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Visual Environments for Visual Thinkers

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Abstract

The paper explores the fundamentals of microenvironment as essential for learning visual thinking in Architectural Schools dealing only with visual thinkers. The admission to the architecture constitutes screening the candidates to ensure 100% visual thinkers. They use visual images and vocabulary in design thinking. The research talks about the environmental and behavioral impact of an advertisement on achieving a specific objective. The similar media are experimented with the methodical use of the visuals as tools for creating a behavioral environment influencing the quality learning for visual thinkers in an architectural education institute. The visual medias are methodologically used to map the impact of environmental factors on the quality learning for visual thinkers in an architectural education institute.

Keywords: Educational environment; learning environment; environmental stimulus; visual learning

1. Introduction

Cognition is the unique phenomena that have brought the development in a particular direction influenced by the surrounding environment. Thinking is a cognitive process in response to the learning environment. It is a complex phenomenon that draws the relevant database from memory. Thinking is defined as a set of mental abilities based on various factors like knowledge, judgment, reasoning evaluation and visuals generated from the environmental behavior. Thinking is further categorized as critical, analytical, higher order thinking, lateral to vertical thinking, positive – negative thinking, conscious or unconscious, creative thinking - linguistic thinking, visual thinking. The

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paper also recommends improvisation of the environment and its visuals in the surrounding built and unbuilt spaces and information to improve the cognition. The pace of technology change for better quality of life is far ahead of the educational pedagogy. Thus arise the need for including innovative, high impact environmental approach for visual thinking methods in architectural education through its inherent built and unbuilt spaces.

2. Visual thinking

Visual thinking is termed as - spatial thinking/ pictorial/ right brain thinking and learning that happens with visual information processing. The visual memory is based on analysed visuals and the memorised information as visuals, graphics, pictures etc.. The brain thinks in a set cognitive patterns and needs to be stimulated to make it work defiantly / efficiently / creatively. The entrance exams for various creative and design courses screen the visual thinkers. If the group is of visual thinkers then enhancing visual thinking ability and capacity is to be enhanced. There are two types of visual thinking 1) Generated by memory 2) Generated by abstraction. (Anaheim 1993). The subjective experiments and explanations from stated the daily thinking is based on the formation and transformation of visual images (Ferguson 1977, Cooper 1990, Arnheim 1969, McKim 1980 & Shepard 1986). There are three examples to explain the role of the environment where visuals make a strong impact.

Example 1 - (Visual + sound + story) – India with its diversities of culture, tradition, taste and most importantly, food (spices) from Kashmir to Kanyakumari, likes Maggi [instant noodles] as an instant snack which is not as exotic as the regional dishes. Liking for Maggie is purely due to the impact through visuals and sound made by advertisements in the brain that makes it a national snack.

Example 2  - (Visual + Different Sound / Teacher’s Voice). There is a general observation that most students look outside the classrooms when the teacher is teaching. This is also observed while reading uninterested contents, contents to understand or to memories. But this does not happen when the inputs are visual with sound to enhance the message and voice to specify the contents and the message, i.e. a virtual experience from the real-time input resulting in more depth and out of the box, unconscious thinking, which would not have been possible in a conscious way. Detailed studies done by Scientists (Koestler 1964, Miller 1984, and Shepard 1978, 1988) stated the role of mental imagery as an essential way to key discovery or insight.

Example 3 - (Visual graphic and a short memory with long-term impact) – The increasing business competition, there is an increase in propagation / promotions through advertisements. The advertisement media like hoarding, street light poles, bus stops, monopole display, digital display, vehicle display contribute to the general environment with strong visuals having a different contact exposure. Even though, the contact exposure is minimum due to various factors the impact factor is high to keep the industry operative and grow (Ogilvy 1985). The impact factor of these visuals could be a source for the educative purpose also, which is unexplored.

3. Visual environment

The Environment is shaped by the proximity of living and nonliving belongings, and then the individual is then shaped by the Environment (Khandwalla - 2008). Numerous researches in physiology are undertaken to identify the impact factor of the environment for learning. Observation is the basic teacher, for an individual, and he keeps evolving from the number of observations he makes. Approach to the physical environment plays the role of the third teacher in early childhood days. (Reggio Emilia -1998). At childhood days, individuals are more creative. Hence, to nurture creativity even in adolescence and adult environment will play a strong role of teacher for visual thinkers. The variation starts from the factors affecting our imagery in terms of size and shape of the surrounding enclosures, openings & voids, comforts, visual of space and visuals in space.

4. Visualization tools at institutes

Visualization could be developed on two levels at an individual work level and institutional level. The input can vary depending on every individual, based on exposure and personal interest, hence biased. Whereas at institute level the serving could be qualitative, quantitative and focused is restricted to teaching hours only. The various learning tools incorporated for teaching hours are the lectures, writing boards, projectors, interactive multimedia
etc.. The virtual media retain the attention of students for a long time and provide information in a detailed and elaborated way, causing a strong impact in terms of visuals and imagery. Hence, this media is becoming more popular to promote student's capability for understanding the subject. Method of utilising the non-teaching hours at the institution for qualitative and quantitative inputs is not available. The non-teaching hours are less as compared to the teaching hours hence the impact factor of the visual media or advertising can also be explored for qualitative, quantitative and focus with a short exposure and long-term impact. This could involve assessing the spaces and impact spaces, classification of the media contents to create best possible focused educative impact.

5. Building Visual Thinking for Architecture Design Process-

The design learning process is to express and present i.e. externalize the cognitive thinking by introduction of the environment and its behavioural impact through visual stimulus to enhance the learning environment essential for visual thinkers. The Architecture students mainly use the cognitive ability to generate a concept and express. The process of designing, if not externalized and intervened by the external stimulus results in design learning process based on only cognitive abilities. The development of design in the learning process based only on cognitive abilities is not an appropriate one. There is scope for improved cognitive skills, creative stimulus, and other external interventions for an improvised learning through micro environment its imagery and visuals.

Thus, the teaching and learning hours contributing the cognitive abilities through the conscious efforts and non-teaching hours contributing the development of higher level cognitive and visual thinking unconsciously through the environment makes a perfect blend for an architectural learning environment. The environment for architectural learning is to nurture in an individual, quality of perception, to incubate, to illuminate when required and to verify as and when expressed. The need for such environment is more in new educational system because of emergence complex and multiple paradigms. The scope has to go beyond problem-solving to innovative thinking, thus to solve the problems in the most fluent way, having an original and novel touch to creativity (Gilford 1967). The Environment contributing visual learning helps development of all four parameters essential of creativity i.e. Perception, Incubation, Illumination and Verification.

Creativity learned and expressed through derivation from visuals is an advanced stage of creative cognition approach to learning environment. The Environment with visuals for learning visual thinking acts as a pull towards learning and also as a push towards learning (Tauru & Nagui 2009).

![Design Process Diagram](image)

Fig. 1. Architecture design process.
Source: Tauru & Nagui 2009

Hence, the aim of research is to understand the role of the environment created for learning visual thinking in building cognition for the architectural design students. The methodology of the research further highlights the objectives of research for understanding the cognitive skill building through built un-built spaces in conscious and unconscious ways.
6. Methodology

Three methods are used to understand the impact of the environment on visual learning and its response, i.e. feedback from students, observations and analysis of the experimental exercises. The experimental exercises focused on the visual environment are adopted from the doctoral research intended to understand the pull & push factor in the design process. The database of experimental exercises is generated for the above exercises from National, Regional and Local levels institutes to analyse the following -

- To analyse the impact of visuals an essential component of the un-built environment by the recall.
- To analyse cognition learning abilities while reproduction.
- To analyse the relation between contents/information and location in and microenvironment.
- To analyse the efforts in creating the environment for visual learning at the individual level and its manifestation.
- To analyse the selection of visuals from the environment to set a guideline for framing new environments.

6.1. Experiment - 1 (impact of visuals an essential component of un-built environment by the recall)

A random selection of thirty-five students was done to undertake the mapping of the phenomenon of visual and imagery recall without explaining the objective, from 10 hoardings on their way from place of residence to the College i.e. general un-built environment. The same students were asked to list the visual and imagery displayed in the college campus i.e. microenvironment. The results showed no significant difference in the analytical scores.

The same group of students was later shown random visuals of ten hoardings and ten notice boards in the audio visual room by projection. Here they could recall some hoarding images [the environment] than the college [micro environment] displayed images. The tabulated results demonstrate a high score of 60-80% for the recall from the hoardings and 40-60% of college display. The most common reason specified was the frequency, size, colour and interesting visual of the hoarding as compared to the displayed images of information posters and brochures, etc.

The same experiment was carried out again two days later with the same group of students to recall from ten hoardings [environment] and ten notice boards [micro environment]. This time a significant difference was observed in concurrence with the result of the second Experiment - I second attempt

6.2. Experiment - 2 (cognition learning abilities while reproduction)

The experiment (6.2.1) conducted in institutes [micro environments], where students were asked randomly to sketch five elevations for an architectural building, residence, hotel, museum, and building of their choice. In the second stage, they were asked to name the most inspiring building in the above-said categories. The experiment analyzed for the results.

![Fig. 2. Work sheet of experiment.](image-url)
6.2.1. Observation 1  
87.4% students sketch the elevations similar to the most inspiring building [micro environment / build spaces] to them. They have a deeper impact of cognition on their minds and at first instance, the same was expressed. The same results were further correlated to the experiment (6.2.2).

Table 1. The variety of visual display in different zones in college.

<table>
<thead>
<tr>
<th>College</th>
<th>1</th>
<th>2a</th>
<th>2b</th>
<th>3a</th>
<th>3b</th>
<th>4a</th>
<th>4b</th>
<th>5a</th>
<th>5b</th>
<th>6a</th>
<th>6b</th>
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<td>College B</td>
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</table>

Legend - 1 – Inspiring College Building, 2a – Paintings in college, 2b – Paintings replacement frequency, 3a – Display are of soft boards, 3b – frequency of change in months, 4a – Teacher's cabin display, 4b - frequency of change in months, 5a – Classrooms workshop, seminar halls, 5b - frequency of change in months, 6a – informative display in canteen Parking etc, 6b - frequency of change in months.

The experiment (6.2.2) was conducted at nine institutes, where students were asked to analyse on 6 parameters for the environment contributing to visual learning in the building like – (1) the building itself, (2) the placement of paintings in the building to the location of display areas in corridors, (3) area of display boards in Sqm (4) display in teachers cabin and (5) display areas in classrooms and (6) frequency to change the display and informal zones in the campus. Since it was on observation and feedback, a range was identified. Dark green indicating the maximum, light green to medium and yellow to very low and Red colour indicated missing things. Even the frequency of change was mapped in the range.

6.2.2. Observation 2  
Students inferred that most of the college buildings were old and not designed for architectural education. But while correlating the results with experiment (6.2.1) it was observed that the characters of their institute building were reflected in the elevations sketched during the experimental test (6.2.2). Only Institute at National and Regional level had wall paintings, and other wall displays, which were inspiring. Even the changing factor of those paintings was yearly or twice a year or never. Institutes of National level had display boards with lots of visual food and at other institutes, it was restricted to official information. There was a lack of display in staff rooms and classrooms. Ironically, whereas students spent the maximum time they should be flooded with the visual and imagery information. The most neglected area was the informal zones and canteens.

6.2.3. Experiment 3  
(The relation between contents/information and location in and microenvironment)  
The next set of students of different years were picked and asked to list the information on different soft board displayed in college and the results were mapped further the results were correlated with the location of soft board and the frequency of visit.)
Table 2. Display location to display content.

<table>
<thead>
<tr>
<th>Location of Display</th>
<th>Content of Display</th>
<th>Frequency</th>
<th>Recall factor</th>
<th>Relevance to studio design exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corridor 1st floor</td>
<td>Write-up black and white A4</td>
<td>High</td>
<td>44%</td>
<td>Not relevant</td>
</tr>
<tr>
<td>Corridor 2nd floor</td>
<td>Colour write-up and white A4</td>
<td>High</td>
<td>52%</td>
<td></td>
</tr>
<tr>
<td>Dead end of the corridor</td>
<td>Competitions poster</td>
<td>Low</td>
<td>36%</td>
<td>Submission time</td>
</tr>
<tr>
<td></td>
<td>Architectural information</td>
<td>Medium</td>
<td>58%</td>
<td>Too much of relevance</td>
</tr>
<tr>
<td>Canteen</td>
<td>Complex poster</td>
<td>High</td>
<td>31%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interesting wall poster</td>
<td>High</td>
<td>89%</td>
<td></td>
</tr>
<tr>
<td>Studio</td>
<td>Project information</td>
<td>High</td>
<td>92%</td>
<td>Completely Relevant</td>
</tr>
</tbody>
</table>

6.2.4. Experiment 4
(Efforts in creating the environment for visual learning at the individual level and its manifestation). The students from one class were asked to create a microenvironment with visual board as a measure to inspire and generate concepts.

Students were reluctant to work on the visual boards being not conversant with the process. Inclusion of the marks / grading of the boards in the design became the driving force to make the boards. 69% of students initiated and only 38% continued and were benefited in the process.

6.2.5. Experiment 5
(Selection of visuals from the environment to set a guideline for framing new environments). Observations of the experiment one to four infer that there is a motivation created by inspiring microenvironmental visuals. A set of indicators was derived from the experiments to set the guidelines for framing the new environmental visuals and its imagery. The visual selection was based on the factors like colour and monochrome, bold and subdued, pattern and organic and classified as figurative and abstract. Then the subject's students were asked to make a selection from the range of sixty images based on the above-mentioned factors and classifications.
6.2.6. Observation 6

It is observed that most of the students select figurative things than abstract in all examples. Colour and bold images were most preferred selections, whereas organic or structured images were not driving factor for selection.

7. Conclusion

The research paper concludes the impact of the designed visual environment with the design students. The results were analysed under identified experimental permanents that conclude the visual influence on the design process. Designing of information for visual displays is required to create an impact on visual thinking. Repetition of information creates a long-term influence on thinking and visual thinking. Unconsciously the cognitive ability keeps improving and reoccurring/ reproducing. Hence defined, and directional efforts have to go in to develop the perception, thereby developing the cognitive abilities. This will result in elevating the visual thinking skills. The educational institutes having influential visual material on display or the strongly built environment (with a specific visual language of design) is unconsciously reflected in the designs. If this unconscious phenomenon is to create an impact conscious way, there will be a positive difference. Locations for display need an analytical thinking to create a maximum impact along with context and content at the institutional level.

- Visuals could be in the form of Information and knowledge.
- Learning from visual and knowledge from visual are two different things.
- Correlation of visuals is important.
- Content going on the boards and classification according to location /position is important.
- It's just not the correlation of the display board locations in the college, but in-depth working is required on the content to be displayed.

A strong reluctance is observed from the students initially to develop visual boards; i.e. to create an individual level visual environment. There is a strong reluctance for a changed pedagogical approach.

The selection of visuals by students is driven by colours and figurative images, which results in obvious designs. Abstraction is though not preferred by the students, but if selected, would result in unobvious creative designs.

Creating visual environs in an architecture institute building helps perceive and incubate (built cognition), for the information and knowledge even in non-teaching hours to be reproduced (illuminated) for creative results. Designing a visual environment helps a continuous and fast rate of thinking with a holistic approach to reducing the time required for incubation and visualisation. The methodology needs to be drawn to enhance the surrounding visual environment for conscious impact through the unconscious way. The visual environment acts as a strong force for creative pull in imparting quality education and directly affecting the quality of life. Thus ‘the strength of the good design lies in ourselves and our ability to perceive the world with both emotion and reason’ (Peter Zumthor 1988).
8. Recommendations

The research paper further lays the avenues and scope for the efficient use of the visual environment in architecture schools and institutes.

- The most important aspect of architectural education is to access to vast information level, which is practically impossible to access in the teaching hours, hence should be shared or transferred by the visual environment.
- Systematic synchronisation of the information and the knowledge within the teaching hours is yet another area for development.
- The display areas are classified as Static and Non-static. Static is the building / the closed envelope, whereas the Non-static are the soft boards, the display boards easily manageable and of short duration.
- College assignments could be based on the themes (vernaculars contemporary, modern, futuristic, identified architect's style / architectural styles etc.). Students from all years can work on the same theme for a scheduled duration according to their levels the complexities of the project and then the project solutions would be displayed in a cross-section.
- Upgrading and monitoring the visual environment shall be equally important as the classroom teaching hours/ timetable.
- Monitoring of the infrastructure and the built form for creating a visual and imagery environment also shall be as important as another academic activity. The spaces which are of non-academic activities like - student's areas, canteen, parking, open spaces etc..
- Apart from the content going on the normal display board, technological inputs and infrastructure should be considered. Virtual screens, 3D projectors, 3D-space glasses, and Simulation software are some of the means to be evaluated and absorbed for a detailed visualization.
- ‘Whatever good things, we built, will end up building us' (Jim Rohn). Thus, for the Visual thinkers to achieve a better design it has to be better Visual Environment.

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References

Cross N. (2001). *Design Cognition: Results from protocol and other empirical studies of design activity* 
Hare Kilicaslan, Burcu Efe Zizek, (2012). *A research about Creativity in design education*. Procedia – Social and Behavioural Science 


