



QualityLogic Reliability/User Experience Test Report

In-House Marketing Solutions with the Color LaserJet CP1518ni & Officejet Pro K8600dn HP Printers

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1. Introduction

QualityLogic Inc., an independent test firm, recently completed an evaluation of the HP In-House Marketing solution set compared to that of several competitors. The HP In-House Marketing solution provides users with the tools needed to quickly develop and cost effectively print limited to moderate runs of marketing collateral materials without leaving the office. This solution is targeted at small and medium-sized businesses. The HP solutions evaluated were based on the HP Color

LaserJet CP1518ni color laser and the HP Officejet Pro K8600dn color inkjet printers. Both solutions encompass capabilities that HP provides through their In-House Marketing website. The Color LaserJet CP1518ni and Officejet Pro K8600dn are two of a portfolio of color printers that HP targets to small and medium businesses to help them print their marketing materials in-house. The CLJ CP1518ni is also one of three printers HP recommends on their website for In-House Marketing applications. The competitors included in this evaluation were from Xerox, Lexmark, Dell, Okidata and Samsung, and are the top market share vendors in this segment per information provided by HP. None of these competitors actually recommend a printer for In-House Marketing. The printers evaluated are listed in the table above. These were picked by HP as being in the equivalent price class to the CLJ CP1518ni and OJ Pro K8600dn printers. The evaluation included key characteristics that QualityLogic feels are important in a printer for it to be used successfully for printing marketing collateral materials. In addition to the printer, any in-box solutions and information provided by the vendor were also included in this study. The manufacturers' websites were searched for any pertinent information in regards to In-House Marketing solutions they provide. In addition, each site was consulted in regards to appropriate media and any limitations for the printer. This document summarizes the results from the evaluation. The information is divided into the following sections:

Manufacturer	Printer
HP	CLJ CP1518ni OJ Pro K8600dn
Xerox	Phaser 6130/N
Lexmark	C532N
Samsung	CLP-300
Okidata	C3400
Dell	1320c

1. Executive Summary (an overview of the next four sections)
2. In-House Marketing Online – website content appropriate to In-House Marketing
3. Out of the Box – anything included with the printer that would apply to In-House Marketing
4. Print Media – available media supported by the printer in question

5. Print Quality – when printing documents appropriate to In-House Marketing

Since two HP printers are included in the study, where there are differences between the HP printers the evaluation will note the differences and contrast the solution of each HP printer against the five competitors.

2. Executive Summary

"This study found that the HP solutions used to help customers print their marketing materials in-house are superior to competitors."

Focus Area	HP CLJ CP1518ni	HP OJ Pro K8600dn	Xerox Phaser 6130/N	Lexmark C532N	Samsung CLP-300	Okidata C3400	Dell 1320c
In-House Marketing Online	✓✓	✓✓	✓	✓			
Out of Box	✓✓					✓	
Print Media	✓✓	✓✓	✓	✓		✓	✓
Print Quality	✓✓	✓✓	✓	✓			✓

For the CLJ CP1518ni, in the four areas covered by this evaluation, the HP solution was superior to the competition. The OJ Pro K8600dn was superior in three of four areas compared to the competition. The HP website, common to both HP printer based solutions, offered a significantly broader set of links to help both the novice and experienced user, while providing a larger set of Business templates to get started with. HP's in-box solution with the CLJ CP1518ni printer included a CD with over 100 Business templates, along with a media packet to start printing immediately. The OJ Pro K8600dn did not include this in-box solution thus this is the single area where a competitor, the Okidata C3400, bested the Officejet solution. The print media that HP provides for both printers was the strongest, with a broader set when compared to the competition, with the exception of Xerox. Information on supported media was easier to find for HP than the competitor's products. Most importantly, HP media is more readily available than that of all of the competitors in this study, as it is easily found in local office supply stores. In addition, HP's print quality was superior to all of the other printers evaluated in this study with the documents we used for the evaluation.

Throughout this document the suppliers that had a superior or equivalent solution were given two check marks, those that had a solution were given a single mark while others received none if they did not have a solution.

3. In-House Marketing Online

"The HP website was the most comprehensive site covering a broad base of users while providing enhanced guidance, tools and capabilities."

	HP CLJ CP1518ni	HP OJ Pro K8600dn	Xerox Phaser 6130/N	Lexmark C532N	Samsung CLP-300	Okidata C3400	Dell 1320c
Comprehensive web site	✓✓	✓✓	✓	✓	N.A.	✓	N.A.
Business Templates	✓✓	✓✓	✓	✓	N.A.	✓	N.A.
Web site ease of use	✓	✓	✓	✓	N.A.	✓	N.A.
Enhanced capabilities and services	✓✓	✓✓			N.A.		N.A.

Overall the HP site, is a common element to both HP printer based solutions. It offers the most information, tools and services to help customers print their marketing materials in-house when compared to the competitors. They have multiple templates, kits, tools and links that help individuals with a broad range of marketing experience. At the same time, they provide guidance in the selection of printers for In-House Marketing use and available media for In-House Marketing printing needs. They also provide access to services that the user might not have expected to be available. The single deficiency for HP is the usability of their website: we consider this equivalent to the competitor's sites. This is largely due to the slowness in navigation encountered when using the many links that they provide.

Evaluation Approach

This portion of the evaluation covered elements of the manufacturer's online sites that offered In-House Marketing solutions. Neither Samsung nor Dell had any websites relating to In-House Marketing capabilities, thus the "N.A." entries in the table in the above summary. The other four manufacturers did provide information on their sites relevant to the evaluation. In this portion of the evaluation we felt that there were four key areas. They are:

- 1) How comprehensive the offering available on the website was
- 2) Availability of Business templates
- 3) Any ease of use issues with the site
- 4) Enhanced capabilities and services offered by the site

3.1. Website

HP had the most comprehensive website offering the most assistance to both the novice and experienced marketing professional. The HP website offers a broad range of capabilities. For the novice user, HP had information on what others are doing, basic marketing concepts, how to run direct marketing campaigns, and how to create marketing brochures. For new businesses just getting started, they offered help by providing business templates along with Logomaker, which allows the user to develop their own logo online at a nominal cost. For the more advanced business users, they provided information on the use of color, LogoWorks by HP (a more comprehensive fee-based logo development, business identity and marketing collateral service), as well as links to forms and photos from other suppliers. For all users, they provided recommendations on appropriate printers and print media and numerous classes online covering a wide variety of software applications. The Xerox website was the next most comprehensive, but was limited in comparison. Xerox provided information in regards to use of color, some guidance for presentation development, effective document design techniques and business templates. The Lexmark and Okidata sites were the most limited in what they provided. These two sites offered templates, some of which were appropriate to In-House Marketing applications.

3.2. Business Templates

HP provided a link that allowed downloading of various business template kits that covered a variety of marketing collateral material. The templates were targeted at five industries, in several styles. HP provided all of the templates in Microsoft Word and PowerPoint. In addition some of the templates were available in Microsoft Publisher, Corel Draw and Quark Express. HP typically provided up to nine different documents in each template kit. The templates were complex in composition and rich in the use of color and included guidance on completion. Xerox offered templates - some in Adobe Acrobat and some in Microsoft Word formats. Those in Acrobat could not be saved and used as templates without the Enhanced version of Adobe Acrobat Exchange. The templates in Word format were more useful but did not target any specific industries and included only around three types of documents per template kit. In general, the Xerox templates were simple in design and their use of color. The Lexmark template set had one template set each for Dentistry, Hospitality, Law and Medical, and two sets each for Retail and Service all in Microsoft Word format. These templates were included with a large group of general templates. The Lexmark template kits ranged between three and five documents. They were somewhat complex in design and used color but not as extensively as the HP templates. The Lexmark templates were difficult to download requiring more than one attempt. Okidata provided templates in Microsoft Word format, as well as a couple of designs in Microsoft PowerPoint. None of the templates were grouped together into

Business templates. Okidata provides good recommendations for each of the templates for the novice user. It is interesting that Okidata points out that one option is to proof the page on the Okidata printer and then take it to a commercial printer to have it reproduced by the hundreds. The Okidata templates were, for the most part, simple in design and use of color with only a few complex in composition and rich in color.

3.3. Ease of Use

There is a tradeoff between the amount of information offered and issues in obtaining the information from the websites evaluated. The Okidata website had few issues but it was also the site with the least amount of information. There was confusion on the Okidata site as to the applicability of the templates for the printer that we were using. The Xerox website had the fewest issues for the amount of information that they provided. The biggest issue we encountered with the Xerox site was that searches found two different locations for templates. One set of templates is reviewed above, while the other set was not applicable to In-House Marketing. The HP website offered the largest amount of information with many links, although navigating all of the links was somewhat slow due to website design and duplication of links. In addition, some links did not provide information as expected, information was not complete or there was an error. The Lexmark website had the most errors encountered. Every time we went to download a template, we encountered an error during the process.

3.4. Enhanced Capabilities

HP was the only site that offered what we would term enhanced capabilities. These are capabilities that the user might not have expected. As an example, they offer two different services for developing logos for a small or new business. They offer links from their site to other services. Examples of this are images from iStockphoto and more templates from StockLayouts. In addition HP has a downloadable application called Print View, which supports several printers including the CLJ CP1518ni, which allows users to see exactly how their document will look along with any changes that are made as they finalize the driver settings. HP is the only manufacturer that makes this capability available. We did encounter one issue when using the application but overall found it a benefit. The Print View application does not support the OJ Pro K8600dn.

4. Out of the Box

"For the HP CLJ CP1518ni printer, HP provides both a starter media pack and enhanced templates which no other competitor offers."

	HP CLJ CP1518ni	HP OJ Pro K8600dn	Xerox Phaser 6130/N	Lexmark C532N	Samsung CLP-300	Okidata C3400	Dell 1320c
Business templates included	✓✓					✓	
Media pack included	✓✓						

The HP in-box solution for the HP CLJ CP1518ni is more complete, as it provides the broadest set of Business templates when compared to Okidata, the only competitor that provides a CD. HP also includes a media packet, which allows users to get started quickly. Note that the OJ Pro K8600dn printer from HP does not provide an in-box solution.

Evaluation Approach

In this section we look at elements of the solution that enhance In-House Marketing efforts and are shipped with the printers. There are two areas covered, Business Templates and Media Packet.

4.1. Business Templates

The HP CLJ CP1518ni and Okidata printers are the only ones that ship with a CD. The HP CD is titled "Business Marketing Design" and is targeted at In-House Marketing. On this CD, there are over 100 free templates covering 12 business areas. These templates are easy to use and are available in both Microsoft Word and Microsoft Publisher formats. They do not overlap with the HP website templates but rather expand what is available. They are well organized and easy to navigate and access. These templates are, for the most part, rich in composition with extensive use of color. The templates provide guidelines for customization of the documents. Each of the Business Identities had between six and nine templates that included Letterhead, Business cards, Envelope, Flyers, Brochures and Postcards. All of the templates are from StockLayouts, mentioned in the previous section. In addition to the templates, the CD also contains links to other capabilities, including iStockphoto images and Logoworks by HP, which is also covered in the previous section.

The CD that ships with the Okidata printer duplicates what is available on their website (covered in the previous section). None of the templates were grouped together into Business templates.

4.2. Media Packet

The HP CLJ CP1518ni ships with a media packet. The media packet includes several samples of specialty media useful for In-House Marketing. Included in the packet is the 4 by 6 laser photo media that is unique to the industry. The packet includes print instructions for the media.

5. Print Media

"The HP solution in the media area is the strongest when compared to the competitors in this study."

The HP solution in the media area is the strongest when compared to the competitors in this study.

The HP products both support as broad a set of media weights and types as any of the other products. All weights are supported through the main tray. They provide branded media in various weights and types that is easily available online or locally. The HP driver is helpful in selecting the correct settings for the media.

	HP CLJ CP1518ni	HP OJ Pro K8600dn	Xerox Phaser 6130/N	Lexmark C532N	Samsung CLP-300	Okidata C3400	Dell 1320c
Printer media support information easy to find and understand	✓✓	✓✓	✓	✓		✓	✓
Broad set of media types & weights supported by printer	✓✓	✓✓	✓	✓		✓	✓
All weights supported in main paper tray	✓✓	✓✓	✓	✓✓		✓	✓✓
Print driver makes it easy to chose correct settings	✓✓	✓✓	✓	✓	✓	✓	✓
Broad set of supported media available from vendor	✓✓	✓✓	✓✓	✓		✓	
Vendor branded media readily available in local stores	✓✓	✓✓					

Evaluation Approach

Print Media is a very important part of the solution for printing of In-House Marketing collateral materials. We felt that the following were key considerations for any solution that would span the possible breadth of printing of marketing materials.

1. Information regarding the media to use, types and weights of specialty media, and the limits of the printer should be easy to find and understand, before and after purchase.

2. A broad set of specialty media types and weights should be supported by the printer.
3. It is best if all media can be fed from the main tray.
4. It should be easy to choose the correct settings in the driver for the media to be used.
5. If possible the manufacturer should have their own branded media, as it makes selection of the correct media easier.
6. The ease of acquiring the manufacturer's media is also a consideration.

5.1. Obtaining Media Support Information

The information for the HP printers is quite good and easily available in a number of ways. The HP website has links directly from the page that provides information for each of their printers to a media support page. The same information is accessed from several sites at HP, including the In-House Marketing website. The Xerox data sheet was available with the printer and was easy to understand. It was hard to find media information on the Xerox website, and the information, when found, was hard to use. Lexmark provided information on their website in regards to supported media types and weights, although when the information provided with the printer was reviewed some contradictory information between the two sources was found. Both Lexmark and Dell make a recommendation that before buying specialty media the user should try it first to make sure that it will work. Samsung covered online the types of media only and not weights that they support. The CD that shipped with the printer had to be searched to find more information, some of which was more technical in nature than provided by other manufacturers. The Okidata website did not provide information on media types, with the exception of their own branded media which is very limited in types. They did provide information on media weights supported. Dell provides information on their website regarding the types and weights of media supported, although the types supported are not very descriptive.

5.2. Printer Supported Media

The HP printers provide the most complete list of media types compared to the other printers. HP provides the broadest support for media types, and together with Lexmark and Dell printers all support the broadest range of media weights from the main tray. In addition the HP OJ Pro K8600dn printer supports up to 13 by 19 inch page sizes while the competition, and the HP CLJ CP1518ni, are limited to Letter and Legal sizes. The Okidata and Xerox printers are more limited in the weights they handle in the main tray, while the Samsung is very limited. The Xerox printer and possibly the Dell do not support transparencies. The Lexmark appears to not support envelopes as this is grayed out in the driver.

5.3. Printer Settings

The HP drivers are helpful in selecting the correct settings for the media to be used. For the CP1518ni they specifically reference the exact HP media, which makes selection easy. For the OJ Pro K8600dn the HP driver does not outline weights supported but that is not a requirement for inkjet printers as it is for lasers. The Xerox, Lexmark and Samsung printers allow selection by media type, which also includes weight, although no specific reference is made to weight. Xerox and Lexmark do not include a list of their specific papers as HP does. Both the Okidata and Dell drivers mix the use of weights and types in their driver, which is somewhat more helpful than the other printers but not as good as the HP driver.

5.4. Manufacturer Branded Media

HP provides a broad set of supported media for this and other Color LaserJet and Inkjet printers. The media is broadly available from HP and other sources on the web. In addition, HP media is widely available in local office supplies stores. HP offers at least one media type, HP Color Laser Photo Paper in a 4 by 6 postcard format, which is currently unique in the industry. Xerox is the only other manufacturer in this study that provides a broad set of laser media that can be ordered from them. Little if any of the Xerox specialty media was found in local office supply stores. Lexmark and Okidata have some of their own branded media for laser printing, but their lists are limited and not available in local office supply stores. Dell and Samsung do not offer any of their own media for laser printing.

6. Print Quality

"The HP printers outperformed all of the competition in the print quality that they delivered."

In terms of Print Quality the HP printers outperformed all of the competitors. They

scored higher than the closest competitor and had no samples rated as unacceptable as the other competitors did.

Sample	Description	Printed on ¹
Health Report Cover Page	Front page of a newsletter with photo and text	Brochure paper, card stock 160 gsm ²
Employee Manual Cover Page	Cover sheet for an employee manual with images	HP Brochure paper, card stock. For the K8600. Glossy heavy paper, 200 gsm ³ for all others.
Wine Price Sheet	Single page price sheet with text and images. Includes color gradient	Glossy presentation paper, 120 gsm
Real Estate Agent Postcard	Two sided real estate postcard with text and images	4 by 6 Postcard material ⁴

Evaluation Approach

A critical element of any In-House Marketing solution is high print quality on an appropriate set of papers. Four document samples were chosen to evaluate the print quality of the six printers in this study. The samples are described in the table above, along with the types of paper used for the print job. All samples were printed on each of the printers, with the appropriate settings chosen for the corresponding paper weights and types, and printing from the appropriate tray based on the paper weight. If the printer had special settings for print quality, samples were printed and evaluated for all appropriate settings. The settings that provided the best overall quality on the target paper were then used for printing the final samples. None of the printers recommend special alignment or calibration procedures, thus no special action was taken prior to printing the samples. Wherever possible, the manufacturer-recommended papers were used for the evaluation. For HP, all of the papers were branded by HP with the exception of the Postcard material used for the OJ Pro K8600dn. For Xerox, three of the papers were Xerox brand, while Okidata sourced two of the four and Lexmark one. Samsung and Dell do not provide any papers appropriate for this study. For all non-manufacturer branded papers, sources were chosen from commonly available equivalents. Suppliers of these papers included Wausau, Avery, Hammermill and Staples.

¹ All weights are approximate and within +/-15% between papers tested.

² GSM (grams per square meter) is a common method to characterize paper weights.

³ The Samsung printer could not handle the weight of the Wausau paper used for this sample. As a result the lighter paper used for the health report cover page was substituted.

⁴ HP has a glossy 220 gsm laser postcard which is currently unique in the industry. All other laser printers used the Avery #5889 product. The HP OJ Pro K 8600dn used the 4 by 6 Matte Paper from Avery for Ink Jet, item # 8386. Both Avery products have two cards per sheet on perforated paper which must be manually detached.

There were two evaluations conducted. The HP CLJ CP1518ni was compared to the competition and then at a later point in time the output from the HP OJ Pro K8600dn was compared to the same competition. No comparison was done between the two HP printers.

Seven evaluators were used to assess print quality during each evaluation. They were chosen from the QualityLogic staff and are experienced print quality evaluators. The assessment was a blind evaluation and no subjects had knowledge of which printer was used to print each of the samples. The following methodology was used for the comparison of each of the four samples:

1. View the samples as though the evaluator had developed them for their own business. The objective is to choose the sample that provides the best image for the business.
2. A high quality PC display was used to access the original document for comparison purposes to understand the original intent and color.
3. Score the samples on a 1 to 10 scale with 10 being best. Note any samples that were found unacceptable with scores of 5 and below.

HP CLJ1518ni vs. Competition

The table to the right summarizes the average scores for all evaluators for all samples. HP's print quality scores are higher than the closest competitor. In addition, the HP printer had no samples rated as unacceptable. In the comparison of the HP CP1518ni the Xerox, Lexmark and Dell printers

Printer		Average Score	# Unacceptable
HP CLJ CP1518ni	✓✓✓	9.3	✓✓✓ 0/28 – 0%
Xerox Phaser 6130/N	✓	6.7	✓ 8/28 – 29%
Lexmark C532N	✓	6.7	✓ 10/28 – 36%
Dell 1320c	✓	6.6	✓ 5/28 – 18%
Okidata C3400		5.0	16/28 – 57%
Samsung CLP-300		3.6	28/28 – 100%

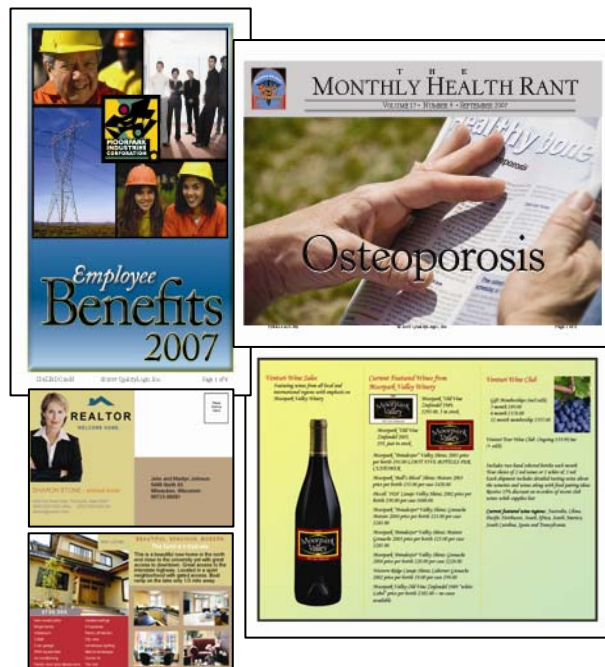
grouped closely together with scores between 6.6 and 6.7, and between 18% and 36% of the scores rated as unacceptable. Dell had the fewest unacceptable scores at 18%. Okidata was fifth overall, with Samsung coming in last.

HP OJ Pro K8600dn vs. Competition

The table to the right summarizes the average scores for all evaluators for all samples. HP's print quality scores are higher than the closest competitor. In addition, the HP printer had no samples rated as unacceptable. In the comparison of the HP Officejet Pro k8600dn the Xerox, Lexmark and Dell printers grouped closely together with scores between 6.3 and 6.6, and between 21% and 32% of the scores rated as unacceptable. Xerox had the fewest unacceptable scores at 21%. Okidata was fifth overall, with Samsung coming in last.

Printer		Average Score	# Unacceptable
HP OJ Pro K8600dn	✓✓✓	9.5	✓✓✓ 0/28 – 0%
Xerox Phaser 6130/N	✓	6.6	✓ 6/28 – 21%
Lexmark C532N	✓	6.4	✓ 9/28 – 32%
Dell 1320c	✓	6.3	✓ 9/28 – 32%
Okidata C3400		5.1	19/28 – 68%
Samsung CLP-300		3.3	27/28 – 96%

The images to the right are samples of those used in the evaluation.



7. About QualityLogic

QualityLogic is a leading Software Quality Services Company offering a variety of testing services and related tools focused on the conformance, performance, and interoperability testing needs, from low level firmware testing, to high level multi-tier application testing. QualityLogic has over 22 years' experience, both in developing specialized test tools and providing comprehensive testing services for top industry manufacturers.

This study was commissioned by HP.

Test results provided by QualityLogic. Tests were performed under laboratory conditions and your results may vary.