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Impact of Colour Produced By Different Printing Processes

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***Abstract*— Focus of this paper is to find out the impact of colour produced by different printing processes and to analyze the same to come out with the clear indication regarding impact of different colour on normal observer. A test chart was prepared containing different types of images such as natural scene images, cartoons type pictures, logo of different colours that captures the attention of people and it was printed through offset, screen, inkjet and digital printing processes. After all a survey was conducted in sample size of hundred people to recognise the printing process that gives maximum impact of colours.**

***Index Terms*— Cyan, Magenta, Cones and Rods**

I. INTRODUCTION

The human eye and brain together translate light into color. Light receptors within the eye transmit messages to the brain, which produces the familiar sensations of color. The eyes are comprised of cones and rods that allow us to see color and light, respectively. When light falls on objects, some is absorbed and some reflected. The visible part of the reflected Spectrum is perceived as the colour of the object. Colour experiences vary from individual to individual & it is not possible to know how another person experiences color. One person's experience of a shade of red can be perceived differently from another one.

The perception of colour depends on the source of light, environment and illuminated objects. All of the colours split into two categories: warm and cool colors. Warm colours, colours in the red range of the spectrum (like Red, Orange, Yellow colour) are generally referred to as warm, active colours and are associated with intense emotions ranging from joy and excitement to violence. Red, Yellow and Orange, the colours of the sun and volcanoes incite motion and change. Blue, Green and Purple, which are on the blue side of the spectrum, are cool colours, arousing feelings of calmness but also of coldness and depression. Colour studies begin with the interaction of light and colour. Without light a person observe no colour, shape, or space. Understanding of light and colour was greatly aided by Sir Isaac Newton's discovery that white light contains all visible colours. Human see colours in wavelengths of light from 400 nanometre to approximately 700 nanometre. The eye has the capacity to discriminate millions of different colours. According to Johnson (2007), Colour does affect mood by producing certain chemicals and stimulating different feelings such as hunger. For example, blue can make one feel calm because it releases calming chemicals, and red can make one hungry because it is an appetite stimulant. Yellow can make one feel irritated, and it is a fact that people lose their temper most in Yellow rooms. However, Pink can make one feel weak. Johnson says that depending on the colour, one's body can do things (like producing chemicals) that cause a certain emotional reaction. Another idea, by Smith (2007), is that the effect colour produces is based on what one's body does in response. For example, Yellow is mentally stimulating, and activates memory, whereas Red increases confidence. Also, Brown can make a person feel orderly and stable, while a dark Blue can make one feel sad. Therefore, Smith says that different colours do in fact change one's mood and the consequences can be negative or positive, but the effect also can depend on one's culture and what one's personal reflection may be. According to present research, results show that offset printing ranked at top with respect to the impact of colour and screen printing ranked at second and the digital and inkjet ranked at lowest no. with respect to impact of colour.

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Comparative Study of Colour Print Quality of Various Printing Process:

Various printing technologies and production possibilities complement rather than compete with each other. The production system itself must be critically reviewed with regards to productivity and reliability to meet the specified requirements.

Offset printing consist high image quality, and produces sharp and clean images, longer printing plate life because no direct contact between plate and printing substrate. It is cheapest method of producing high quality commercial printing.Offset printing provides better results for more complex artwork, such as photographs, gradations, or images using percentages of colors. Complex images as well as solid colors reproduce boldly under 4-color process offset printing.

Screen printing is the only one which can personalize a wide variety of items, from textiles to ceramics. Unlike other printmaking techniques, such as intaglio or relief, screen printing allows many prints to be created before a re-application of ink is necessary, which makes screen printing very useful commercially.Solid colors using 4-color process artwork do not print as well in screen as in offset. Photos and high resolution details do not show up well.

Digital Printing refers to methods of printing from a digital-based image directly to a variety of media. It usually refers to professional printing where small-run jobs from desktop publishing and other digital sources are printed using large-format and/or high-volume laser or inkjet printers.

Digital printing has a higher cost per page than more traditional offset printing methods, but this price is usually offset by avoiding the cost of all the technical steps required to make printing plates.The savings in labour and the ever-increasing capability of digital presses means that digital printing is reaching the point where it has ability to produce larger print runs of several thousand sheets at optimum price.

The four natural scene images, four cartoons images and logos and type matters in Cyan, Magenta, Yellow, Black, Red, Green and Blue colours are included in test chart and printed by Offset, Inkjet, Digital and Screen Printing Processes.

Research Objective

Objective of present research is to find out the impact of colour produced by different printing processes and to analyze the same to come out with the clear indication regarding impact of same as well as different colour, on normal observer.

II. Research Methodology & Data Analysis

A suitable test chart was prepared containing the different type of images that do not connect any emotional attachment with people, for example if the photograph of Mahatma Gandhi and Jinnah's is shown to the citizens of India and Pakistan, It is obvious that the Indian will prefer to like Mahatma Gandhi, as they are emotionally attached with him. So the four natural scene images, four cartoons images and logos and type matters in CMYKRGB, colours were included in test chart as shown in fig.1. Then the test chart was printed by different printing processes such as Offset printing, Screen printing, and Digital printing processes and it is decided to exclude the Gravure and Flexo process, as both are mostly used for printing of packaging jobs.

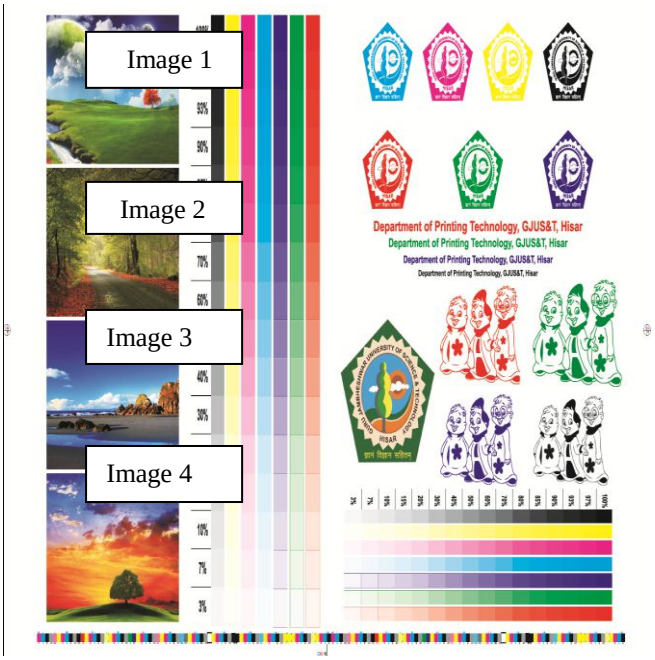

Fig.1. Test Chart

In this study the target audience age was selected in two groups first, having age below twenty five and second, having age above twenty five years. Survey was conducted on total of hundred peoples out of which fifty male and fifty females were targeted. Black sheet gives better background for judging the impact of colour, so all the images that are printed by Offset, Digital, Screen and Inkjet printing were placed on black sheet.

Table.1. Impact of Different Images Printed by different printing processes

Type of images	Type of printing	Male			Female			Total(male + female)		
		Above 25 [25]	Below 25 [25]	Total male [50]	Above 25 [25]	Below 25 [25]	Total female [50]	Above 25 [50]	Below 25 [50]	Total [100]
Image no.1	Offset	19	18	37	12	17	29	31	35	66
	Inkjet	2	0	2	1	1	2	3	1	4
	Digital	4	6	10	12	8	20	16	14	30
Image no.2	Offset	7	12	19	8	9	17	15	21	36
	Inkjet	3	3	6	1	1	2	4	4	8
	Digital	15	10	25	16	15	31	31	25	56
Image no.3	Offset	14	17	31	15	16	31	29	33	62
	Inkjet	2	1	3	0	0	0	2	1	3
	Digital	9	7	16	10	9	19	19	16	35
Image no.4	Offset	10	15	25	15	13	28	25	28	53
	Inkjet	2	1	3	1	2	3	3	3	6
	Digital	13	9	22	9	10	19	22	19	41

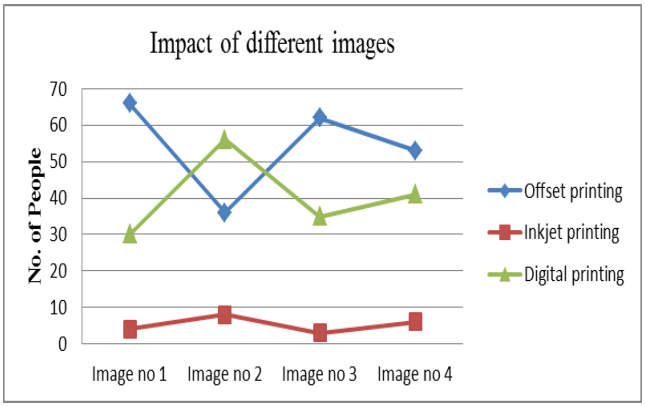

Fig.2. Impact of Different Images Printed by different printing processes

Prints were pasted in order of OIDS (Offset, Inkjet, Digital and Screen printing processes) series. All the images, logos, type matters and cartons images separately cut and pasted on black sheet according to the series. These arranged images, Type matter and logo in CMYKRGB colour were shown to the different peoples according to their age group and their choice of colour by different processes was marked and then collected data is analysed.

Table.2. Impact of colours by different printing processes

Printing Processes	Offset Printing	Inkjet Printing	Digital Printing	Screen Printing
Peoples (in %)	41.71 %	3.14 %	18.42 %	32.50 %

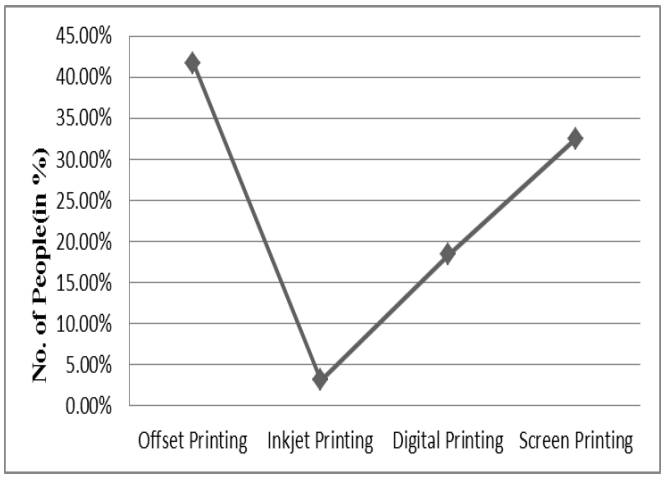

Fig.3. Impact of colours by different printing processes

III. CONCLUSION

After analysis survey it is found that out of the four processes that were experimented, offset printing ranked at highest position with respect to the impact of colour. Screen printing ranked second position, digital ranked third position and inkjet ranked at lowest position. As compared to other printing processes 41.71% of observers ranked offset printing, and 32.50% of observers ranked screen printing, digital printing ranked by 18.42% of observers and inkjet printing ranked by 3.14% observers (as shown in fig.3).

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