

KITCHEN DESIGN: A TWENTY-YEAR COMPARISON 1968: 1988

Carmen D Steggell and Joan R McFadden

Abstract

Of all the rooms in the home, the kitchen has received the most attention in terms of design efficiency. Widely accepted standards for kitchen design have existed since the early 1960s; however, it has not been clear how carefully designers have adhered to them. This study examined kitchens presented as models in 1968 and 1988 consumer magazines. Content analysis was conducted to determine the kitchens' conformity to fundamental kitchen design guidelines. The majority of kitchens were found to have one or more major flaws. The most common problem was cross traffic interruption of the work triangle. Other frequent problems included a lack of counter space next to the open side of the refrigerator and a lack of counter space next to the oven. Mean efficiency scores on a five-point scale were 3.79 in 1968 and declined to 3.50 in 1988.

Introduction

Of all the rooms in the home, the kitchen has received the most attention in terms of design efficiency. In 1869, in her widely read book *The American Woman's Home*, Catharine Beecher encouraged women to insist on a "Christian home" that included her design for an efficient kitchen. Her aim was "... to show how time, labor, and expense are saved, not only in the building, but in...its [interior] arrangement" (p.25). The kitchen plan she advocated prescribed the arrangement of work and storage spaces, and was detailed down to the placement of foodstuffs and utensils.

By 1897, when the *Ladies' Home Journal* had the largest circulation of any magazine in the world, nearing one million, editor Edward Bok published plans for "The Model Suburban Home." Although it was actually a "model of discomfort, bad lighting and close, shrugging lines" (Woodward, 1960, p. 70), hundreds were built exactly as shown, and thousands more adapted the plans. America was looking for guidance in home and kitchen design.

Gilbreth (1927), who pioneered the application of industrial time-and-motion studies to household work, along with Wilson (1938) and other early researchers, explored the height and placement of kitchen work spaces for maximum efficiency. By the end of World War II, America had undergone a technological revolution that resulted in the modern, standardized kitchen (Cowan, 1976). A wide selection of appliances were readily available. And with "packaged" and "case unit" kitchens waiting to be incorporated into postwar homes, the need for basic research in kitchen planning became acute. Heiner (1945) called for work in defining storage and equipment needs, as well as space requirements relating to kitchen activities. They were to be based on female proportions and on the psychological aspects of kitchen design.

By the 1960s, a wealth of information concerning kitchen design was available. Steidl and Bratton reported (1968) that:

An impressive amount of research [had] been done on the arrangement of kitchens. A substantial contribution to the research literature was made from projects at Cornell University Agricultural Experiment Station (Heiner and Steidl, 1950, 1951a; Mize, 1952; Mize et al.,

Carmen D Steggell is a Ph.D. Candidate in the Human Development and Family Science Department at Oregon State University. Joan R McFadden is a faculty member in the Department of Housing and Equipment at Utah State University.

1952; Snow, 1956; Steidl, 1954, 1955b, 1957, 1960). Other published research [was available] from various state agricultural experiment stations: Washington (Wiley, 1950), Oregon (Wilson, 1938), Utah (Bennion et al., 1956), Indiana at Purdue (Mundel et al., 1948), and Illinois (McCullough and Farnham, 1960, 1961a, b). Various master's theses and popular leaflets based on research [also contributed] helpful information (Steidl and Bratton, 1968, p.132-33).

In 1965, when the Small Homes Council-Building Research Council published its definitive *Kitchen Planning Guide* (Wanslow), many of today's prevailing kitchen design guidelines were already established. *The Kitchen Planning Guide* (1965) was a landmark publication. It was based on the extensive research that had been conducted at the University of Illinois and elsewhere. A "kitchen score sheet" was included that could be used to analyze a specific kitchen's arrangement, storage space, convenience, and general efficiency. *The Kitchen Planning Guide* (1965) and other books incorporating on-going research were widely used in the training of home economists, architects, and others associated with kitchen design.

By the 1970s, there were new questions. The impact of evolving technologies and changing family life-styles on kitchens had not been fully explored. The arrival of the separate cooktop and oven and the introduction of the work island have complicated the traditional "work triangle" concept. In addition, as households acquired microwave ovens, questions concerning the safe and efficient placement of this appliance arose. The movement toward dual-earner families and equal rights for women suggested that kitchens needed to accommodate multiple workers. "Suggestions for kitchen planning adaptations for two workers had been made as early as 1914; however, empirical research [had] not been done to determine the impact on basic planning standards of a second worker in a kitchen" (Olson and Yust, 1987, p. 267).

Questions raised by new appliances and changing life-styles are now beginning to be answered. Yust and Olson (1987) and Turkki (1987) have recommended the placement of the microwave within the kitchen based on their research. The Yust and Olson height recommendations will soon be integrated into National Kitchen and Bath Association Technical Manuals for study by Certified Kitchen Designers. Other research by Olson and Yust (1987) has addressed the implications for kitchen planning when two workers share meal preparation. Nevertheless, definitive standards have yet to be developed for microwave placement within the work triangle and for two-worker kitchen arrangements.

While some widely-accepted standards for kitchen design have existed since the 1960s, it is not clear how carefully designers have adhered to them. There are three objectives for this study. The first is to examine kitchens presented to consumers as implied models of the ideal. The next is to quantify the extent to which these "ideal" kitchens comply with accepted guidelines. The last is to compare contemporary models with those presented twenty years ago.

Research Method

Population

Communications scholars and practitioners appreciate that communications may be a prime data source for social analysis. Members of society who have been raised in an environment of constant exposure to media are increasingly influenced by mass media messages. Brimm (1983) reasons that as electronic and print media proliferate, society becomes more and more dependent upon them to provide necessary information. In this study, general circulation magazines, as indexed in *Readers' Guide*, were examined.

Every article concerning kitchens which was indexed in 1968 and in 1988 was examined. A content analysis was conducted to determine the configuration of each kitchen and its conformity to accepted kitchen design guidelines.

Although prescriptions detailing precise measurements in kitchen arrangement were available, including a "kitchen score sheet" from *Kitchen Planning Guide* (1965),

it was not possible to accurately determine compliance from the photographs and diagrams shown in the magazines. As a consequence, six guidelines were developed from compatible standards in three sources: the *Kitchen Planning Guide* (1965); Steidl's *Extension bulletin* from Cornell (1968), and a popular housing textbook by A.M. Watkins (1962). These guidelines were:

1. Counter space to the right of the primary sink.
2. Counter space to the left of the primary sink.
3. Counter space on at least one side of the cooktop.
4. Counter space on at least one side of the oven.
5. Counter space on the open side of the refrigerator.
6. The work triangle is free from traffic interruption.

It was not possible to determine exact measurements of these spaces from the photographs and limited descriptions of the kitchens in the magazines. Nor was it possible to calculate total storage space, adequacy of lighting, or any aspect of ventilation. However, it was felt that examination of these six, basic aspects of each design would suggest a general efficiency score for the design. Therefore, scores for overall kitchen efficiency were computed. The guidelines were given a point value as follows:

Counter space to the right side of the primary sink	= 1.0
Counter space to the left side of the primary sink	= 1.0
Counter space on at least one side of the cooktop	= 0.5
Counter space on at least one side of the oven	= 0.5
Counter space on the open side of the refrigerator	= 1.0
Work triangle free from traffic interruption	= 1.0

Most sources treated the cooktop and oven as a single unit, assuming that if there was counter space next to the cooktop, it followed that there was counter space next to the oven. Since separate cooktop and oven locations are now fairly common, the guideline "counter space on at least one side of range" was separated for this study, and the point value divided between the two. Scores on each item were summed for a total value ranging from zero to five, and an overall mean was calculated.

In addition to the six guidelines, data were gathered on the configuration of each kitchen, the absence or presence of second sinks, work islands, and other special features such as intercom systems, televisions, and computers. The affiliations and credentials of designers, when stated, were also recorded.

Analysis

The authors reviewed all articles concerning kitchens that were published in general-circulation magazines in 1968 and in 1988. Findings are reported as frequencies and percentages. Descriptive statistics were prepared using the *Statistical Package for the Social Sciences* (1983).

Caution must be exercised in generalizing these findings to any other population. There are several other magazines that sometimes feature kitchens. *Interior Design* and *Professional Builder* are examples. But they circulate among professionals in the housing industry and their readership or consumer influence may not be comparable to the consumer-oriented magazines examined in this study. Similarly, many kitchens were designed and built or remodeled during the study period. This work did not survey actual kitchen construction; hence, we cannot be confident that the recommendations of the magazine articles were incorporated into actual kitchens.

Reliability in content analysis is generally a question of replicable results (Andren, 1981). Coding reliability for this study was tested by employing two independent researchers to code a pilot test sample. Agreement among the codings was tested with a simple test of proportions and was found to be 93 percent. This was considered acceptable based on other content analyses of magazines conducted by Silver (1976) and Merrell (1985) who accepted reliability scores of 85 and 80 percent respectively.

Findings

Description of the Population

References given by the *Readers' Guide Index* included articles on kitchens in 14 different consumer magazines. Of those, nearly 75 percent of the kitchens were presented in only five magazines: *Better Homes and Gardens*, *Good Housekeeping*, *House and Garden*, *House Beautiful*, and *Sunset*. Other articles were presented in *American Home*, *Architectural Digest*, *Farm Journal*, *Ladies' Home Journal*, *New York Times Magazine*, *Popular Science*, *Successful Farming*, *Saturday Evening Post*, and *Southern Living*. Six additional articles were indexed. Four of these were for do-it-yourselfers; two were essays on life-styles. A complete reference list of all the articles examined is available from the authors.

According to *Ulrich's International Periodicals Directory* (1966, 1988), the subject publications represent a combined circulation of nearly 14 million in each of the two years examined. A total of 143 kitchens were examined; there were 87 in 1968 and 56 in 1988. Nearly 50 percent of the articles focused on kitchen arrangement, while 34 percent focused on decor. An additional 14 percent focused on new equipment or new materials for kitchens. Recommendations for the design of new kitchen construction was the focus of 35 of the 143 or about a fourth of the articles examined. Recommendations for remodeling a kitchen were the theme of 96 of the articles or about two thirds. Whether a kitchen was new or remodeled was not specified in 12 of the articles. This represented about eight percent.

Who Designs Kitchens?

Of the 87 kitchens examined from 1968 magazines, 46 did not mention the designer. From the 41 kitchens remaining, 25 of the designers listed an affiliation with architectural firms, and three were American Institute of Architects (AIA) members. Four listed "interior designer" as the principal kitchen designer of whom two claimed the American Society of Interior Designers (ASID) designation. Two other interior designers worked as consultants to architectural firms that designed the kitchens. Seven home owners designed their own kitchens. Their professional status was not noted. Three of the designs were sponsored by the magazines in which they appeared.

In 1988, 56 kitchens were examined. More than a third of these did not mention the designer. Architectural firms were associated with 24 of the kitchen designs. This represented 43 percent, with five claiming membership in the AIA. Only one interior design firm was listed as the principal designer of a kitchen, although three were named as associate designers and claimed affiliation with the ASID. There was one Certified Kitchen Designer (CKD) kitchen in the 1988 designer population, and five home owners who designed their own kitchens.

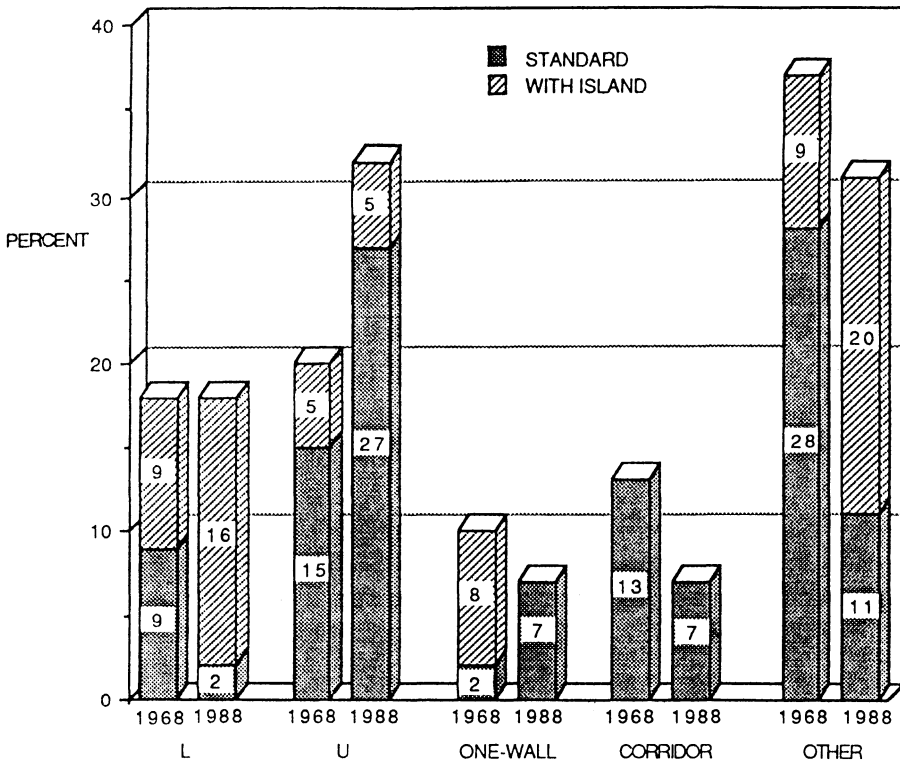
Kitchen Configuration

Most discussions of kitchen configurations, both in professional literature and in consumer publications, recognize four fundamental plans. These are commonly "L," "U," "one-wall," and "corridor." The pilot study for this project revealed that these four configurations often included an island. So each kitchen examined was identified as one of the following: "L," "L-plus-island," "U," "U-plus-island," "one wall," "one-wall-plus-island," "corridor," and "other." The "other" label was used for all nonconforming plans such as hexagonal and circular designs. In 1968, about 10 percent of the kitchens were arranged as an L, 15 percent were arranged as a U, 12 percent were corridor kitchens, and less than five percent were one-wall arrangements. These are shown in Figure 1. The L-plus-island configuration was found in about 10 percent of the 1968 kitchens. The U-plus-island was in about five percent; one-wall-plus-island in about 10 percent. The "other" label was recorded for about 35 percent of the kitchens. Almost ten percent included islands.

In 1988, less than five percent of the kitchens were a straightforward L. About 15 percent were L-plus-island. The U configuration was most frequent, with over 25 percent. An additional five percent had the U-plus-island arrangement. The corridor configuration was seen in less than 10 percent of the kitchens. A simple one-wall con-

figuration was not seen at all in 1988. The one-wall-plus-island, however, was found in over five percent of the kitchens examined. Over 30 percent of the kitchens were labeled "other." Almost 20 percent included islands as indicated in Figure 1.

FIGURE 1
KITCHEN CONFIGURATION



The Kitchen Island

About 30 percent of the kitchens examined from the 1968 portion of the category included islands. By 1988 the figure had grown by almost half. The addition of an appliance to the island was comparable at about 40 percent for both years. The cooktop stove was the most common. Second sinks were found in 25 percent of the kitchens examined. The third-most-popular configuration was the work-space-only island. This represented about 15 percent as shown in Table 1

Table 1. Description of the island.

	Percentage*	
	1968	1988
Work-space-only	26.9	15.4
Appliance	42.3	46.2
Primary sink	15.4	7.7
Appliance + primary sink	3.8	3.8
Second sink	3.8	19.2
Three or more items	7.7	0.0
Appliance + second sink	0.0	7.7

*May not sum to 100 percent due to rounding.

The Microwave Oven

The microwave oven is a relatively new addition to the kitchen. In 1968 only six percent had a microwave oven. By 1988, the figure was completely reversed; over 90 percent included a microwave oven. This number exceeds the 75 percent ownership rate reported by *Consumer Reports* (1989).

The best placement of the microwave within the work triangle has yet to be determined. Work by Yust and Olson (1987) suggests that the microwave be placed close to the "mix center," convenient to the "sink center," and situated so the interior shelf is between two inches below the user's elbow and ten inches above. One study suggests the microwave should have "a good connection [with] at least the work top and dining table" (Turkki, 1987, p. 71). In the 1988 kitchens, over 50 percent of the ovens were installed along with a conventional built-in wall oven. Oven placements are fairly consistent with the Yust and Olson recommendation. What is often omitted is nearby counter space to accommodate heavy, sometimes hot, dishes.

At almost 20 percent, the second most common location for the microwave was on a counter top. This placement may be the most convenient space for kitchens that have not been remodeled to accommodate the microwaves. And though within the Yust and Olson height recommendations, this location is a trade-off: it reduces much-needed work space but usually has the advantage of nearby counter space.

In about 15 percent of the kitchens the microwave was in a wall away from the conventional oven or built into an upper cabinet. Sometimes this was near a dining table, by a secondary sink, or near a work space. Heights varied widely. Few had counter space for hot or heavy dishes. One in ten kitchens situated the microwave over the cooktop in the space designated for a ventilation hood. While this arrangement saves space in small kitchens, it is too high, according to Yust and Olson (1987) for either safety or convenience. In addition, it may conflict with the use of the cooktop below, and if the cooktop is in use, could present safety problems. Beyond that, microwaves designed to

fit an over-the-cooktop space are generally smaller. The only other microwave location noted was on a portable cart. This was found in less than five percent of the houses as shown in Table 2.

Table 2. Placement of microwave.

	Percent 1988
With wall oven	51.4
Counter top	18.9
Other wall or upper cabinet	16.2
Over cooktop	10.8
Cart	2.7

Kitchen Efficiency

Of the six fundamental design criteria identified, the most frequent problem was the interruption of the work triangle by cross traffic. Nearly 50 percent of the kitchens in 1968 were free of this problem. By 1988, the figure had risen to well over 50 percent. Another recurrent problem was the lack of counter space next to the open side of the refrigerator. In 1968, over 60 percent of the kitchens met the requirement, while only 50 percent of the 1988 kitchens succeeded. The popularity of the two-door, side-by-side built-in refrigerator may have influenced this development. These figures are shown in Table 3.

Table 3. Adherence to fundamental guidelines.

	Percent	
	1968	1988
Counter space, right of primary sink	95.4	87.5
Counter space, left of primary sink	87.4	92.9
Counter space, one side of cooktop	72.4	71.4
Counter space, open side of refrigerator	63.2	50.0
Work triangle free of traffic interruption	49.4	55.4

A third major difficulty in kitchen design was the lack of counter space next to the oven. When the cooktop and oven were found in one unit, almost all of the kitchens provided convenient counter space. When the cooktop and oven were separated, counter space was provided next to the cooktop in almost all while counter space was provided next to the oven only about 65 percent of the time. This is shown in Table 4. In addition to the inconvenience, this problem was viewed as a potential safety hazard.

Table 4. Counter space next to cooking unit.

	Percent
Cooktop/oven unit	94.6
Separate units	
Cooktop	94.9
Oven	64.1

The overall efficiency of each kitchen was determined by a method designed to yield comparable scores. A system of rating from zero to five was established in which five was the highest mark. Efficiency scores were computed by summing the ratings on each of the guidelines for a total score from which a mean was then calculated. The mean was used as the kitchen efficiency score. The kitchen efficiency score for 1988 was a mean of 3.5, lower than the 1968 mean of about 3.8. As shown in Table 5, this suggests that kitchen efficiency is not improving with time. The reasons for the lower 1988 score were not evident.

Table 5. Kitchen efficiency scores.

	Percent*		
	1968	1988	Combined
0-2	3.4	10.7	7.7
2.5-3.5	26.4	41.0	32.2
4-5	66.7	48.3	59.5
Missing cases	1.1	0.0	0.7
Mean	3.79	3.50	3.68
Mode	4	4	4

*May not sum to 100 percent due to rounding.

In the magazine articles nearly 50 percent of the kitchens examined focused on kitchen efficiency. The mean score of those, about 3.8, was only slightly higher than the overall mean of about 3.6. Again the most common problem was interruption of the work triangle by cross traffic. In the entire category, about 50 percent (1968) and 55.3 percent (1988) of the kitchens were free of this problem. In the "efficient" designs, less than 50 percent were free of the problem. The second most common problem was the lack of counter space next to the open side of the refrigerator. "Efficient" kitchens had this counter space two thirds of the time, compared with overall ratings of 63.2 percent (1968) and 50.0 percent (1988). Like the entire category, the other four guidelines were met 70 to 90 percent of the time.

Discussion

One of the purposes of this study was to compare contemporary kitchen models with those presented twenty years ago. The changes most evident in the kitchens examined were the adaptation of an island and a microwave oven in most of the kitchens shown in 1988. The adaptation of the microwave oven is, of course, a direct result of new technology. It may also be influenced by today's fast-paced life-styles. Kitchen designs that include islands may also reflect changing life-styles as more women participate in the labor force and other family members begin to participate in food preparation. The island may accommodate simultaneous preparation better than traditional kitchen configurations. Some islands are equipped with secondary sinks to further accommodate multiple workers (Steggell and McFadden, 1989). The consumer demand for a combination kitchen and family room, or "great room," (Wells, 1989) may also reflect consumers' desires for family participation in food preparation as the family gathers after spending the day apart and away from home.

Why do kitchen designers ignore some of the most basic efficiency guidelines, when these have been painstakingly established and are well-accepted and available among professionals? Some kitchen designers are employed by retail appliance dealers or by cabinet shops. When the primary objectives are sales and profit, designers may feel little obligation to design for efficiency. Perhaps designers lack the knowledge that would improve their designs. Or perhaps there may be architectural features or budget constraints which limit the designers' options. Consumers may not be well informed concerning kitchen design. They may be too easily swayed by glittering new appliances and the interior ambiance of a kitchen to insist on design efficiency.

Implications and Recommendations

Guidelines for kitchen design have been well researched and widely accepted for several decades. In light of this study, it is clear that even the most fundamental requirements for efficiency, convenience, and safety are often lacking in kitchens presented to consumers as models of the ideal. Beautiful kitchens are presented to the average customer complete with attractive cabinets, counter tops, floors, wall coverings, modern appliances, and professional decor. Only after working in such kitchens does the inadequacy of the design become apparent. By then it may be too late or too expensive to modify. In an age when people are increasingly dependent upon media to provide needed information, publicizing models of attractive yet inefficient kitchens in magazines that circulate to over 14 million households seems tantamount to misleading consumers. Historical precedence suggests that consumers may imitate magazine presentations. An infamous example occurred when thousands of homes were patterned after the poorly designed "Model Suburban Home" featured in the *Ladies Home Journal* (Woodward, 1960).

An impressive amount of research has been conducted on the arrangement of kitchens. Additional work is currently being directed by the National Kitchen and Bath Association to establish design criteria for two-cook kitchens and for incorporating islands, peninsulas, and new technologies. Revised *Kitchen Industry Technical Manuals* will be released in 1991 (Eber, 1990). The importance of a kitchen that will accommodate multiple workers in an efficient manner should appeal to a wider segment of the consuming public as women are increasingly employed in the labor force and men and children expand their roles in family food preparation. Perhaps an increased awareness of the importance of efficient designs will result in a willingness on the part of consumers to invest in professional advice. Research should be conducted to determine the level of understanding that consumers possess regarding kitchen design and their skill in making design choices.

Further research should be conducted to determine the extent to which American kitchens adhere to accepted guidelines. The trend toward the kitchen as a multipurpose room raises questions concerning the storage of items other than food or cooking utensils. In addition, as the computer becomes a common household appliance that is sometimes placed in the kitchen, questions concerning its placement should be studied.

It is important for educators to recognize their potential to influence consumer choices and to become even more active in communicating with the general public. The kitchen is the most expensive and most frequently remodeled room in a house. It is a room that is regaining popularity as a family gathering place. Housing educators should exercise their influence toward improved kitchen design. This influence should not be limited to the university setting or through extension, but through professional organizations such as ASID, AID, CKD, and through the popular press. Increased awareness may better equip consumers to question whether a proposed design will meet the needs of the family it is designed to accommodate. Something as simple as a checklist of standards could enable a consumer to critically and accurately evaluate the efficiency of a proposed design.

This study suggests that there is much to be done to educate the public and to encourage designers to improve kitchen designs. The successful outcome of such efforts will be more efficient and convenient kitchens and improved lives for their users.

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