“Good sense, good design: Interior design in dementia accommodation”

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“Enriching the Lives of People with Dementia”
The 6th Biennial International Conference, 29-30 June, 2006
Introduction

- Dementia-specific design: about accessibility, safety & security
- Colour & Colour Contrast – widely used as cueing strategy + safety ......
- ..... only effective when sufficient Light to perceive Colour
- Minimal light … colour is ‘greyed’ (tone)… spaces & objects less identifiable
- Consequently, colour strategies diminished if tonal relationships are inappropriate
- Reduced visual ability - difficulty in daily tasks
- Persons with dementia of the Alzheimer’s type - have disruption to basic visual capacities
- Canvass Colour & Tonal Contrast and Lighting in Dementia Accommodation
Colours Vision & Perception

- Colour Vision - many variables…..
  - stimulus itself; other stimuli in field of view;
  - other stimuli recently viewed; size & shape of object viewed;
  - stationary or moving; memory of colour &
  - visual abilities of the observer!

- Visual Field - Yellow (20º in from peripheral), Blue, Red then Green within a 40º cone

- Reduction of visual field with increasing age - red and green more important?

- One Research Study reports selective disruption to visual capacities (Cronin-Golomb, 1995):
  e.g. depth perception; contrast sensitivity & colour discrimination
  - it is suggested that difficulties in activities in daily living may be attributable to specific visual dysfunction e.g. problems in spatial orientation & locomotion may be related to deficient depth perception
Common strategy in many dementia-specific facilities: highlight/landmark toilet doors with colour and/or pictures/pictograms …. object is for a resident to find the toilet by themselves.

Success of these strategies is contingent upon:

- level of cognitive decline; visual ability of the person;
- ability to identify colour; contrast between door and architrave;
- contrast between door and handle; recognition of picture/pictogram
- contrast of picture/pictogram with the door
- amount & type of available natural or artificial light?
- time of day?, sunny or cloudy?
- level of glare & resultant disruption to visual functions

As for cognitively intact people, colour and tonal contrast in the environment can be both guiding when correctly used, and confusing when misused.
Some researchers have investigated Colour Vision for people with dementia of Alzheimer's type - the research is minimal and the studies have all been small.

A small study (24 people) reported that people had their colour sense intact regarding:
- colour identification and memory of common colour names
- ability to discriminate between various kinds of small colour differences
  
(Wijk & Sivik, 1995)

In a further study (50 people) researchers found:
- discrimination ability better in yellow and red area and for lightness differences
- cognitive decline had a significant impact on naming mixed colours and using elaborate colour names
  
(Wijk, Berg, Sivik & Steen, 1999)

And as stated earlier, another researcher reported selective disruption in contrast sensitivity & colour discrimination
  
(Cronin-Golomb, 1995)
The findings are of the studies into Colour Vision are inconclusive and in some cases they are conflicting. All researchers advise that further research is required with larger numbers of participants to verify the findings. However, the early results are of interest - they suggest that, in the absence of conclusive or definite findings, good sense should prevail and that we should use caution when specifying colour in dementia accommodation.
Lighting

- Light essential for the perception of colour
- Sight - most important sense for acquiring information
- People with partial sight (low vision) receive distorted or disturbed visual pictures
- Incorrect inferences/incorrect behavioural responses: because of too much, too little or wrong type of light in the environment
- Safe & comfortable visual environment depends mainly on: avoidance of excessive illuminance variations; absence of direct glare; appropriate luminance distribution; light sources with suitable colour characteristics

- **AS1680.2.0:1990** (Australian Standard, Interior Lighting, Part 2: Recommendations for specific tasks and interiors) - missing from the Standard - recommendations for Nursing Homes, Hostels & Retirement Living
- **AS1680.0:1998** (Australian/New Zealand Standard, Interior Lighting, Part 0: Safe Movement) – again, no specific lighting design guidance
In the absence of ‘Specific Lighting Guidelines’ for aged care accommodation - good sense should prevail.

No excuse for ‘bare’ lamps shining into the eyes of residents from either ceiling, wall mounted or any other type of light fitting.

Many facilities now ‘high care’ - residents confined to bed, flotation chairs or similar: face the ceiling a great deal of the time.

Installation of light fittings shining into peoples eyes: inappropriate, irresponsible.

Dimmers? - not good enough to suggest that lighting can be controlled by dimmers - experience shows that rarely occurs - staff have neither the time or would forget - residents are still facing ‘bare lamps’.

Mobile residents are just as affected: glare introduces problems of light & dark adaptation - leads to incorrect inferences & responses, placing residents at risk.
Good Sense, Good Design: Interior Design in Dementia Accommodation

Lighting

- Luminaire (Light Fitting) Design - the majority is very low standard - little thought give to people with visual handicap of any sort.
- Very few Luminaires comply with the ‘low glare/no glare’ requirement
- Examples from: RP-28-98 ‘Lighting and the Visual Environment for Senior Living’
  ANSI: Approved American National Standard

Figure 1
Pendant + Cove Lighting

Figure 2
Pendant Lighting

Figure 3
Pendant + Cove Lighting
Lighting

Figure 4
Appropriate Lighting?

Example from: RP-28-98 ‘Lighting and the Visual Environment for Senior Living’
ANSI: Approved American National Standard
Light Fittings
Tonal Contrast

- Tone is the lightness or darkness of a Hue (colour) – creates relationships between elements in the environment i.e. Tonal Contrast (also known as Luminance Contrast).
- Luminance Contrast: defined as the luminance difference between a task detail and its background (Bright, Cook & Harris, 1997).
- Where luminance contrast (tonal contrast) is minimal or non-existent between two colours - boundaries of elements become blurred and/or unrecognisable.
- Minimising or maximising of tonal differences between adjacent surfaces can therefore be either a positive or negative strategy!
- Tonal relationships are not necessarily obvious to the human eye when two colours are viewed together.
- Tonal difference or lack of it can generally only be confirmed in ‘grey-scale’.
How can Tonal Contrast be ‘tested for’ for current or future Projects?
Tonal Contrast

“VISUAL TESTING”

- Most basic test (shade & shadow testing) - view ‘adjacent’ samples under different light sources and low levels of light - provides an indication - requires verification
- Photocopy samples - basic…. provides an indication - requires verification
- Scan samples - input into suitable computer programme - provides good indication
- Digital photograph (no flash, using different electric light sources or only daylight) - input images onto suitable computer programme - again, provides clear indication of tonal relationships
- Monochrome images of an interior demonstrate that as light levels, light sources or light direction changes, the degree of difficulty in recognising objects increases or decreases accordingly.
- Interiors are dynamic - the specification of colour, colour contrast and tonal contrast need to take account of continually changing light conditions both natural (daylight) and artificial (electric light)
Tonal Contrast

Figure 7
Colour Contrast

Figure 7A
Tonal Contrast
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Sunset ‘Contrast’
Sunrise ‘Contrast’
**Tonal Contrast**

- Appropriate ‘Tonal Contrast’?
- e.g. ..... what level of tonal contrast (i.e. difference) between adjacent flooring materials would be permissible so that travel would not be impeded? ........ Unknown!
- **Research Question:** what are the minimum/maximum levels of tonality between adjacent interior elements which provide appropriate resolution under varying light conditions?
- **Research Question:** what is the method of accurately measuring the tonality levels?
- When answers are provided to those two questions, the guesswork will be taken out of interior design in dementia-specific accommodation
- Until then ..... good sense and considered judgement prevails ........ err on the side of caution ...... provide maximum and minimum levels as appropriate where ever considered appropriate.
Residents disabled by reduced cognition, mobility & visual ability

No Lighting Standards specifically for Aged Care environments - in their absence *good sense* must prevail - do not specify lighting (interior or exterior) which incorporates lamps (light bulbs) which shine into the eyes of residents

Specification of inappropriate lighting causes both disability and discomfort glare

The interior environment is dynamic - light conditions are continually changing ……

**COLOUR** Contrast strategies: assume standard colour vision & perception - they are dependant on ‘appropriate’ lighting (natural or artificial)

**TONAL** Contrast strategies are *good sense*: they recognise diminished visual ability and are far less dependent on the prevailing light conditions

Research into the specification of Lighting and Colour should be a priority - the standard of the specification of both has a direct impact on the quality of the daily living experience of people in dementia accommodation