverty.	Global : Poverty
1.2 billion people suffer from deficiency of calories and protein and 1.2 billion people suffer from over-consumption, obesity and calorie excess.	Global : Nutrition
By the year 2025 nearly 2 billion people will live in regions experiencing absolute water scarcity.	Global : Water
For the first time in generations, Scottish parents are looking at their children facing shorter life expectancy than their own.	National : Nutrition
Basic health for all would cost about £37.4 billion per year, yet in Europe and the USA we spend about £9.7 billion on pet foods.	Global : Health

TABLE 1. Sample of six global sustainability statements.

The intention of (ii) was to constantly remind the designer(s) of broader premises on which the vision for the new centre should operate. The philosophy scale-links the global, national and regional sustainability statements with reminders of the purpose of visioning, its timescales and the role of participation. It explores the pursuit of sustainability through natural design, relating the ideas of

creative and sustainable societies with sustainable lifestyles and provides guidelines for design (Todd & Todd, 1980, Orr, 1992, McDonough & Braungart, 2002). It was enhanced with quotations like –

"From my designers perspective I ask: why can't I design a building like a tree? A building that makes oxygen, fixes nitrogen, sequesters carbon, distils water, builds soil, accrues solar energy as fuel, makes complex sugars and food, creates microclimates, changes colours with the seasons and self-replicates. This is using nature as a model and a mentor, not an inconvenience. It is a delightful prospect" (McDonough & Braungart, 2002)

The philosophy also focused on the linkage between outdoor education (physical) and eco-literacy and supplied a bibliography of about forty-five (45) key readings. The intention of (iii) was to provide the designer(s), not with a capital limit, but with a dynamic operational plan where investment was continually seen as a resource for action and performance embedded in scale-linking sustainability.

Using the technique of 'pulsing' it was hoped that the designer(s) would be continually reminded of scale-linking whilst they pursued their eco-architectural solutions.

The designers ultimately arrived at four conceptual layouts for the building(s) referred to as Ribbon; Cluster; Street and Radial. Sketches and small models were made for each layout. Finally, in consultation with the client, the normal process of selecting one solution was adopted and further sketches were prepared of both inside and outside the buildings, and details of unusual features. The client was satisfied with the study and chose the Radial layout. (See FIG. 1 to 4) This scheme had an estimate cost (in 2004) of approx. £8 million.
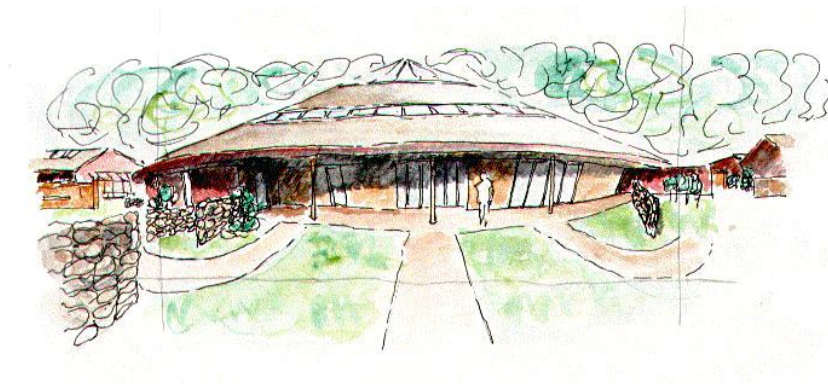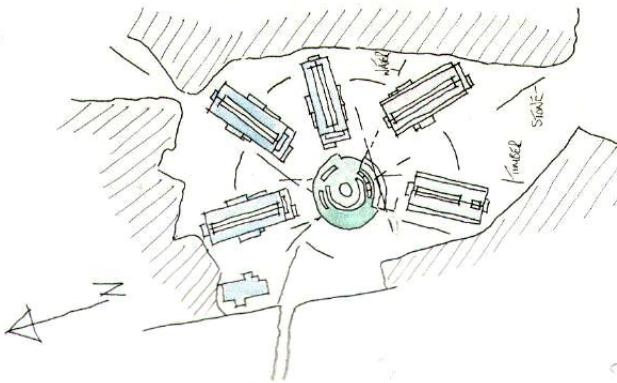

FIG 1 View of Main (Hub) Building

FIG. 2 Plan of main cluster of buildings

FIG 3 and 4 Views around main cluster of buildings

At this point however, two questions were asked by the researcher/designer – how do I know, even at this conceptual stage, whether we have made the correct decision? Is there any other form of evaluation (other than client choice) which might be helpful? The next part of the paper explores these issues.

3. PART 2 - PARTICIPATORY EVALUATION

3.1 AIMS & OBJECTIVES

The main aim of this part of the project was to explore a participatory method of evaluating the consultancy conceptual design solution(s). The following experimental protocol was designed as a consensual tool for evaluation.

The project also had the following important educational objectives:

(1) To contribute to the learning experience of participants through the compression of the early preparatory stages of the design process.

(2) To expose the participants to the rapid mind shift from the design process which leads to their own ideas, to the evaluation of the ideas of others and to note the similarities and differences.

(3) To expose the participants to the gradual but rapid transition of working as individuals, pairs and small groups on the same problem and to note the effect of this on decision making.

3.2 EXPERIMENTAL METHODOLOGY

3.2.1 GENERAL CONDITIONS

- All participants in the experiments were volunteers and students on the BDes(Interior and Environmental Design) course at Duncan of Jordanstone College of Art and Design at University of Dundee.

- Two sets of experiments were conducted at different times. The first, with a cohort of 3RD and 4TH Year students (experienced cohort) and the second with 1st Year students (naive cohort). Only data from the first study, the experienced cohort, is presented here.

- A set of experiments (12) lasted approximately 6 hours. These were divided evenly between morning (AM Experiments) and afternoon (PM Experiments). The split was also designed to accommodate five students who could only participate for a half day.

- The experiments were conducted in a spacious, well lit (natural daylight) room free from external intrusion, and the participants worked on and around large tables (See FIG. 5 Photograph of Experimental Area)

- Facilities for video and power point presentations were available as well as flipcharts for 'public' recording of opinions etc.

FIG 5 Photograph of Experimental Area

- The two parts of an experimental set were separated by a lunch break although most participants worked through this interval.

- The complete experimental procedure was conducted by the researcher (Carol Aitken) supported by two tutors. The researcher, although known to many of the participants, was formally introduced to the experimental cohort by a senior tutor and the full experimental protocol was outlined at the beginning of the project.

Workshop commenced 9.30am	Descriptors	Participants	Duration
Morning Experiments (AM) PREPARATION PHASE	Introduction to workshop protocol and Nature's Academy project	Cohort	30 minutes
AM 1	Reaction to 20 minute visual presentation Oral, centrally collated results	Individuals	30 minutes
Morning Break			15 minutes
AM 2	Reaction to 5 minute power point presentation Written & Oral, identify choices	Individuals	20 minutes
AM 3	Reaction to 10 minute power point presentation Written, identify potential influences	Individuals	20 minutes
AM 4	Creative mind mapping	Pairs	15 minutes
AM 5	Creative progress outputs	Pairs	30 minutes
AM 6	Creative outcome	Pairs	30 minutes
Lunch Break Workshop resumed 1.45pm			+ 1hr
Afternoon Experiments (PM) EVALUATION PHASE			
PM 1	Response to models	Individuals	5 minutes
	Introduction to Sustainable Strategy for Nature's Academy	Cohort	15 minutes
PM 2	Design question sheets	Groups	20 minutes
PM 3	Omitted		
PM 4	Semantic differential type questionnaire	Groups	40 minutes
PM 5	Oral, centrally collated results	Individuals and Cohort	10 minutes
PM 6	Oral, centrally collated results	Individuals and Cohort	10 minutes
	Feedback questionnaire	Individuals	10 minutes
Workshop ended 3.45pm			

TABLE 2. Summary of Main Characteristics of Experiments

- A summary of the main characteristics of the set of experiments, the mode of participation and the duration of each experiment are shown in TABLE 2.

- The participant protocol was designed to expose recipients to working progressively as individuals, then in pairs and finally in small groups. Pairs and groups remained constant across experiments. Pairs of participants were self-selected whilst individuals were randomly allocated to groups. FIG 6 summarises the experimental participant protocol. All participants are identified by a letter (A to BB) and thereafter pairs become for example A U and groups become A E K L V Z for example. Coincidentally, no pair ever became part of the same group. The mix of 3rd and 4th year students is also shown.

Although the research project was primarily designed to evaluate conceptual designs resulting from consultancy work (Part 1) the method used was first to prepare the participants with simulations organised in the form of a typical but compressed design process i.e. site visit; image formation (words and pictures) early selection of colours, shapes, forms and materials etc. Sketching and modelling was especially encouraged in experiments AM 5 & AM 6. This process occupied the first 6 experiments (AM) when the participants worked as individuals or in pairs.

Following this preparation, the afternoon experiments (PM) with participants working as individuals or in groups was devoted to evaluation. The preparation period ensured that all participants were given the same information, regardless of what knowledge, beliefs and opinions they also brought to the project. The latter, would however, most likely surface during the experiments.
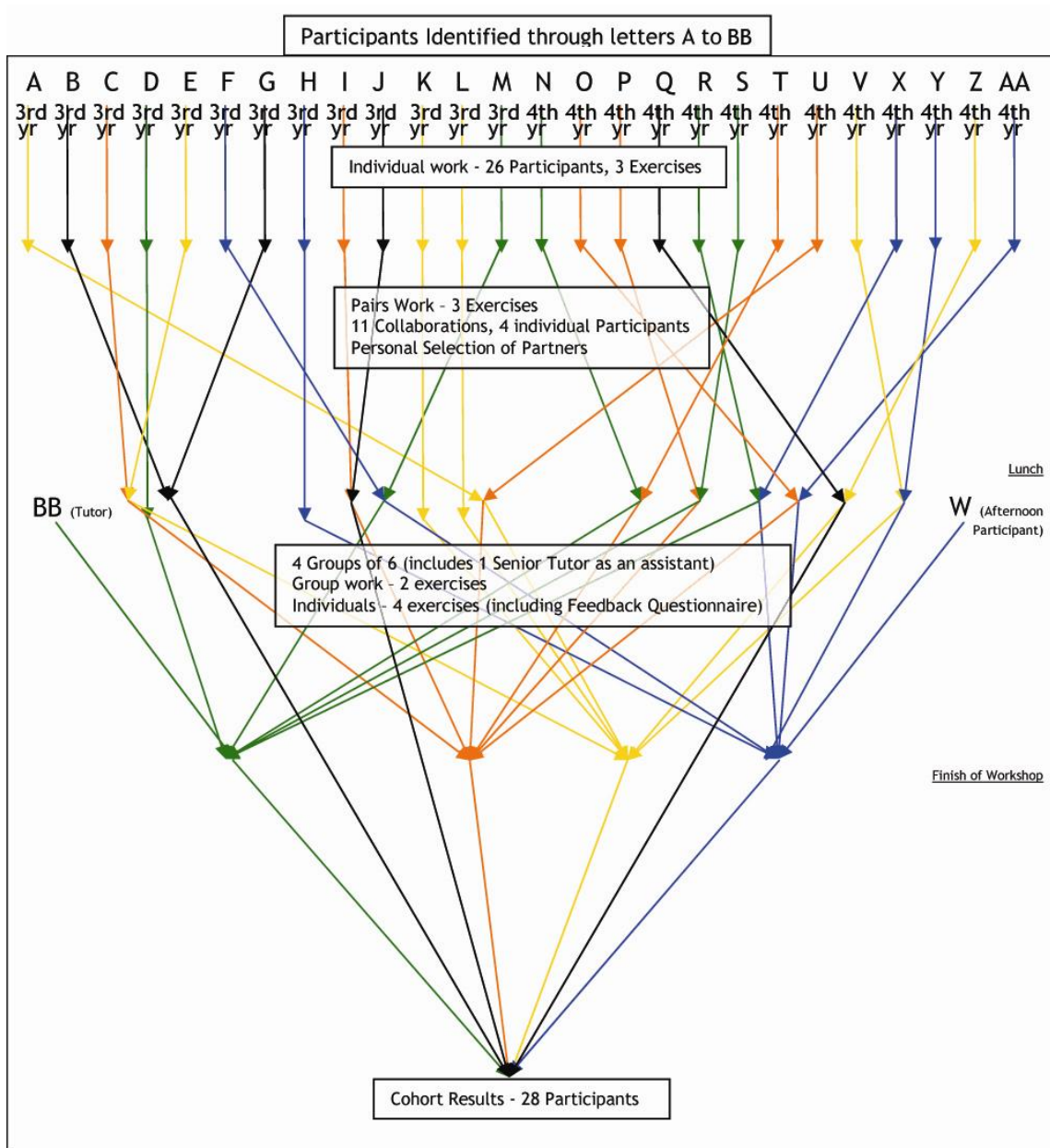
FIG.6 Experimental Design: Participant Protocol

Because of the large amount of data from this study, we only report on a sample of participants by following 4 individuals into 2 pairs then 4 groups providing both lateral and longitudinal data (See FIG. 7)
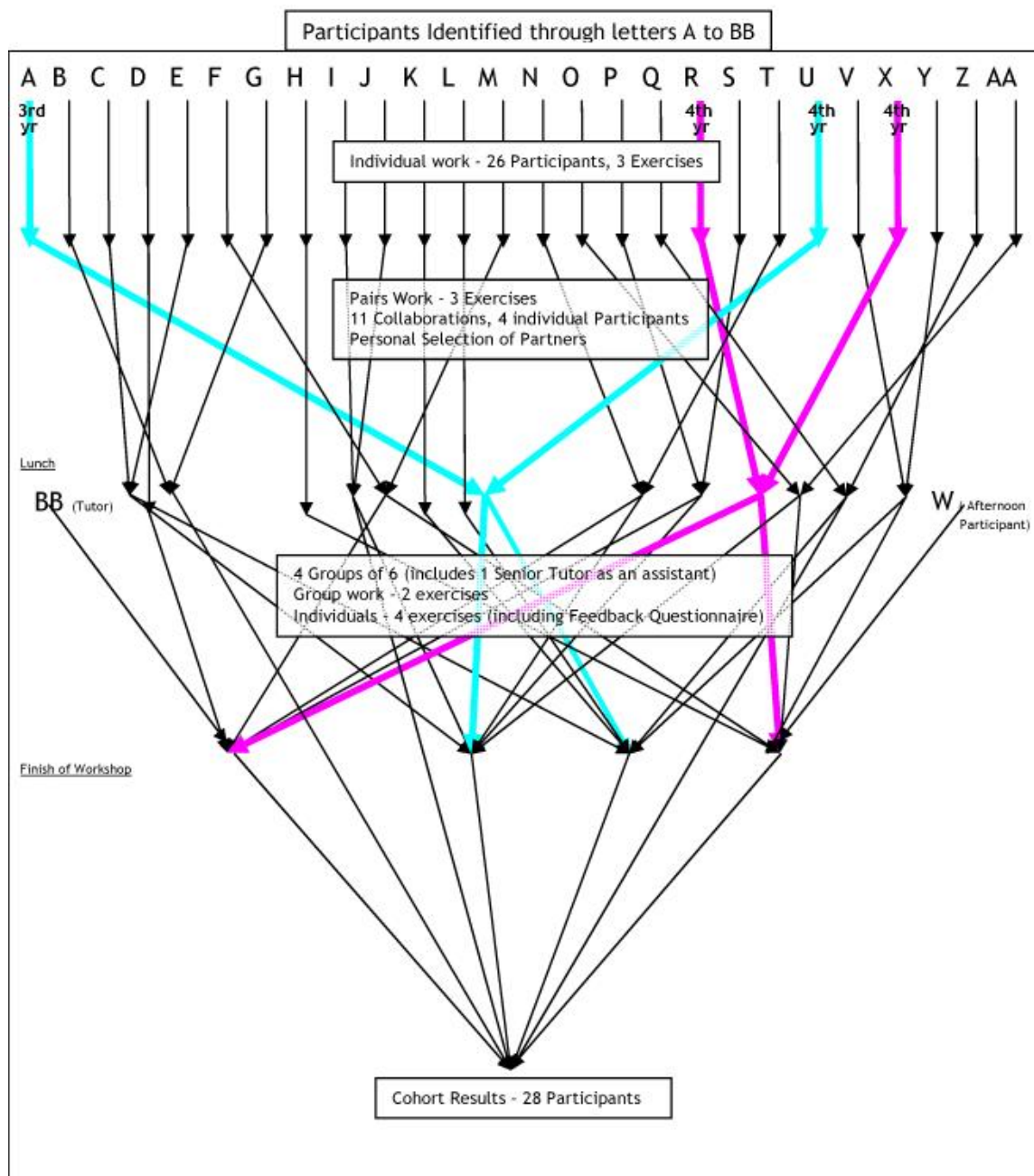
FIG. 7 Experimental Design: Participant Protocol Sample of 4 individual's route through the experiments.

3.2.2 RESULTS AND COMMENTS

PREPARATION EXPERIMENTS (MORNING EXPERIMENTS AM 1 – 6)

Experiment AM 1 results are summarized in FIG 8 where 26 participants were encouraged to express word/phrase descriptors (free choice) in response to a video simulation of a journey to, through and around the project site.
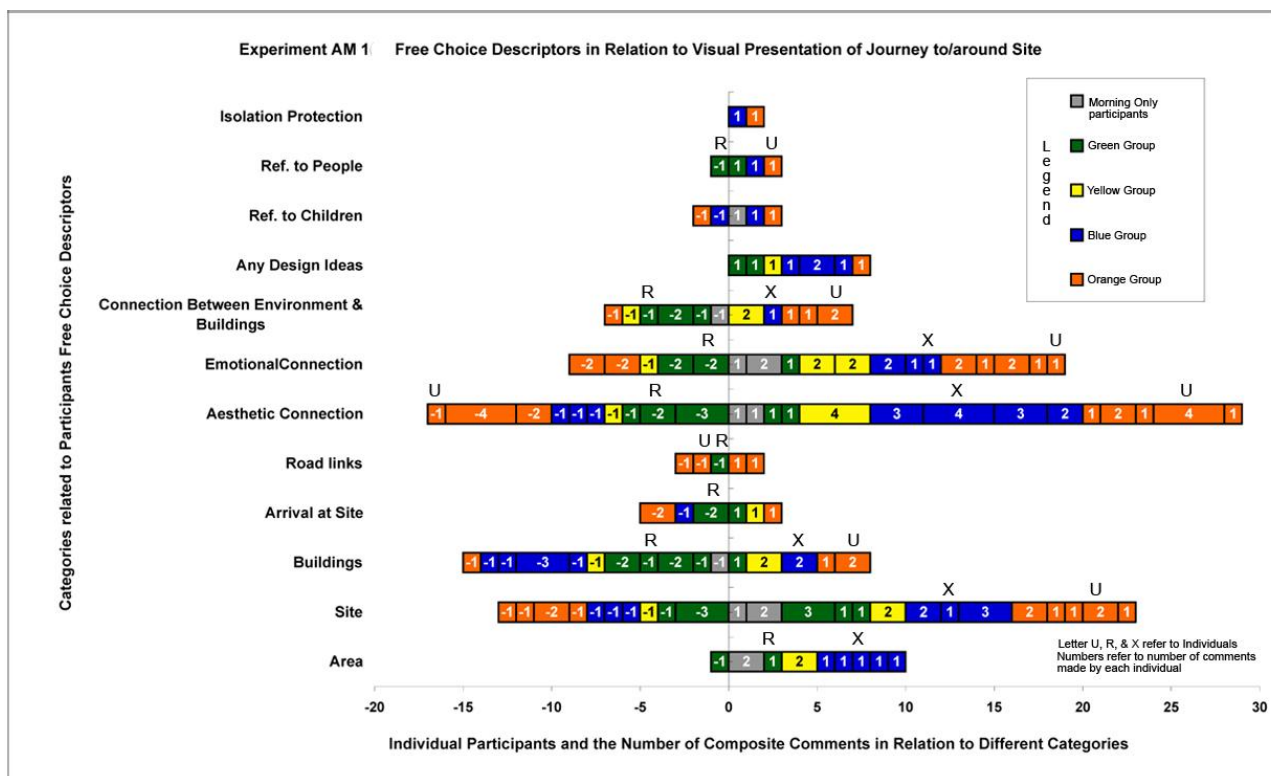

FIG 8 Responses to Experiment AM 1

The descriptors were collated by the researcher and sorted initially into 5 main categories covering the local environment, site, buildings and design ideas. However, many descriptors were composites of several attributes which meant that they could be sorted into more than one category. To overcome this and to refine the data further, the researcher deconstructed the composite descriptors into single element categories. This resulted in the 12 categories shown in FIG 8. There were 102 original descriptors and after accounting for similarities and deconstruction, there are a total of 114 descriptors contained in FIG 8.

In addition, FIG 8 divides the responses into what appeared to the researcher to be either positive or negative comments. An example of a positive, composite response was "I can close my eyes and feel the place, immerse myself in the beauty of the site. Could stay there in this place forever." (Q) and a single element positive response was " A place of protection" (J). In contrast, a negative composite response was - "a feeling of loneliness because the buildings were empty and there was no one around" (J). A single element negative response was "not very exciting" (F). Whether these comments reflect the mood of the respondent or are only part of a long continuum from 'bad to good' judgements is not known. If the former, this could have important effects on how the individual respondent traverses the experiments and relates to others in the pairs and groups.

Finally, in FIG 8 we are able to locate, through lettering and colour coding, the progressive tracking of our 4 individuals, through their pairs and groups.

Comments on Experiment AM 1 – This experiment is discussed in more detail because it provides the baseline for subsequent experiments. Out of a total of 114 descriptors, there were more positive responses (64) than negative responses (50).

The most common descriptors referred mainly to the site, buildings and aesthetics (including emotive responses). Negative descriptors only outnumbered positive descriptors in relation to buildings. Some participants were much more responsive than others. For example, 7 participants did not respond at all (B G D A Z L K) and in contrast, one student (T) recorded 12 comments, 3 of which were composites. It is interesting to note that the orange group ended up with the most vociferous individuals (responsible for 38 responses) and the yellow group was the least vociferous (responsible for 15 responses). The green group had the most negative descriptors. What this might mean as the individual progresses through the pairs to the group may be of interest and how this might be reflected in the final evaluation may be important.

The four individuals chosen in this paper to be followed through the experiments were A, R, U and X. These were chosen by considering the self selected pairs and identifying one member of a pair who, from the evidence in experiment AM 1 had some interesting qualities. For example, U was chosen as vociferous and positive hence identifying A (A had no responses in Experiment AM 1) R was vociferous and negative hence identifying X. All 4 individuals ended up in different groups.

Experiment AM 2 gathered additional semantic responses. The participants were supplied with a list of 28 terms which had been derived by the researcher from an analysis of her own notes and sketches as she worked on the consultancy. Participants were asked to select those terms which were consistent with their feelings and thoughts about the project which had been displayed in the video from Experiment 1 and further reinforced by a power point presentation in Experiment AM 2. Participants were also encouraged to add new terms stimulated by the power point presentation and the researchers own list. 76 new words were added. 139 choices were recorded against the fixed list of 28 terms and 94 choices on the 76 new terms. Further analysis of the data showed a number of synonymous terms and the fixed list was condensed to 26 categories. The additional terms too, were reduced to 26 categories. A similar convention is used to identify the 4 selected individuals (2 pairs) and the groups. FIG 9 summarises the data on the pre-selected terms and FIG 10 the data on the additional terms. Finally, as a consequence of seeing the site etc presented in a different medium (power point) but as a reinforcement to that shown on the video (Experiment AM 1) participants were given another opportunity to select the most important terms to describe their reaction to the images FIG 11 summarises this data.
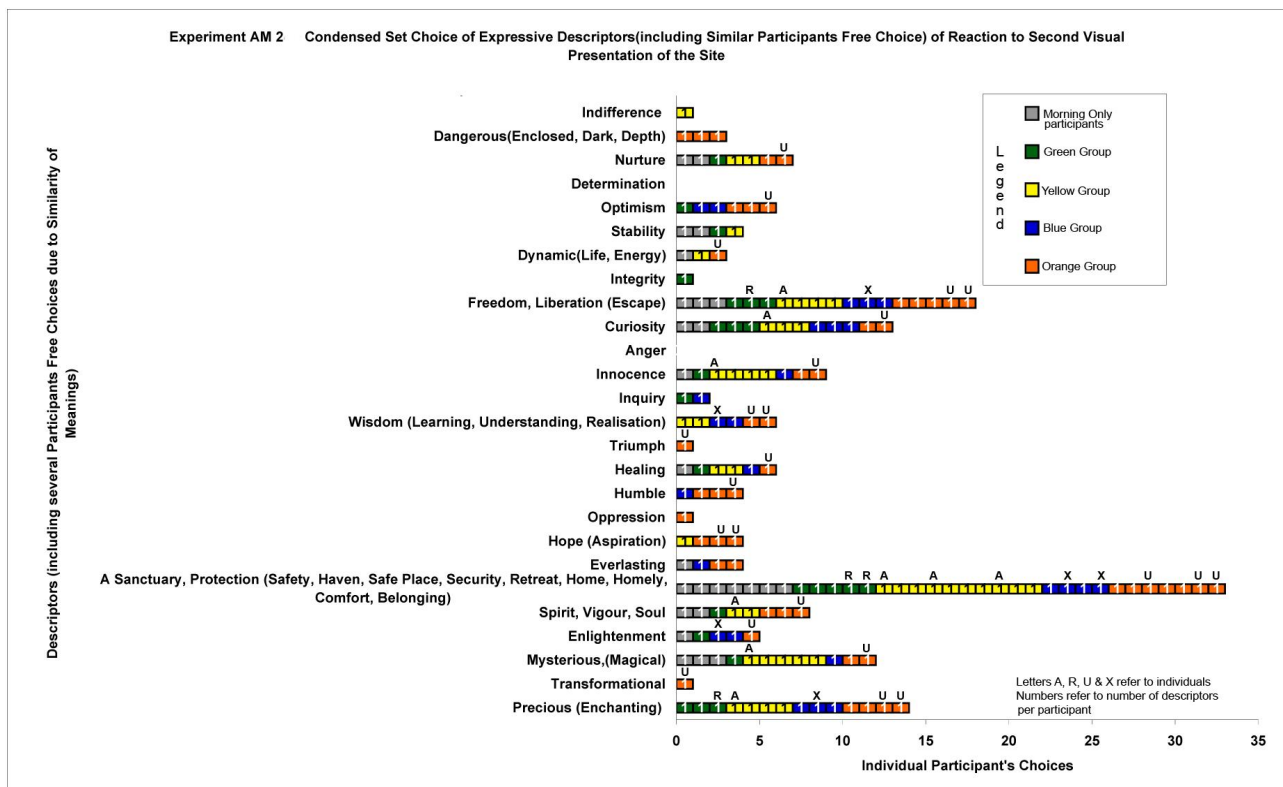
FIG. 9 Responses to Experiment AM 2, pre-selected terms

Experiment AM 2   Condensed Free Choice list of Descriptors of Reaction to Second Visual Presentation of the Site

Free Choice Descriptors(Several Grouped through similar Meanings)

Colour
Raw Perfection, Emerging Beauty
Nature, Wild, Powerful, Balance, Spirit of place – Genius Loci
Opportunity
Clean
Inspirational
Beauty
Lost, Alone
Overlooked, Under used, Unloved, Overgrown, Suspended animation
Rustic, Organic, Fresh
Awarding
Respect
Musty Smells
Scent
Delicate
Ambience
Lucy in the Sky
Tranquil, Quiet, Peacefulness, Soothing, Stillness
Potential
Connections
Pathways
Friendship, Relationships, Meeting girls and friends
Childlike, Laughter, Hide and seek, Mischief,
Adventure, Evokes exploration, Experience, Encountered spaces, Activity, Exciting,
Elation, Hidden spaces, Wonderland, Open Space
Boundaries
Memories

Indivdual Participant's Choices

Legend:
- Morning only participants
- Green Group
- Yellow Group
- Blue Group
- Orange Group

Letters A, R, U & X refer to individuals
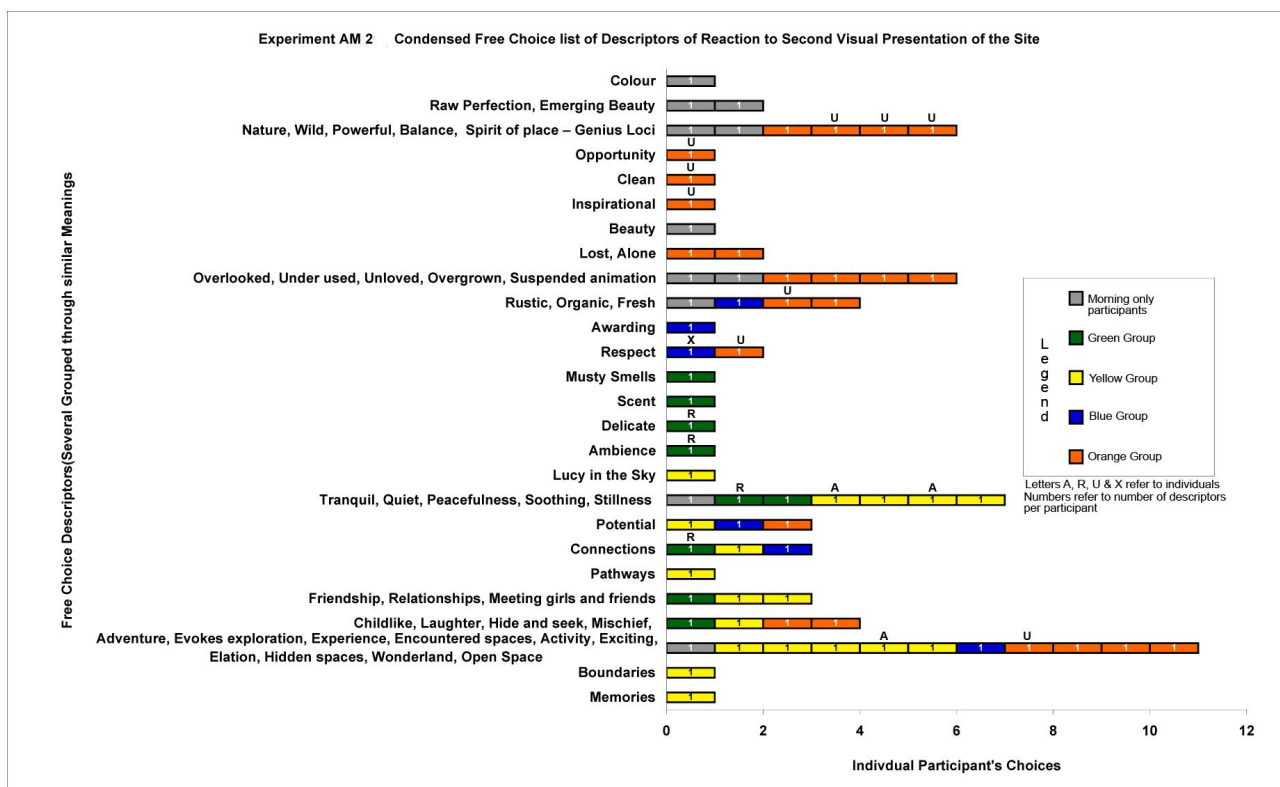Numbers refer to number of descriptors per participant

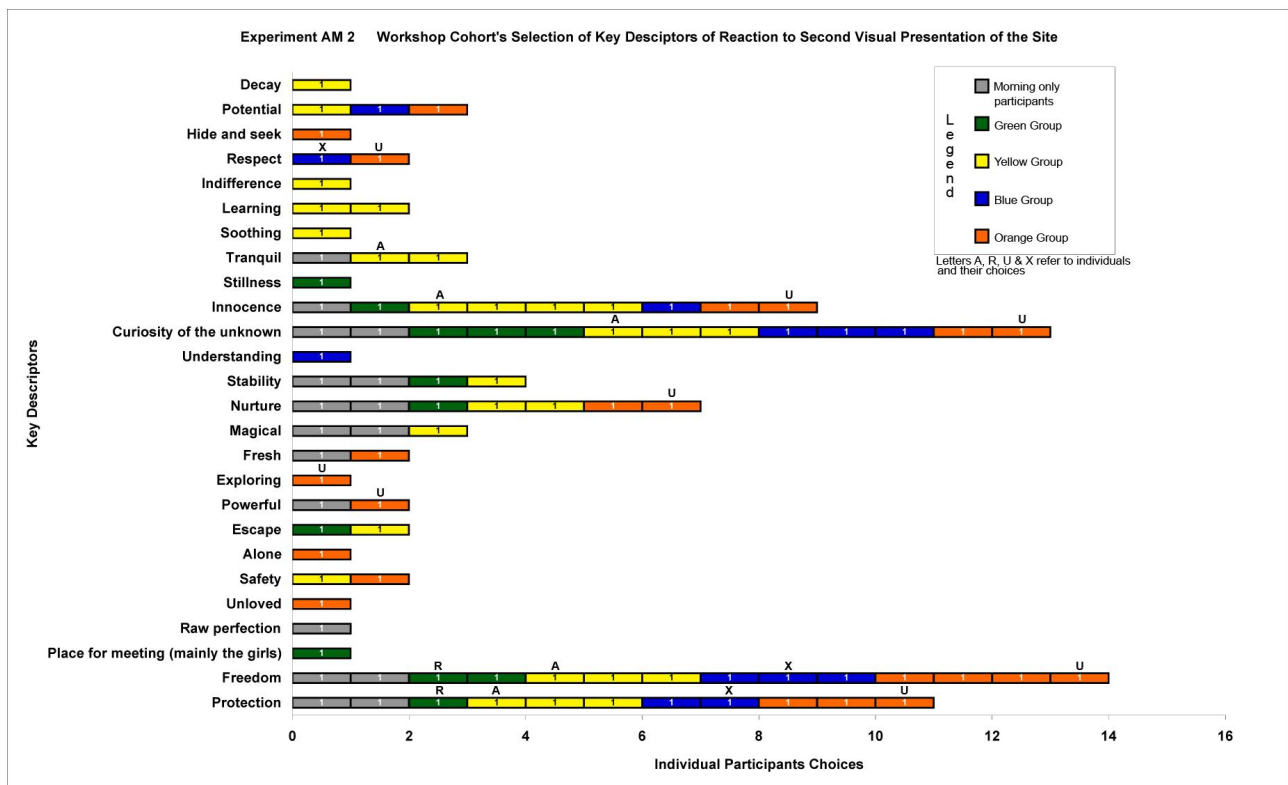FIG 10 Responses to Experiment AM 2, new free choice terms

FIG 11 Individual responses noted as a cohort response to Experiment AM 2

Experiment AM 3 was the last of the individual preparation experiments. Participants were given a list of 36 images and shown these on a power point presentation. Only two of the images (1 & 8) were specific to the project site. 4 images contained a word only (4, 11, 20, 26) the significance of which would only become apparent in the latter stages of the evaluation. All images were chosen by the researcher to act as possible stimulants or catalysts to prompt the participants design thinking in relation to colour, shape, form, materials etc in the progression of their thoughts on the development of the experimental site. Participants were asked to select only 5 images. Some selected more, FIG. 12 summarises this data.
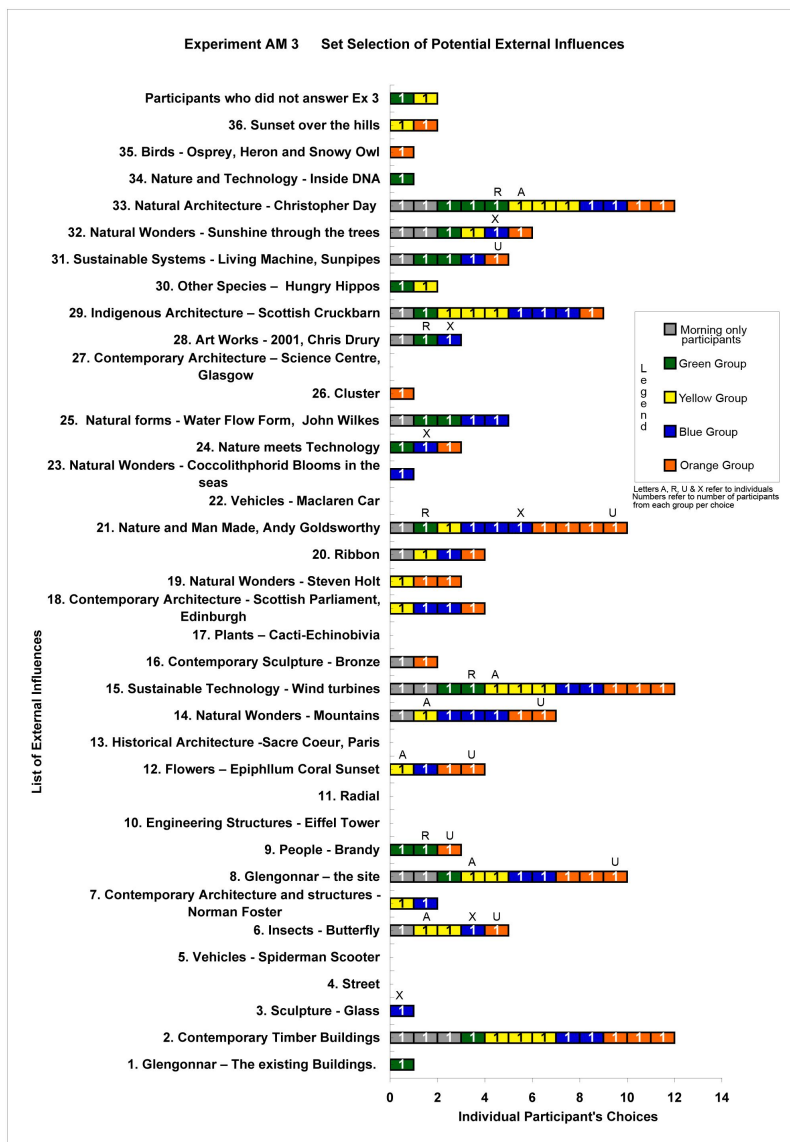
Fig 12 Responses to Experiment AM 3, potential stimulant images

Comments on Experiments AM 1, 2 & 3. - From the data gathered in these 3 experiments it is possible to draw up a profile of each of the candidates based on how they reacted to images of the site and associated images of how they might deal with the design of any new development on the site. This is summarised for the 4 selected individuals (A R U X) in TABLES 3 (3A 3R 3U 3X)

TABLE 3A

Name: **A**			Year: 3		
Sex: Female			Attendance: Morning		
			Afternoon		
Nationality : British			All day		X
Group Colour	Yellow				
Morning Exercises (Individual and Pairs					
Experiment AM 1 (Individual and Cohort)	None				
Experiment AM 2 (Individual and Cohort)					
From set list	Precious	Mysterious	Spirit (vigour, soul)	A Sanctuary	
	Protection	Innocence	Curiosity	Freedom	
Own words	Open space	Security	Tranquil	Quiet	
Experiment AM 3 (Individual)					
From set list	6.Insects - Butterflies	8.Glengonnar – the site	12.Flowers – Epiphllum Coral Sunset	14.Natural Wonders - Mountains	
	15.Sustainable Technology – Wind turbines	33.Natural Architecture - (Christopher Day			
Experiment AM 4-6 (Pairs)					

TABLE 3R

Name: **R**			Year: 4		
Sex: Female			Attendance: Morning		
			Afternoon		
Nationality: British			All day		x
Group Colour:	Green				
	Morning Exercises (Individual and Pairs)				
Experiment AM 1 (Individual and Cohort)					
Any initial thoughts on video	Surrounding town seems well off. Nice houses etc that did not connect with grounds. Entrance road (uncomfortable) – very rough and unwelcoming. Gate seems small and insignificant but it also makes you feel that you are not wanted or needed. Buildings are horrible – do not fit in with the landscape – need man made and nature to merge and blur. Mark of people noises, etc atmosphere				
Experiment AM 2 (Individual and Cohort)					
From set list	Precious	Protection	Freedom		
Own words	Belonging	Connection	Ambience	Peacefulness	
	Delicate				
Experiment AM 3 (Individual)					
From set list	9. People – Brandy	15.Sustainable Technology - Wind turbines	21.Nature & Man Made Scaur Water, Dumfriesshire Andy Goldsworthy	28.Art Works - 2001 'Rhythms of the heart' – Conquest Hospital, Hastings Heart Waves, Chris Drury	
	33. Natural Architecture - Workshop, Pishwanton Woods, East Lothian (Christopher Day				
Experiment AM 4-6 (Pairs)					

TABLE 3U

Name: **U**		Year: 4	
Sex: Female		Attendance: Morning	
		Afternoon	
Nationality: British		All day	X

Group Colour:	Orange

Morning Exercises(Individual and Pairs)	

Experiment AM 1 (Individual and Cohort)	
Any initial thoughts on video	Green, natural (a bit overgrown and unkempt)
	Feeling of being in woodland area – nature is reclaiming what humans built or developed
	Site seems surrounded by trees – feeling of being in an enclosure, yet it had a spacious layout
	Seeing traffic through gap in trees – seems to be out of place – a reason perhaps for the disuse of the centre
	Did not notice the buildings within the site (as a whole) Suppose this means they have an non intrusive quality.

Experiment AM 2 (Individual and Cohort)				
From set list	Precious	Transformational	Mysterious	Enlightenment
	Spirit(vigour, soul)	A Sanctuary	Protection	Hope
	Humble	Healing	Triumph	Wisdom
	Liberation		Innocence	Curiosity
	Freedom	Dynamic	Optimism	Nurture
Own words	Inspirational	Evokes exploration	Haven, Safe place	Balance
	Enchanting	Powerful	Organic	Clean
	Respect	Opportunity	Realisation	Spirit of place – Genius Loci
	Aspiration			
Own thoughts	Precious – Borrowed from nature, not our to harm			
	Spirit(vigour, soul) – in touch with			
	Protection – given by surroundings from every day difficulties			
	Hope – gives inner hope from oppression of cities			
	Humble(accessible) - lack of grandeur, no snobbery, no qualifications required to go there			
	Healing – fresh air etc			
	Triumph – at accomplishing tasks			
	Wisdom (evocative) - from trees			
	Innocence – because of natural qualities			
	Curiosity (evokes) – mysticism of woodlands, paths, trails etc			
	Inspirational – Integrity, Determination			
	Dynamic(s) of nature (organic) (sustainability)			
	Powerful – now nature seems to be a force which we have to respect, it was on this planet first (Respect)			
	Opportunity – to allow expression of all contained in exercise 2			
	Realisation – (of self), of outside, fresh air being beneficial to health and well being			
	Sustainability- occurs within nature itself (regeneration)			
	Spirit of place – (Genius Loci) By becoming friends with nature, Glengonnar has came into existence. The understanding of nature, what it offers us and how we can accept what nature has shown us – nature makes suggestions as to how we can develop physically and mentally			

Experiment AM 3 (Individual)				
From set list	6. Insects - Butterfly	8. Glengonnar – the site	9. People - Brandy	12. Flowers – Epiphllum Coral Sunset
	14. Natural Wonders - Mountains	21. Nature and Man Made Scaur Water, Dumfriesshire Andy Goldsworthy	31.Sustainable Systems - Living Machine Rainwater Harvesting Masonite Beams and Warmcel Insulation Sunpipes	
Own thoughts	6. Insects – who/what the site is shared with, harmony has to exist			
	9. People – consider the effect the whole experience has on a cross-section of society			
	12. Flowers – as insects			
	14. Natural Wonders – shows the power of nature			
	21. Nature and Man Made – shows the harmonious the 2 extremes can be			
	31.Sustainable Systems – examples of technology that compliment the use of natural resources			
Experiment AM 4-6 (Pairs)				

TABLE 3X

Name: X		Year: 4	
Sex: Female		Attendance: Morning 　　　　　　Afternoon All day	X
Nationality: British			
Group Colour:	Blue		
Morning Exercises(Individual and Pairs)			
Experiment AM 1 (Individual and Cohort)			
Any initial thoughts on video	Peaceful, Which deserves respect Picturesque Huts enhance the landscape don't take anything away from the beauty of the site. Existing old huts enhances the age of what was there. Sculpture		
Experiment AM 2 (Individual and Cohort)			
From set list	Precious	Enlightenment	A Sanctuary	Protection
	Freedom			
Own words	Respect	Realisation		
Experiment AM 3 (Individual)			
From set list	3. Sculpture - Glass	6. Insects - Butterfly	21. Nature and Man Made Scaur Water, Dumfriesshire Andy Goldsworthy	24. Nature meets Technology Glengonnar – The motorway and railway line, communication links
	28. Art Works - 2001 'Rhythms of the heart' – Conquest Hospital, Hastings Heart Waves, Chris Drury	32. Natural Wonders - Sunshine through the trees		
Experiment AM 4-6 (Pairs)			

Experiments AM 4, 5 & 6 were the last of the preparatory experiments conducted in the morning session. They were also conducted in pairs. Individuals selected their own working partner. In this paper, we follow individuals A, R, U & X in the pairing of A U and R X.

Following the visual presentations and the semantic data recordings in Experiments AM1, 2 & 3, individuals, whilst working in pairs were asked to note four or five key thoughts in words or sketches which they considered lay at the heart of their design thinking at that moment. The participants were reminded that this was a step towards the design of a new centre.

Experiments AM 5 & 6 shifted the exploration of ideas from words to images and models. Working in pairs, the participants were first asked to create some basic shapes and to choose colours which they felt were consistent with their word images and relevant to the design of developments on the project site. They were encouraged to use drawings and maquettes (Experiment AM 5). Finally in Experiment AM 6, the participants again working in pairs, were asked to extend their ideas into the first formation of designs for the new centre. They were reminded of the need for the development to reflect sustainability, ecological design and learning. This data was then collated and compiled and

added to the individual participant's profile. (for example see sample profile for participant A in TABLE 4) The result of the pairings can be seen in the data recorded for each individual of the pair. From these profiles it is now possible to see any areas of possible compromise or change in an individual's thinking.
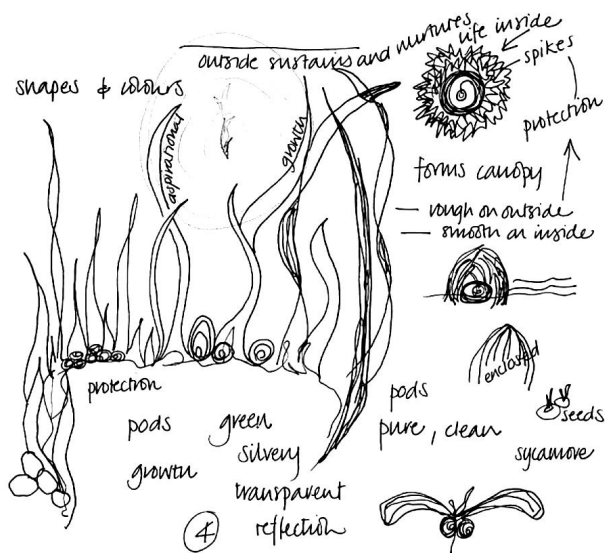
Experiments AM 4 - 6

Exercise 4-6 (Pairs)	
Name of partner:	U Orange Group
Experiment AM 4	Co-existing Inter-dependence Consideration Natural Architecture(influence) Sustainable Technology
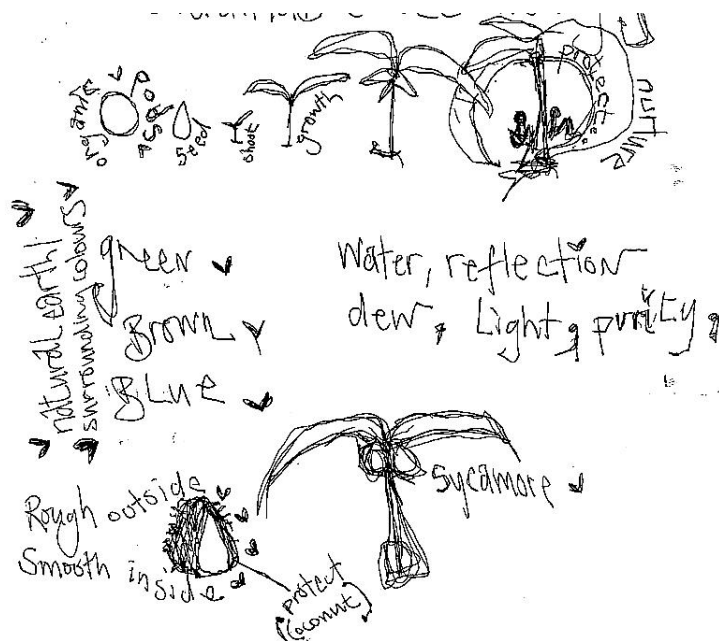
Organic pods – seed – shoot – grow – protect and nurture
Natural earth
Surrounding Colours – green, blue, brown
Water, reflection dew, light, purity
Rough outside, smooth inside - protect (coconut)

Experiment AM 4	Key Thoughts as duo Consider who/what the site is shared with Co-existence, interdependence (between humans and nature) Natural architecture - not bringing in alien materials - blends in with what's there Sustainable technology – taking advantage of nature without exploitation

Shapes and colours
Protective pods (Sycamore seeds) with rough exteriors to protect growing object within.
Colours – green, silvery/transparent and reflective
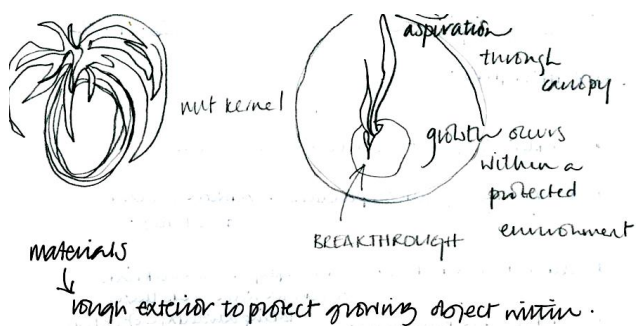
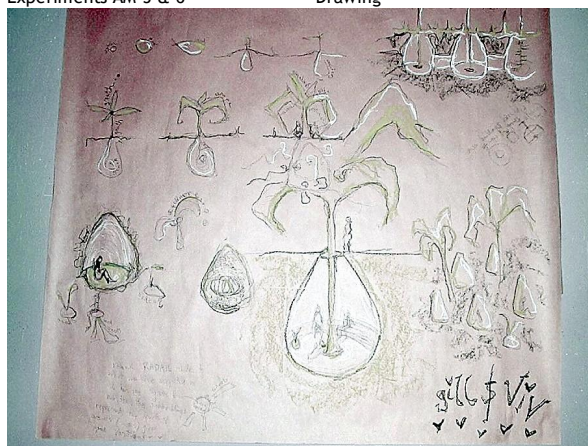Experiments AM 5 & 6   Drawing


TABLE 4 Profile for Participant A

At the end of the mornings' experiments and whilst the participants were still working in pairs, the opportunity was taken to make the transition from preparation to evaluation and from individual/pairs to groups. 4 models (see FIG 13) resulting from the initial consultancy (Part 1) were placed centrally to the working participants. In this first afternoon experiment, participants were asked one question only – "which model best expresses your ideas and thoughts at this moment?' The results of 21 choices are shown in FIG 14, 3 participants did not choose a model at all and 2 participants could not decide between two of the models. In this latter case their vote was divided into 2 half votes. Despite the fact that these were individual choices, both members of our selected pairs chose the same model i.e. A & U chose Radial. R & X chose Cluster. We will return to these results later.
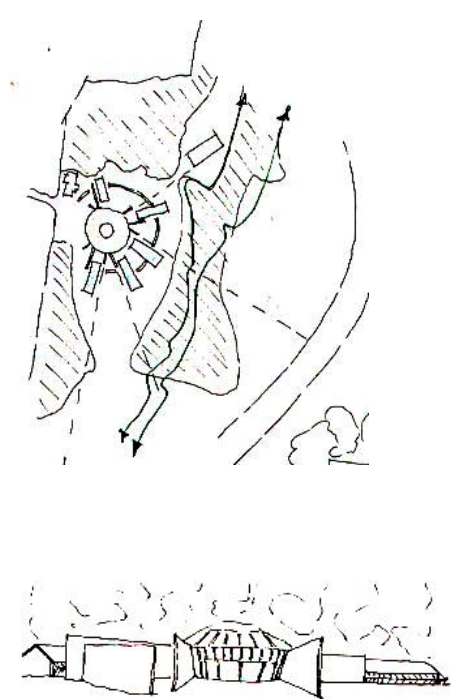
Radial Model
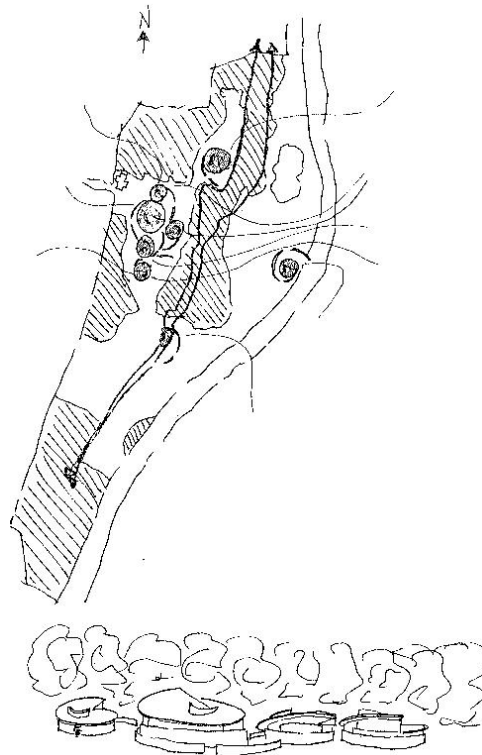
Cluster Model
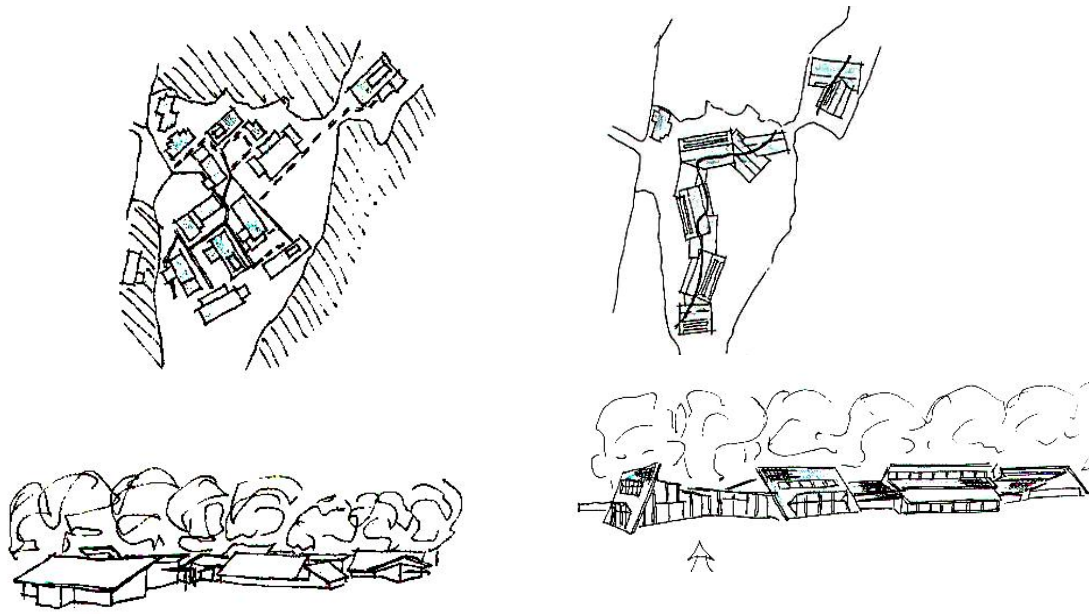
Street Model   Ribbon Model

FIG 13 Sketches of the 4 models – Radial, Cluster, Street & Ribbon
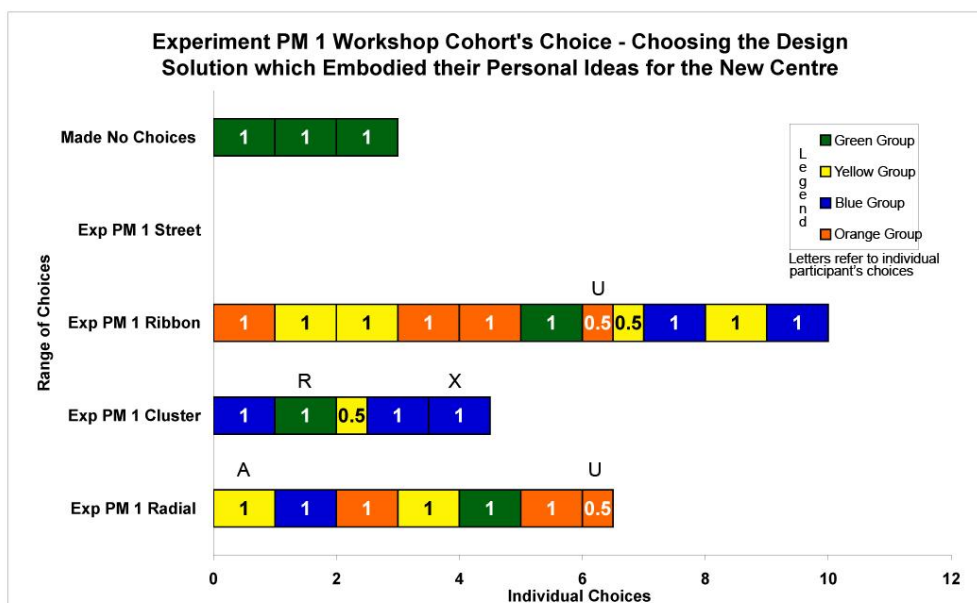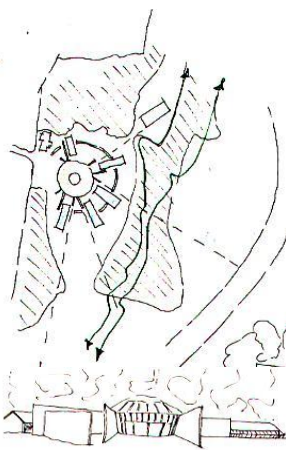

FIG 14 Response to Experiment PM 1, model choices

EVALUATION EXPERIMENTS (AFTERNOON EXPERIMENTS PM 1 – 6)

For the group studies (Experiment PM 2 & 4) participants were randomly allocated to one of the 4 groups. Each group was then randomly allocated one of the 4 models shown in Experiment PM 1. In addition to the information(generic) provided to all candidates in the morning experiments, groups were now provided with additional data specific to the model (Radial, Cluster, Street & Ribbon) that they had been allocated. All participants were then provided with a proforma related to their model. Then, as a result of their mornings' work each individual had to choose 5 keywords which encompassed their overall responses: 2 colour responses: 2 choices based on shapes and a choice between model and drawing. Sample proformas for our original candidates are shown in pairs in FIGS 15 & 16. (following page)

Experiment PM 2 Personal Appraisal of Radial Design	Personal Choice – Words	On a scale of 1-7 tick the box that represents the Reaction of Personal Choice to Radial Design								

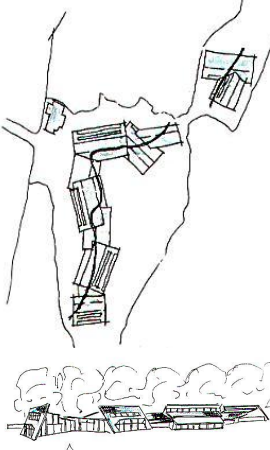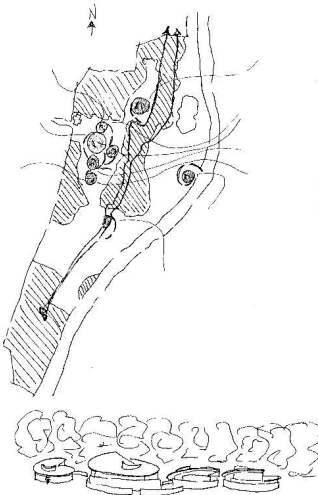| Personal Choice – Words	Strongly Agree	1	2	3	4	5	6	7	Disagree
1 Growth Community	Strongly Agree		2 X	3	4	5	6	7	Disagree
2 Communication Growth	Strongly Agree		X						Disagree
3 Development Protection	Strongly Agree		X						Disagree
4 Protection Learning	Strongly Agree		X						Disagree
5 Nurture Stability	Strongly Agree		X						Disagree
Personal Choice – Colour									
1 Brown Earth	Strongly Agree	1	2 X	3	4	5	6	7	Disagree
2 Green Land	Strongly Agree		X						Disagree
Personal Choice – Shapes									
1 Organic Circular	Strongly Agree	1	2 X	3	4	5	6	7	Disagree
2 Linear shoots Geometric	Strongly Agree		X						Disagree
Personal Choice – Model/drawing									
1 Radial	Strongly Agree	1 X	2 X	3	4	5	6	7	Disagree

Experiment PM 2 Personal Appraisal of Ribbon Design	Personal Choice – Words	On a scale of 1-7 tick the box that represents the Reaction of Personal Choice to Ribbon Design								

Personal Choice – Words	Strongly Agree	1	2	3	4	5	6	7	Disagree
1 Spirit	Strongly Agree	1	2	3	4 X	5	6	7	Disagree
2 Freedom	Strongly Agree		X						Disagree
3 Dynamic	Strongly Agree		X						Disagree
4 Liberation	Strongly Agree			X					Disagree
5 Sanctuary	Strongly Agree			X					Disagree
Personal Choice – Colour									
1 Green	Strongly Agree	1	2	3	4	5	6 X	7	Disagree
2 Silver	Strongly Agree				X				Disagree
Personal Choice – Shapes									
1 Tall, willowy	Strongly Agree	1	2 X	3	4	5	6	7	Disagree
2 Circular, rounded	Strongly Agree				X				Disagree
Personal Choice – Model/drawing									
1 Ribbon or radial	Strongly Agree	1	2	3	4	5	6	7	Disagree

FIG 15 Sample proforma for Radial and Ribbon models, Participant A and U respectively.

Experiment PM 2 Personal Appraisal of Cluster Design	Personal Choice – Words	On a scale of 1-7 tick the box that represents the Reaction of Personal Choice to Cluster Design								
	1 Preciousness	Strongly Agree	1	2 X	3	4	5	6	7	Disagree
	2 Freedom	Strongly Agree			3 X					Disagree
	3 Protection	Strongly Agree		2 X						Disagree
	4 Growth	Strongly Agree				4 X				Disagree
	5 Learning	Strongly Agree		2 X						Disagree
	Personal Choice – Colour									
	1 Frosty	Strongly Agree	1	2 X	3	4	5	6	7	Disagree
	2 White	Strongly Agree	1 X							Disagree
	Personal Choice – Shapes									
	1 Strips	Strongly Agree	1 X	2	3	4	5	6	7	Disagree
	2 Cluster (curves)	Strongly Agree		2 X						Disagree
	Personal Choice – Model/drawing									
	1 Cluster	Strongly Agree	1	2	3	4	5	6	7	Disagree

Experiment PM 2 Personal Appraisal of Street Design	Personal Choice – Words	On a scale of 1-7 tick the box that represents the Reaction of Personal Choice to Street Design								
	1 Protection	Strongly Agree	1	2	3	4	5	6	7	Disagree
	2 Overpowering	Strongly Agree								Disagree
	3 Dynamic	Strongly Agree								Disagree
	4 Cluttered	Strongly Agree								Disagree
	5	Strongly Agree								Disagree
	Personal Choice – Colour									
	1 Natural	Strongly Agree	1	2	3	4	5	6	7	Disagree
	2	Strongly Agree								Disagree
	Personal Choice – Shapes									
	1 Angular	Strongly Agree	1	2	3	4	5	6	7	Disagree
	2 Variation	Strongly Agree								Disagree
	Personal Choice – Model/drawing									
	1	Strongly Agree	1	2	3	4	5	6	7	Disagree

FIG 16 Sample Proforma for Cluster and Street models, Participant R and X respectively

Then, in groups the participants had to resolve any differences and conclude with a group choice of keywords, colours, shapes etc. The sample for the Green Group is shown in FIG 17.
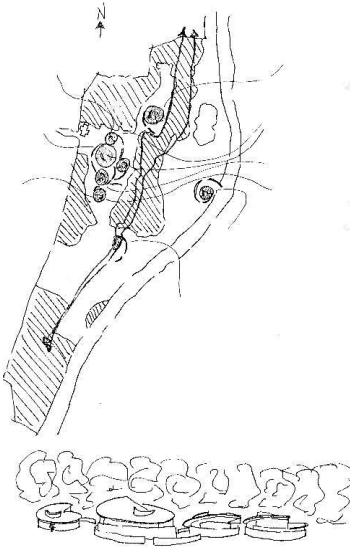
Experiment PM 2 - Green Group Group Appraisal of Cluster Design	Group Choice – Words	On a scale of 1-7 tick the box that represents the Reaction of Group Choice to Cluster Design								
	1 Connection	Strongly Agree	1	2 X	3 X	4	5	6	7	Disagree
	2 Sanctuary	Strongly Agree			X					Disagree
	3 Sustainable	Strongly Agree		X						Disagree
	4 Freedom	Strongly Agree		X						Disagree
	5 Growth	Strongly Agree	X							Disagree
	Group Choice – Colour									
	1 Brown	Strongly Agree	1	2	3	4 X	5	6	7	Disagree
	2 White	Strongly Agree		X						Disagree
	Group Choice – Shapes									
	1 Curve	Strongly Agree	1	2 X	3	4	5	6	7	Disagree
	2 Fractal	Strongly Agree		X						Disagree
	Group Choice – Model/drawing									
	1	Strongly Agree	1	2	3	4	5	6	7	Disagree

FIG 17 Sample proforma for Cluster model, Green Group, Participant R.

Experiment PM 3 is not reported here.

Experiment PM 4 returned to the use of words and word pictures this time using the method of semantic differentials. The data here is also extensive and not reported on here.

Experiment PM 5 returned to the question of choice. After having worked in groups, the individual participants were then asked again to make a choice of one model out of 4, this time based on the question – " Which model do you think is the most appropriate choice for the new centre on this site?"

The results are shown in FIG 18 and can be usefully compared with the choices made earlier in FIG 14
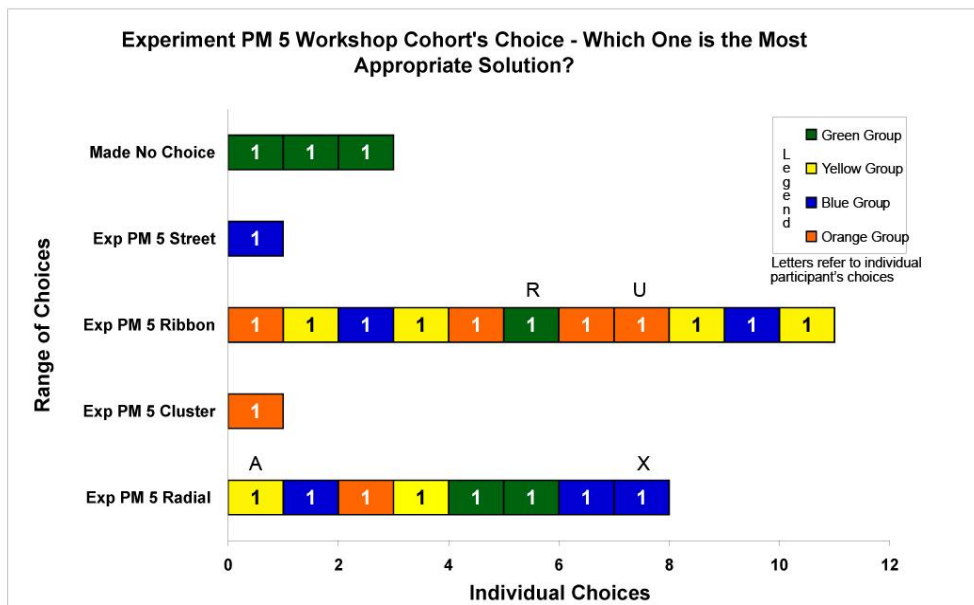
FIG 18 Responses to Experiment PM 5 model choices

The most important characteristic of FIG 18 is now the clear division of participants into only two models – Radial and Ribbon. The re-distribution is not simple however i.e. all candidates originally in the main choices – Radial and Ribbon did not necessarily stay within this choice. Out of the original 4½ choices in Cluster, 3½ went to Ribbon and 1 to Radial. One migrated from Ribbon to Cluster, and one from Ribbon to Radial. Apart form the possibility that working in groups might tend to reduce the variance of choice it is also possible that participants believed that Ribbon & Street were similar and Ribbon was better and that Radial & Cluster were similar and Radial was better. If the choices are now aggregated into 2 categories, Radial + and Ribbon+ then the scores are almost equal. This might suggest in the end that there are 2 different but equally preferred choices or that there was little variation from chance i.e. the scores are 9 & 12 from a random mean score of 10 ½. One final question arises from Experiment PM 6, the result of asking the question, "Which scheme (model) do you think the client would choose?" The results are shown in FIG 19 and they too can be compared with FIGS 14 & 18

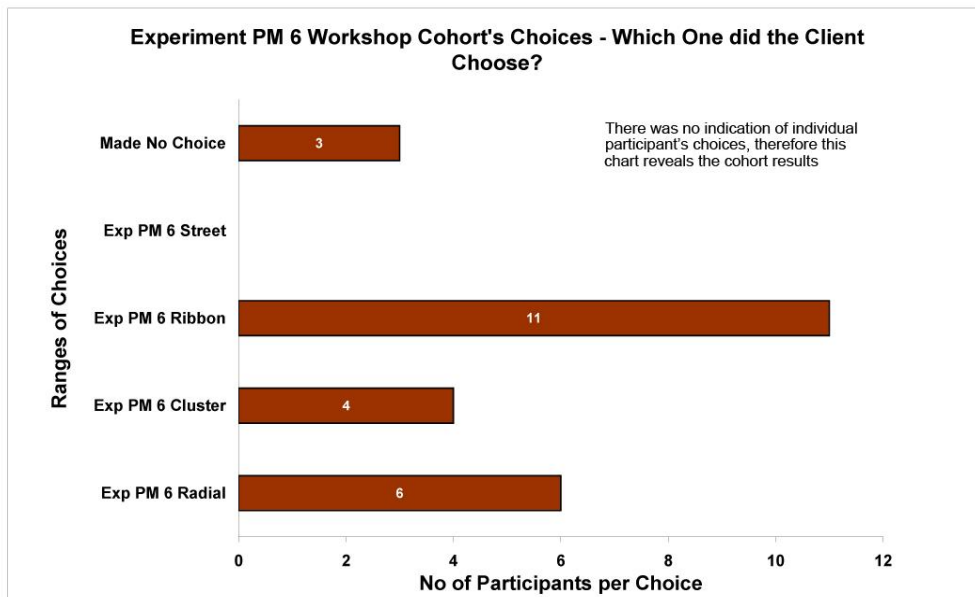**Experiment PM 6 Workshop Cohort's Choices - Which One did the Client Choose?**

FIG 19 Responses to Experiment PM 6, model choices

PROVISIONAL CONCLUSIONS

EVALUATION

There are some who would argue that such an evaluation test is not necessary for this type of project; that it is sufficient for the client(s) and advisor(s) to make the choice. We do not entirely agree, although we do agree that the client should make the final decision. Many products from foods to fast cars undergo some form of 'product' evaluation or market testing and although it would not be possible to build actual buildings just to validate choice, evaluation could occur at some prototypical stage. e.g. conceptual designs. We also have some anecdotal evidence from a small sample of practitioners involved in this kind of building design work, who have indicated an interest in a possible early design method of evaluation. We also know that, from conception to completion(in this case a finished building) the cost of making changes escalates as the project proceeds. Furthermore, although post-occupancy evaluation (POE) is a useful technique to be applied after the building is built, it can not accommodate major changes in design. What is needed is a relatively lost cost, rapid and reliable technique of evaluation which can be applied as early as possible in the design process

and which provides useful additional information in the making of choice decisions. This information does not, of course, replace the final decision by the client but, we would hope, makes for a more informed decision making process. In this study, the participants become a consensual evaluation tool. Because of the additional educational objectives, participants were drawn from design students but if the technique is promising then other groups should be explored and compared.

However the results of this preliminary study, though not yet fully analysed, are interesting but not conclusive. What is clear is that a cohort of participants (c20) do arrive at clear choices, and not as some would think, an almost equal distribution of choice, on the assumption that 'everyone in different'. The procedure of moving from individual to pairs and then groups does affect choice and as the process becomes more consensual the variation in choice is reduced. In this case from four models to two. The final two schemes, Radial & Ribbon appeared to be equally favoured. They also confirmed the clients choice i.e. Radial. However, now the client has the opportunity to reconsider the original decision i.e. Radial, in relation to a direct comparison with Ribbon. Here then the client and advisors need to clearly articulate why they think one scheme is better than the other, (not why one is better than 3 others which has already been done at least superficially.) In this instance, this may not be difficult because the client will probably draw on additional information not made available to the evaluators. Nevertheless, with a more precise articulation of why the final choice was made, data then becomes available which can later be compared in a post-occupancy evaluation. We also suspect it raises confidence in the decision making process of expensive projects.

Our study also suggests that, if the final groups only consist of 4 or 5 participants who are already known to each other then the use of pairs may not be a necessary part of the process.

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