

European Consumer Attitudes to Flat Panel TVs

Research Report

1. Introduction

This report presents research into consumer attitudes to plasma and LCD TVs. Built around a side-by-side comparison of a range of Plasma and LCD models at locations in the UK, France and Germany, the findings provide the first authoritative analysis of how end users rate the two technologies. The study was commissioned by Panasonic and Pioneer.

www.synovate.com

2. Contents

- 1. Introduction**
- 2. Contents**
- 3. Executive Summary**
- 4. Objectives and Methodology**
- 5. Headline Findings**
 - 5.1 Pre-comparison**
 - 5.2 Post Comparison**
- 6. Detailed Findings**
 - 6.1 Key Technical Assets**
 - 6.2 Sharpness**
 - 6.3 Colour**
 - 6.4 Response Speed**
 - 6.5 Contrast**
 - 6.6 Black Quality**
 - 6.7 Resolution**
 - 6.8 Image Depth**
- 7. Key Conclusions**

3. Executive Summary

With the availability of new TV formats, the switch to HD and digital technologies as well as aggressive promotion from vendors and occasional misinformation, there's no doubt that purchasing a new flat panel display can be a confusing decision. By canvassing consumers' opinions about plasma and LCD, this research is intended to make the purchasing decision easier.

This report details the findings of research conducted in the UK, France and Germany into consumers' attitudes toward the image qualities of flat panel TVs. In particular, the survey focused on plasma and LCD, the technologies that have been the main beneficiaries of the transition away from bulky cathode ray tube (CRT) screens to sleek flat panel displays.

Synovate conducted a comprehensive survey of consumer attitudes to plasma and LCD. It canvassed opinions among 603 randomly selected people in Paris, Cologne and London. Respondents were asked to enter a 'comparison suite' where a range of plasma and LCD TVs displayed the same content. The participants were then asked a series of questions based on the image performance of the displays.

The results reveal a strong preference for the contrast, black tone, resolution, image depth, sharpness, colour and response speed of plasma. More importantly, opinions among those who had some prior knowledge of the two technologies swung dramatically toward plasma once they viewed the content side by side in an environment similar to their homes. This suggests that consumers, dealers and manufacturers interested in assessing or demonstrating image quality should consider the consumers' home environment when evaluating the two technologies.

4. Objectives and Methodology

The objectives of the research were to assess consumers' opinions about the relative merits of plasma and LCD TVs; the only sensible method of securing candid feedback is a side by side comparison.

Comparison suites were set up in locations in Paris, London and Cologne. Six LCD and plasma displays were used in the research - one each in the 37-inch, 42-inch and 50-inch category (screen resolutions were 37-inch XGA PDP and XGA LCD, 42-inch XGA PDP and 1080p LCD and 50-inch category both 1080p) with three comparison suites set up to compare the models side by side.

Conditions were designed to reflect typical viewing environments in the home. The screens were watched in default settings, seats were positioned two to three metres from the displays in a central position and light conditions were of 50lux brightness. The brand name of each TV was covered to ensure that preferences for particular manufacturers didn't influence the feedback. 75 per cent of respondents agreed that the environment was either identical or highly similar to their homes (when watching TV in the evening). Additionally, the environment and TV settings were verified by a third party auditor (SGS).

Respondents viewed a 90 second video sequence of images that showed everyday objects such as buildings, animals and colourful drawings. The objects were shown in a mixture of daytime and night settings at different motion speeds. The objective of using such images was to provide content that would objectively present the various qualities that were measured. The content was presented in high definition (1080i) and supplied to screens via a HDMI digital interface.

At its conclusion, respondents were asked a series of questions relating to technical parameters including: sharpness, colour, response speed, contrast, black quality, resolution and image depth.

To provide a benchmark for the research, the sample was split into two groups: those who claimed to have prior knowledge of plasma and LCD displays and those that did not. While all 603 respondents watched the short film, the 473 people who claimed to understand plasma and LCD were asked to provide their opinions on the overall quality of each display type and the range of technical issues outlined above before watching any content. These base findings were used to track opinion shifts after the content was viewed.

Demographics

Age 18-44 (50 per cent) and 45-65 (50 per cent)

Male/female split: 50:50

Those who work in the electronics sector were excluded

5. Headline Findings

Although the survey canvassed 603 people, the first series of questions filtered out those who expressed no prior knowledge of plasma or LCD TVs. Those who claimed to have prior knowledge were asked, prior to entering the comparison suites:

'Considering everything you know about LCD and plasma flat screen televisions, can you please indicate which type you believe has the best overall quality?'

5.1 Pre-Comparison

There was no clear preference expressed between respondents in Germany and the UK. However, in France, plasma was viewed as the best overall display by a significant majority: 68 per cent considered it superior to LCD.

5.2 Post Comparison

All of the respondents (603) were shown the short video sequence on each of the 37-inch, 42-inch and 50-inch displays with the respective plasma and LCD displays arranged side by side. When it finished, the respondents were told which display was using plasma or LCD and then asked to give their view on the following:

'Considering the three viewing sessions you just experienced, can you please indicate which screen type you believe is best in overall image quality?'

The results reveal an important shift in opinions. Overall, 73 per cent of the sample believed that plasma provides the best viewing experience compared to 27 per cent for LCD – an increase of one third among the group that believe plasma provides the best overall viewing technology. The majority of the support came from those who had professed initially that there was little difference between the two technologies.

The people with prior knowledge of the technologies were also asked to judge a range of technical criteria prior to seeing the displays in action. In each of the categories, there was no clear preference expressed for one or another system with a large group expressing the two were equal prior to the playing of the short film. This group, along with the audience who had no understanding of plasma and LCD were then asked to respond to the questions again once they had seen the short film.

The results show that plasma was deemed to be significantly ahead of LCD in all quality areas and overall, after the content was shown. More specific findings related to these measurements are detailed in the next section.

The analysis provides the first authoritative analysis of consumer perceptions of the relative merits of plasma and LCD when viewed in a controlled environment with conditions similar to those at the consumer's home. Cutting through the misperceptions often promoted in relation to the two technologies, the top line conclusions indicate that:

- Consumers believe that plasma provides the best quality viewing experience in comparison to LCD
- Seeing is believing: Consumer opinions shifted dramatically when they viewed the content in an environment which they largely considered to be similar to their homes (watching TV in the evening)
- Plasma displays are deemed to be superior to LCD across all of the image categories. Plasma outscored LCD by at least two to one across the areas e.g., 63 per cent remarked that plasma provided the 'best quality for sharpness' compared to 21 per cent for LCD
- Plasma scored particularly well with regard to black performance with close to three-quarters (71 per cent) commenting that the technology delivered the 'best black quality'
- 'Colour' and 'contrast' metrics were also strong assets for plasma: 67 per cent and 64 per cent of respondents remarked that the displays provided the best quality in these areas

6. Detailed Findings

6.1 Key Technical Assets

Using the sample of 473 people who had prior knowledge of plasma and LCD TVs, the researchers asked the respondents to comment on flat panel TV performance in relation to sharpness, colour, response speed, contrast, black quality, resolution and image depth. This data illustrates consumers' current perceptions of plasma and LCD – knowledge that has been generated through ownership of a flat panel TV or discussions with friends, in-store guidance, online research or analysis of specialist media.

They were then shown the short video sequence three times in different rooms where the LCD and plasmas of 37, 42 and 50-inch screen sizes sat side by side. The remaining respondents (who had no prior knowledge of flat panel TVs) were also shown the film. When the clips ended, all of the sample base of 603 participants were asked to comment on the technical criteria providing comparatives for 'before' and 'after' viewing.

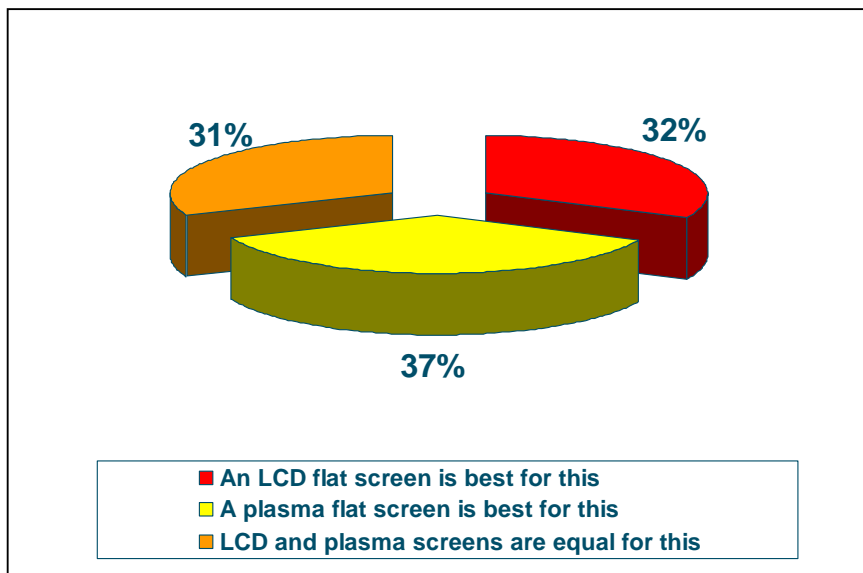
The following section details the key findings with a focus on the average scores for each area across the UK, France and Germany. For all the following results, comparison scores are for those who claimed initially to know both technologies.

6.2 Sharpness

Sharpness defines how crisp an image appears to the eye on screen, the overall smoothness of the image and whether any 'noise' is present. Before entering the comparison suites, the respondents who had prior knowledge of flat panel TVs, were asked if an '*LCD or plasma is best for sharpness*' or whether the displays perform equally. There were no marked differences across the countries, with a similar breakdown: 32 per cent in favour of LCD for sharpness performance compared to 37 per cent for plasma while 31 per cent indicated that both technologies deliver similar performance levels.

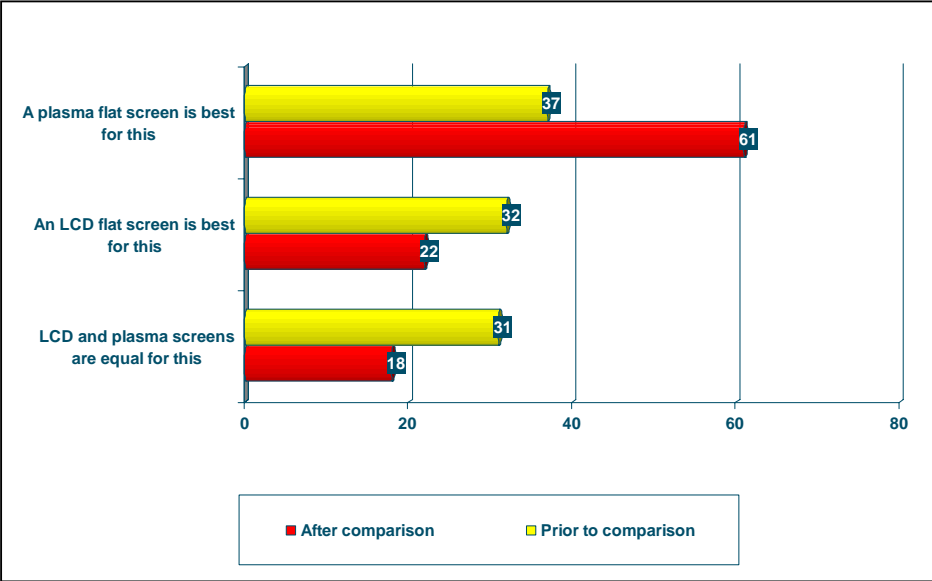
Note: Respondents were given the following explanation for sharpness: The extent to which you can see everything focused on the screen. Too little sharpness results in edges that are out of focus, while too much sharpness leads to edges that appear much brighter than in reality.

*European mean scores: LCD or plasma is best for sharpness
(Prior to evaluation)*



After seeing the content played on the three screens, respondents were asked to comment on the sharpness performance. An average of 61 per cent of people identified plasma as delivering the best 'sharpness quality' – an increase of 25 per cent – with the highest figure recorded in Germany (70 per cent).

Post comparison: Which display format is the best for sharpness?

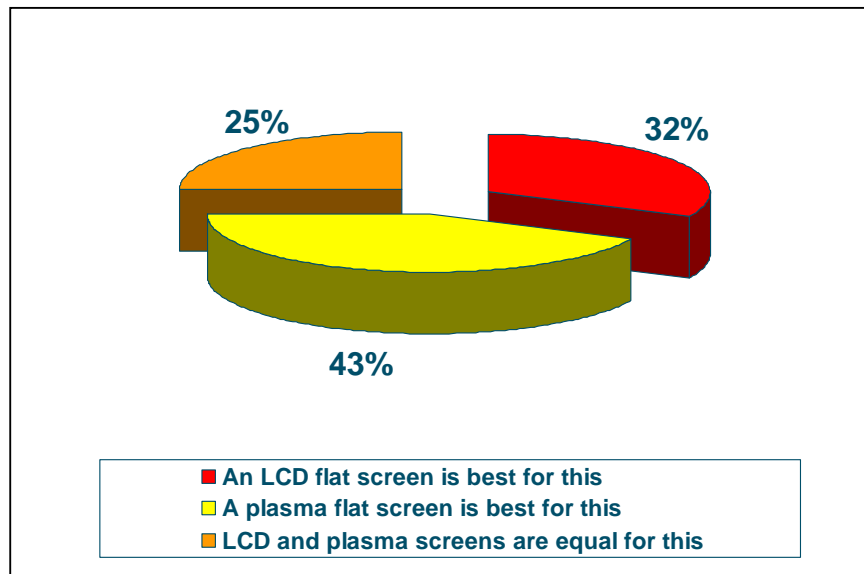


6.3 Colour

Measurement of colour refers to the depth, range and accuracy of colours reproduced by screens.

Prior to seeing the LCD and plasma comparisons, perceptions among the base group - that were aware of the two technologies prior to the research - revealed a belief that plasma's colour performance is ahead of LCD's. When asked '*Which display format is the best for colour?*': 43 per cent of respondents selected plasma, 32 per cent indicated that LCD has the best colour performance while 25 per cent voiced the view that both technologies deliver equal colour reproduction.

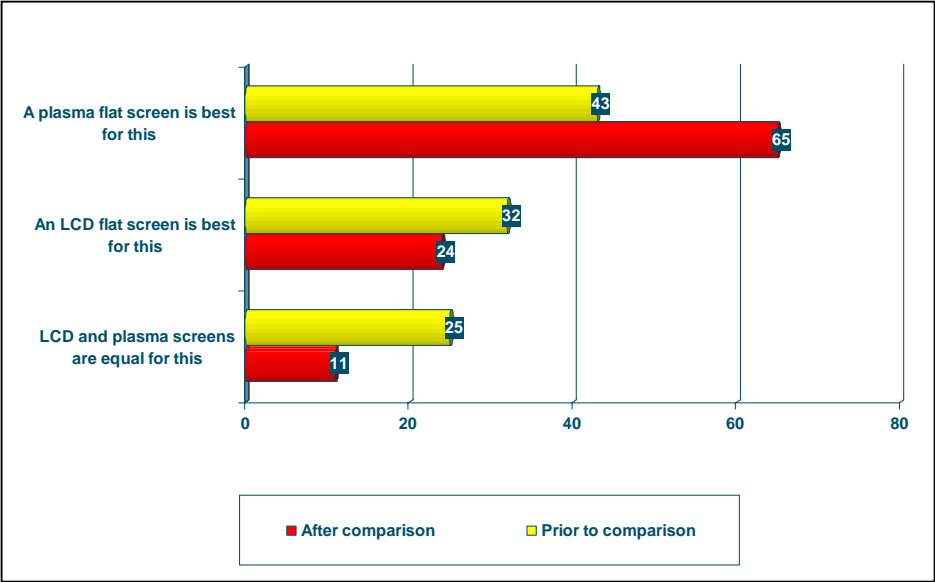
*European mean scores: Which display format is the best for colour?
(Prior to evaluation)*



After watching the comparison video sequence, the number of people who felt that LCD is the leading flat panel format for colour fell to 24 per cent while 65 per cent of people favoured plasma for 'colour quality'.

Note: Respondents were given the following explanation for colour: The extent to which the colours that are shown on the screen are in line with their natural appearance.

Post comparison: Which display format is the best for colour?



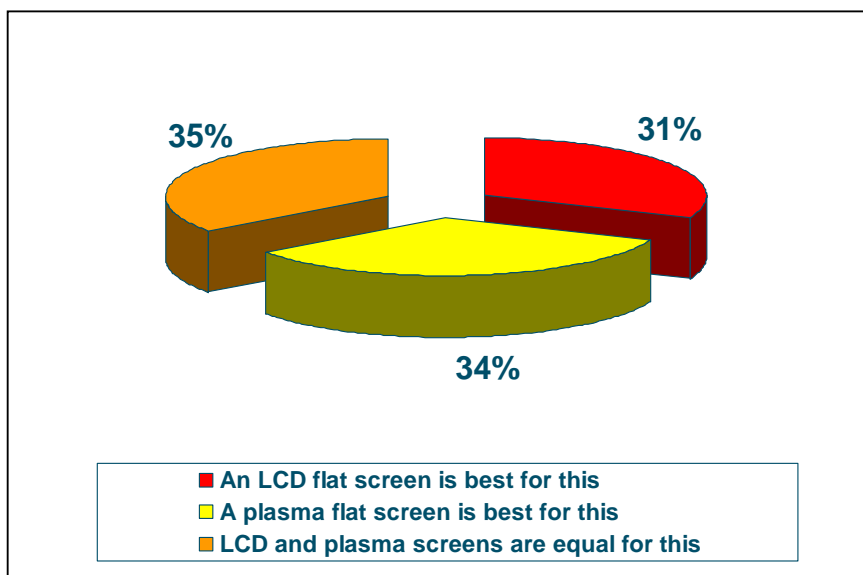
6.4 Response Speed

Response speeds refers to how quickly an image is refreshed. If a display has a slow response rate, fast moving scenes can cause 'motion blur' where images lose their sharpness and the picture appears out of focus.

Note: Respondents were given the following explanation for response speed: This is the capacity of the screen to accurately show fast moving images. In cases where the response speed is not optimal one can see 'after-images' when fast moving images are shown on screen (also known as 'ghosts'). As an example, when the response speed is too low, you can not perfectly see the ball while watching a football match on television.

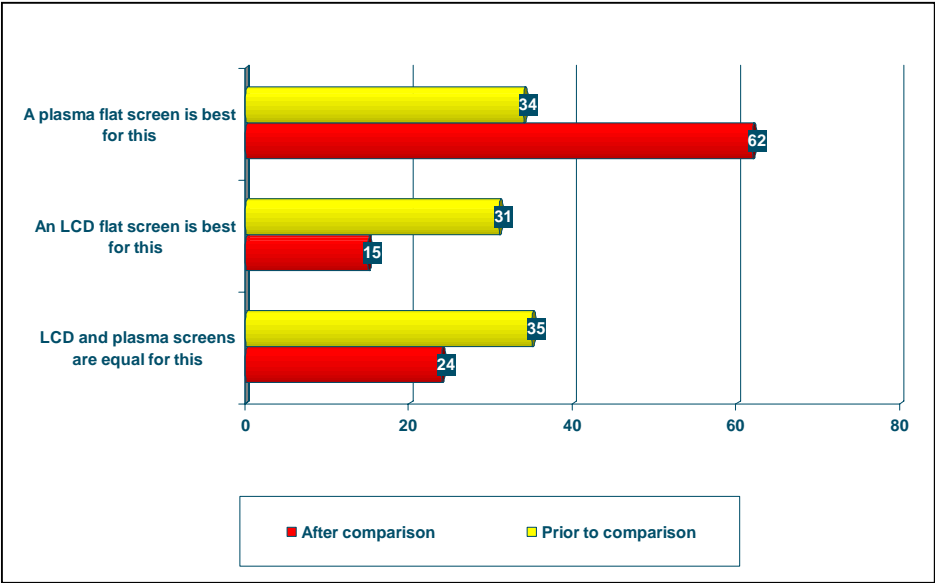
Prior to showing the comparison video sequence, the research team posed the question to the audience that had knowledge of plasma and LCD: 'Which display is best for response speed?' The findings are almost equally split, 31 per cent highlighted LCD, 34 per cent selected plasma while 35 per cent indicated that both technologies are equally adept at response rates.

European mean scores: Which display format is the best for response speed? (Prior to evaluation)



The same question was posed once the participants had seen the film - again recording a significant shift in plasma's favour with 62 per cent indicating that plasma has the best response time. Support for LCD fell markedly to 15 per cent.

Post comparison: Which display format is the best for response speed?



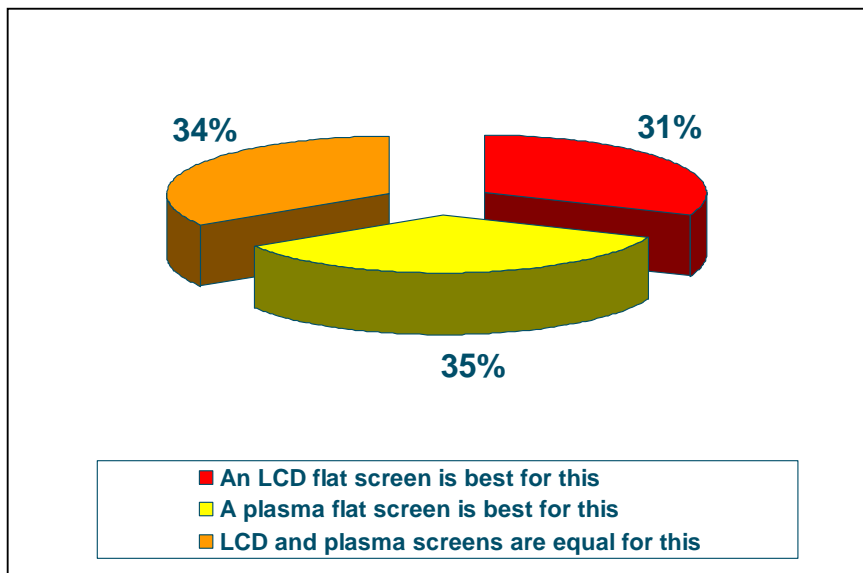
6.5 Contrast

It's very important for displays to have a strong 'dynamic range' between pure whites and deep blacks, preferably without 'crushing' gradations in blacks and 'clipping' in whites. If there's not enough contrast, pictures can look washed and scenes can lose details impairing the overall viewing experience. *When asked initially: 'Which display type offers the best level of contrast'* the responses were almost identical to response times as follows:

- LCD has the best contrast: 31 per cent
- Plasma has the best contrast: 35 per cent
- LCD and plasma are equal for contrast performance: 34 per cent

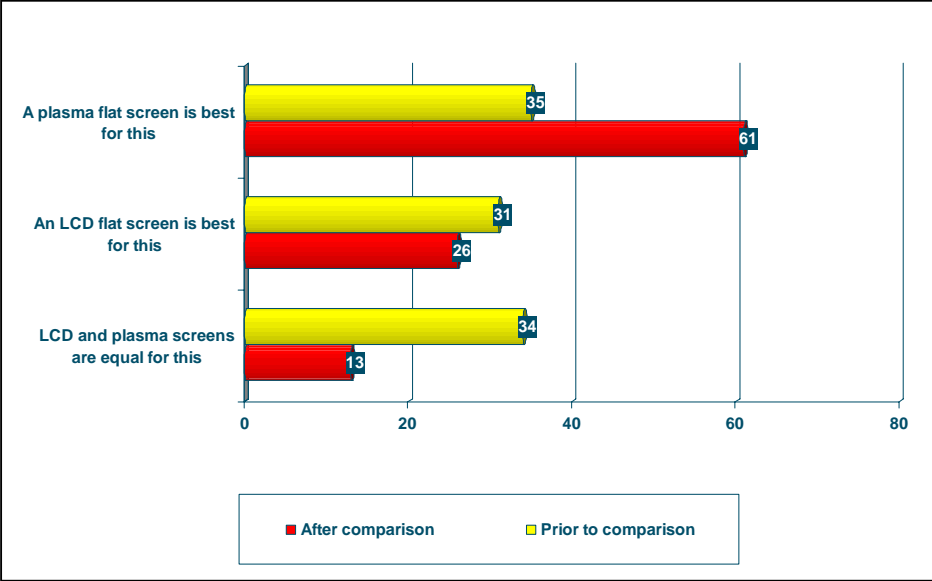
Note: Respondents were given the following explanation for contrast: The viewed image appears to have little or too much contrast. Images with too little contrast appear dull and grey. Those with too much contrast (which is less common) can be too bright in some areas and too dark in others.

*European mean scores: Which display format is the best for contrast?
(Prior to evaluation)*



Having seen the content, the respondents again re-evaluated their feedback with an increase of 26 per cent in the category of people who believe that plasma provides the best quality (to 61 per cent). LCD fell back slightly (31 to 26 per cent).

Which display format is the best for contrast? (Post comparison)

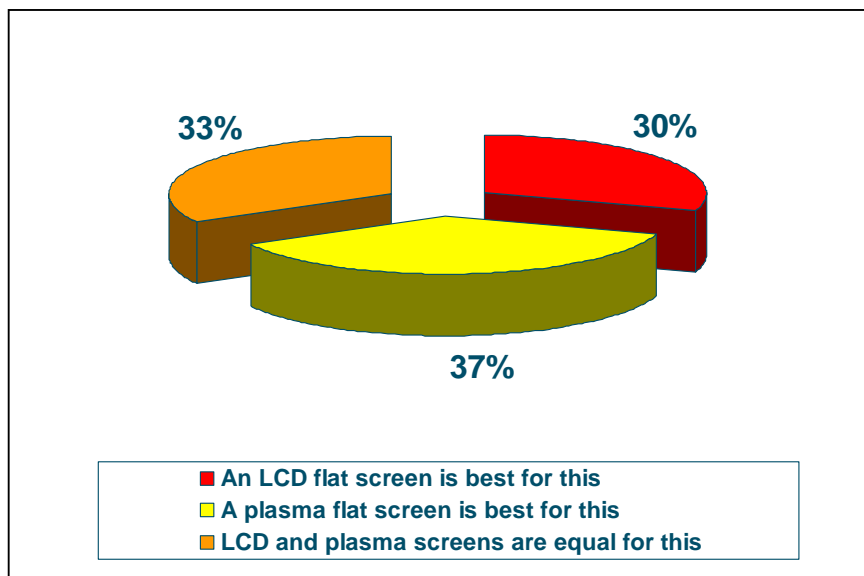


6.6 Black Quality

Black output is very important to the richness of an image: without strong black performance, a deep red for example can appear washed out. Black is also important to provide a sense of depth – to create the right sense of perspective when an individual is standing in a dark alley – with poor black levels the shadows will look pale and un-realistic which will make the picture seem flat. In essence, black is essential to creating a realistic image and a richer overall picture. It's therefore pivotal to an enjoyable viewing experience.

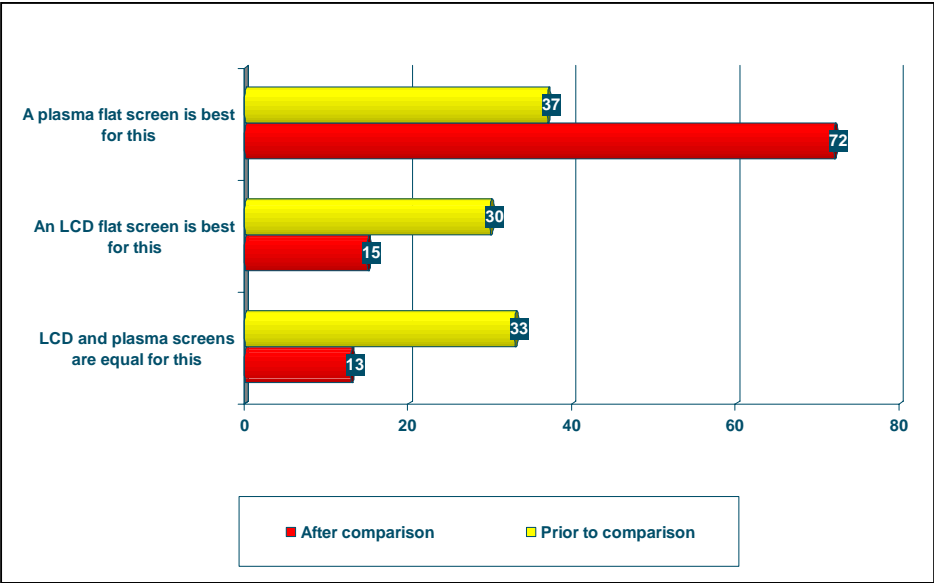
Before seeing the screens in action, the respondents with knowledge of flat panel TVs were ambivalent as to which offers the best 'quality black performance'. Plasma was deemed to have a slight lead (37 percent to 30 percent for LCD). A third felt that both formats provide similar black performance.

*European Mean Scores Which display format is the best for black quality?
(Pre-comparison)*



Across the regions, plasma is deemed to have the best black performance by 72 percent. Support for LCD dropped by a similar level across the region: from 30 to 16 per cent in the UK, from 25 to 16 per cent in France and from 34 to 15 per cent in Germany.

Which display format is the best for black quality? (Post Comparison)



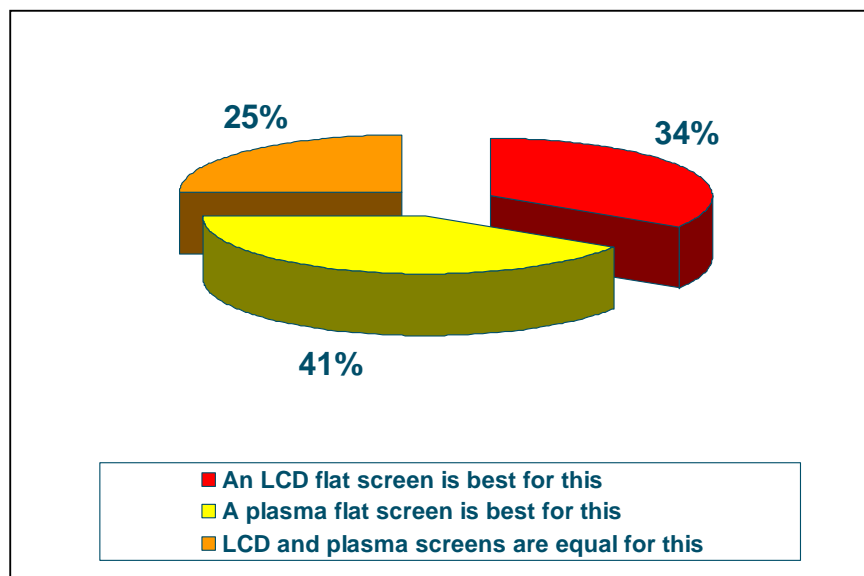
Note: Respondents were given the following explanation for black quality: This is the extent to which black truly appears as black on the screen. When the black quality is suboptimal, black appears more like grey on the screen.

6.7 Resolution

To accurately test resolution, displays were used with industry leading performance for their category. In the 37-inch sector, the displays were of an XGA resolution, in the 42-inch category an optimum quality LCD of 1080p resolution was compared to an XGA plasma and in the 50-inch sector, both screens delivered high performance 1080p resolutions.

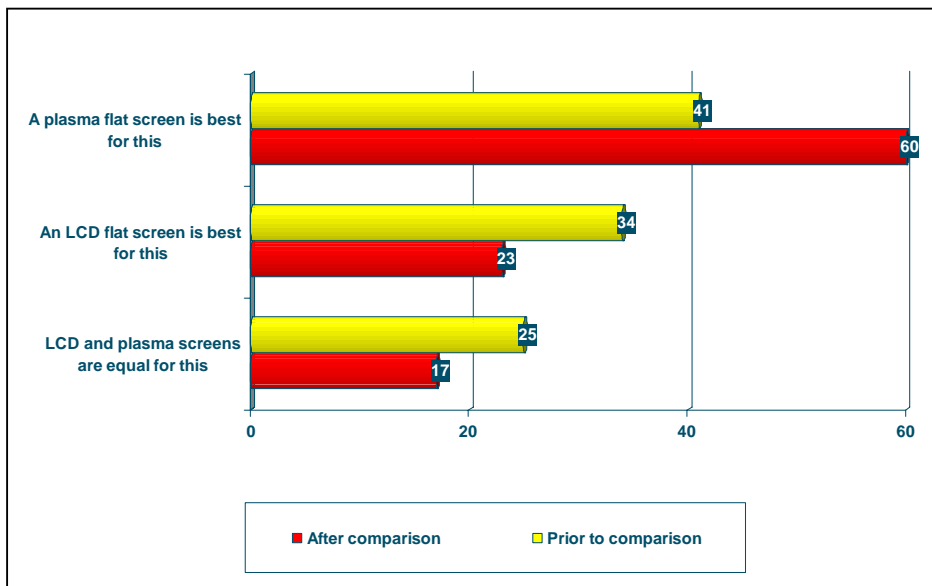
Among the knowledgeable audience, plasma had a slight lead when they were asked (prior to seeing the comparison suite) 'which TV provides the best resolution quality.' It was rated the leading technology for resolution by 41 per cent of the respondents with LCD selected by 34 per cent and a quarter of people replying that both screen formats perform to similar levels.

*Which display format is the best for resolution?
(Prior to evaluation)*



Once the video sequence was played, sentiments swung behind plasma. Where resolution is concerned, plasma was deemed to provide the 'best quality' by some margin – 60 per cent to 23 per cent for LCD – while the view that both technologies deliver similar performance in this category is held by 17 per cent of those who viewed the video sequence.

Which display format is the best for resolution? (Post comparison)



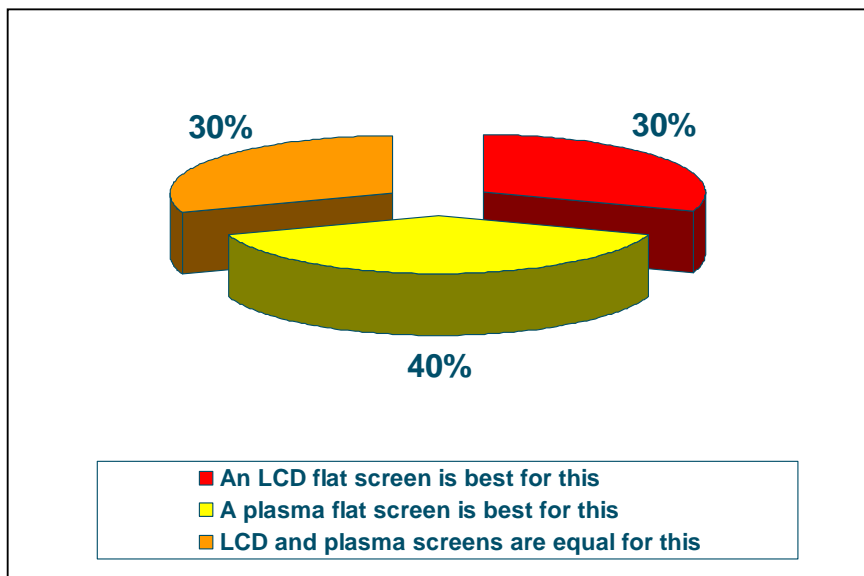
Note: Respondents were given the following explanation for resolution: This is the extent to which you can see all details clearly and sharply.

6.8 Image depth

Image depth refers to how lifelike images appear on screen producing a '3-D like' experience compared to displays that produce images that appear 'flat' and 2-D in form.

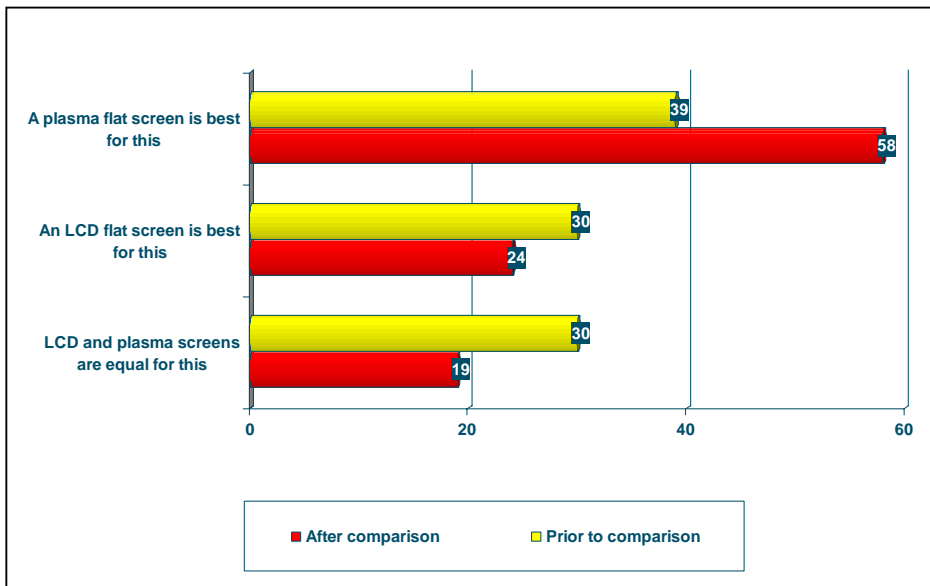
Feedback was evenly spread among the sector of respondents with a sound technical knowledge about flat panel TVs. Plasma at 40 per cent was deemed to have the best performance for image depth, compared to LCD at 30 per cent and 'both are equal' at 30 per cent.

*European mean scores: Which display format is the best for image depth?
(Prior to evaluation)*



After watching the video sequence on the three plasma and LCD displays, attitudes changed markedly. Plasma is deemed to have the best 'image depth' quality (by 58 per cent of the respondents) considerably ahead of LCD (24 per cent) and the assertion that both provide similar levels of depth performance (19 per cent).

Which display format is the best for image depth? (Post comparison)



Note: Respondents were given the following explanation for image depth: Image depth refers to the way images are displayed in a 3D mode. Good image depth results in images that appear with perspective and realistic dimensions.

7. Key Conclusions

Competition between these two TV technologies has stirred much debate about the strengths and weaknesses of LCD and plasma. LCD technology is evolving to support screens larger than 37-inches, which is eliminating the barrier that separated the traditional markets for both technologies (LCD sub 32-inch and plasma over 37-inch and above). Additionally, the advent of HD in broadcasting and package media is affecting considerations for purchase. Consumers are also faced with conflicting media stories, analyst debate and aggressive manufacturers' promotions that extol their technologies' merits.

Lost in this cacophony is the consumer's opinion. And there's no doubt that, given the plethora of confusing messages that they are faced with online, in the media and even in store, finding the best display can be both daunting and arduous. The research shows clearly that seeing is believing. At least with regard to image quality, consumers should evaluate technologies based on their home viewing environment and the kinds of content they view. Dealers should consider providing space that simulates those environments so that those interested in quality can make the choice that is best for them.

The research detailed in this paper is designed to provide an 'honest broker's' advice for the consumer seeking to buy a new flat panel TV. It should be noted that the research is focused on image quality and did not consider other factors such as price, vendor advice, or availability, all of which could play a significant part in the buying decision.

Based on the research into image quality, this is Synovate's point of view:

- People based their responses on a straight appraisal of how the screens appeared to their naked eyes and plasma was revealed to be provide the 'best quality' picture.
- Manufacturers should consider methods to better communicate which displays are best for particular viewing environments. This would help consumers select the right display for them rather than ask them to make decisions based on technical detail which, beyond a very few technology aware consumers, has little relevance.
- Similarly, retailers should take time to understand a viewer's watching environment to recommend the best all round screen and create spaces to enable screen types to be easily compared in conditions that are similar to home viewing environments.
- The industry should communicate more clearly the benefits to the consumer of various technical factors, rather than focusing on the technical factors themselves.

The above reflects consumer perception of flat screen TV's with regard to image quality, captured at a point in time. We have no doubt that manufacturers on both sides are enhancing the qualities of their respective technologies and these will bring additional "watching value" to consumers when viewing their favourite programs.

ENDS