

Nov 17th, 12:00 AM

The Domestic Cooking Appliance: A Fundamental Re-Evaluation.

Selby Coxon
Monash University

Follow this and additional works at: <https://dl.designresearchsociety.org/drs-conference-papers>

Citation

Coxon, S. (2004) The Domestic Cooking Appliance: A Fundamental Re-Evaluation., in Redmond, J., Durling, D. and de Bono, A (eds.), *Futureground - DRS International Conference 2004*, 17-21 November, Melbourne, Australia. <https://dl.designresearchsociety.org/drs-conference-papers/drs2004/researchpapers/186>

This Research Paper is brought to you for free and open access by the Conference Proceedings at DRS Digital Library. It has been accepted for inclusion in DRS Biennial Conference Series by an authorized administrator of DRS Digital Library. For more information, please contact DL@designresearchsociety.org.

The Domestic Cooking Appliance: A Fundamental Re-Evaluation.

Selby Coxon

Monash University

Objectives of Research

To develop a more pertinent paradigm of the domestic kitchen cooker to contemporary modes of eating and living.

Method

The author has adopted a pragmatic research approach to the re-modeling of the domestic cooker developed from the practice of Industrial Design.

Nature of Main Findings

The author has developed a new three-dimensional model of the domestic cooker reflecting a more aligned usage behaviour with contemporary living.

The author's hypothesis is that a proliferation in kitchen 'gadgets' has led to work benches crowded with appliances: toasters, kettles, rice cookers, bread makers, electric woks and sundry objects that jostle for what can often be short lived 'faddish' supremacy. Along with this consumerism has been a rapid expansion in dietary choice. A wide range of food is available to the western pallet that would have been unheard of a generation ago. Multiculturalism in countries, especially Australia, has led to the broadening of culinary tastes and with that a diversity of cooking techniques.

The making and consuming of food is a distinguishing part of our everyday life. Family and domestic structures are evolving. There are more people who live alone and more urban apartment dwellings. Eating out is more accessible and cooking skills are taught less in schools with a consequence upon our cooking behaviours. All these changes suggest an opportunity to question the current paradigm of what the domestic cooker should be.

The aim of the author's work is to advance a redefining of those loose collections of objects and appliances that 'roam' the kitchen environment and to offer an alternative solution to the domestic cooker. The physical outcome of this research addresses a design specification based upon the criteria of contemporary society. A 'modular systems' approach to cooking equipment has been developed, with a cohesive array of objects that cater for the variability of human need. The intention of the author is that this outcome will enable comparisons and create implications for future research.

The domestic cooking appliance: A fundamental re-evaluation.

Abstract

Central to this paper's discussion is that a proliferation in kitchen 'gadgetry' has led to kitchen benches crowded with appliances: toasters, kettles, rice cookers, bread makers, electric woks and sundry objects that jostle for short-lived fashionable supremacy. Coinciding with this consumerism has been a rapid expansion in dietary choice. A wide range of food is available to the western palate that would have been unheard of a generation ago. Multiculturalism in countries, especially Australia, has led to the broadening of culinary tastes and with that a diversity of cooking techniques.

Outside these culinary changes family and domestic structures are evolving. There are more people living alone and more urban apartment dwellings. Eating out has become more accessible and cooking skills are taught less in schools which have impacted upon our cooking behaviours. All these changes suggest an opportunity to question the current paradigm of the domestic cooker.

A central aim of the author's work was to redefine those loose collections of objects and appliances that 'roam' the kitchen environment. Through design studio research an alternative proposal is presented here, one that addresses a design specification based upon the criteria of contemporary society. A 'modular / systems' approach to cooking equipment has been developed, with a cohesive array of objects that cater for the variability of human need.

1. Introduction

Embedded in the world of our everyday experience is the making and consuming of food. In this participation we inevitably pass through the collective environment of the kitchen its products and architecture [1]. Yet, even in the home in which nobody cooks, the paraphernalia of the kitchen remains part of the landscape. The domestic cooking appliance has not fundamentally changed radically from the four-burner cook top. The nature of the research was to revisit the domestic kitchen cooker and re-evaluate its functional significance in the light of contemporary western life.

1.1 The context of the problem.

There is a widening of culinary tastes as evidenced by the profusion of popular culture, lifestyle magazines, cookery programmes and the number of restaurants reflecting successive waves of immigration. Increased access to and awareness of the variations of culture through travel, television and increasing globalization has meant that within a generation diets have become broader, accommodating an ever-increasing appetite for diversity of experience. The repercussions for the kitchen can be seen in the burgeoning consumerism of electrical appliances that promise authentic replications of specialist dishes from around the world. Rice steamers and woks as well as pasta and bread makers unheard of a generation ago, exemplify this trend.

Family and domestic structures are also evolving. There are an increasing number of people who live alone [2]. There is an increase in urban apartment dwellings, and this trend is set to increase [3]. Eating out is more accessible and cooking skills are taught less in schools with a consequence upon our cooking behaviours. Statistics suggest that inner city Australians will eat 'out' as much as three times a week [4]. The implication here is that a plentiful food supply of a wide variety of choice and price is likely to entice a money rich / time poor household away from the kitchen rather than send it back into the domestic 'cocoon'. [5]

[1] R. Nelson – *Expressions of purpose in Australian Design* – Melbourne, Monash University, 1992. p42

[2] Australian Bureau of Statistics, 2003.

[3] Victorian Government – *2030 Report* – Melbourne 2001.

[4] Unknown author - *Sunday Herald Sun* – Melbourne, March 3 2002, p16.

[5] F. Popcorn - *The Popcorn report* – New York, Random House 1992, p78.

1.2 The contemporary kitchen cooker.

Anecdotal evidence suggests few people utilize all the burners on their cook top at one time. Those with children find their cooking implements, pots and pans, migrate from the front to the back two burners as their children become more mobile and curious. Six burner units exist for the avid entertainer but are they a status symbol or an answer to a real need?

A stroll down any city high street or a brief glance at interior design magazines tends to indicate that the traditional arrangement of the four-burner hob and oven is deeply ingrained into the fabric of kitchen interior culture. There are subtle changes in materials and finishes in an attempt to appear fashionable. Contemporary style in kitchen appliances would appear to confine itself to an 'artful metallurgical confection' [6]. The cultural significance of the four-burner arrangement, the author speculates, is probably why few designers have been brave enough to change it. In the western context of cooker design there remains a tendency to be drawn to those materials and colours that personify a sense of hygiene (for practical reasons) and cleanliness, such as stainless steel or white enamel. Further modifications and apparent innovations in the product are masked to some extent by this uniformity [7].

New technology invites opportunity for exploration into new design models. The development of the microwave oven demonstrated that a new technology needed a new visual vocabulary. However even this has now been refined to a point where differentiation comes from an ever increasing array of more complex operational controls.

2. Framework of the study

The author's research question is framed in two parts. Firstly in the light of contemporary society, what are the general needs of a cooking appliance? Secondly, what new paradigm of cooker will provide a satisfactory performance for both the occasional cook and the frequent entertainer?

The author's approach to the study is that of a series of defined steps. These steps follow a combination of models developed by Williamson, and also Roozenburg and Eekels that reflect the author's own experience in research, teaching and design practice [8] [9].

[6] *Design Style* - London, Design council, 1995, p36.

[7] Adrian Forty - *Objects of Desire* – London, Thames and Hudson, 1986, pp 207 –214.

[8] K.Williamson - *Research Methods for Students and Professionals* - Wagga Wagga, NSW – Charles Sturt University 1999, p143.

[9] N.F.M. Roozenburg and J. Eekels - *Product Design Fundamentals and Methods* – place John Wiley and Sons 1995, pp 151–152.

2.1 Cooking behaviours.

A review of current written commentary reveals that a principle driver of cooking behaviour is confidence in the operation of cooking equipment and the processes involved in the preparation of a meal [10]. A lack of these skills or knowledge of food preparation techniques as well as facilities has been identified as an important factor in limiting, in particular, the choice of food purchased by men. More women compared to men are confident about specific techniques in cooking [11]. For example, females are more confident about stewing, braising and casseroles. However, also revealing is that confidence is strongly related to age. Steaming, poaching, stewing and braising are not methods younger women feel familiar with. Older women appear to be more confident in this instance, with the exception of using a microwave. Confidence with cooking techniques is greatest in groups with the highest educational qualifications, especially in stir frying and micro-waving. In the case of deep fat frying the education trend is reversed [11].

The author questioned a selected group of people to ascertain their usage profile toward their own kitchen cooker. The focus group was made up of the following profiles:

- 5 single people less than thirty years of age.
- 2 people over fifty years of age.
- 3 couples with young children (therefore 6 adults).

In all cases, including those with children, an infrequent use of all four burners at the same time was revealed. In the case of the single home occupant, frequent single burner usage was discussed. However, all groups with the exception of those over sixty years of age commented on the frequent use of individual separate electrical appliances for specific tasks. (Toasters and rice cookers being examples). Those interested or competent to some degree with various cooking skills revealed frequent usage of the oven. Microwaves were used largely for reheating food, the cooking of readymade meals or defrosting.

[10] M. Caraher, P. Dixon, T. Lang R. Carr-Hill - *The state of cooking in England the relationship of cooking skills to food choice* – Reading, Thames University, 1999, pp 197 - 199, and p595.

[11] T. Lang and M. Caraher *Cooking skills and health* Reading, Health Education Authority, 1999, p31.

2.2 Identification of the problem.

The author's focus group although small, supported findings from the wider survey conducted by Lang et al [11]. Correlation with this wider survey helped in identifying the design problem. Variability in user needs determined that a desirable appliance would be one that readily expanded or contracted to meet specific requirements.

Respondents	Frequency of use on a daily basis:		Identified problems with current cooktop arrangement
	Cooktop burners	Bespoke appliances	
a1	Only use one.	Electric wok, toaster.	Cooker / oven too big.
a2	Only use one.	Toaster.	Lack of bench space.
a3	Mostly two.	None.	Storage space for appliances.
a4	At least three.	Electric wok / rice cooker / grill.	Power lead management. Lack of bench space.
a5	Only use one.	Electric grill.	Cooker / oven too big.
b1	Mostly two.	Toaster / steamer.	Cleaning.
b2	Only use one.	Microwave.	Association of microwave with the rest of the cooker.
c1	At least three.	Kettle / toaster breadmaker.	Power lead management.
c1			Non - child safe cooking surfaces.
c2	Mostly two.	Microwave / Kettle / electric grill.	Child proof controls / cleaning.
c2			
c3	Mostly two.	Microwave.	Non - child safe cooking surfaces.
c3			

Key: a = Single person under thirty years of age.
 b = single person over fifty.
 c = Married couples with children.

Figure 1.
Focus group problem definition.

2.4 Design process.

The focus group responses were applied to studio-based activities in which both drawing and model making were employed to empirically test new outcomes. Re-design activities focused on flexibility of usage, integration of bench top appliances into the cooker, child security and clean unbroken surfaces.

At the end of a period of sketch exploration the author had in essence three broad conceptual directions to evaluate. The first and most radical being home vending, the second a re-invention of architectural space, and the third the deconstruction of actual cooking techniques. The author returned to the focus group for evaluation of these broad concepts. Their response was unanimously in favour of the deconstructed cook top.

There is a tangible appeal to the concept of clearing the traditional kitchen bench and re-constructing the constituent parts in a variable cooking system. Both German manufacturers Gaggenau and AEG already offer a solution of 'fixed' components in its modular range. What might be more appealing is the notion that these modules could be continually swapped around and changed according to need. In essence a cooker could be assembled from basic elements corresponding to a specific cooking technique or intended outcome and disassembled to accommodate others.

3. Features of the design outcome

The final outcome of the design activity is a deconstruction of the cooker into a flexible and variable system of appliances. At the centre of this deconstruction is the implementation of cooking 'tiles' (figure 2). These task-orientated objects create a very flexible work area. Individual tiles can be used and left in place, or whole bench tops can be populated with equipment and tidied away at the users whim. This is an open-ended solution that provides multiple ways of combining elements and even introducing new ones. A systematic approach brings with it the possibility of personalized space and individuality.

Each tile is customised to a type of cooking process. The tiles are manufactured from cast iron. Connecting the tiles to a power source is facilitated by magnetic induction. A high frequency electromagnetic field in the cook top excites molecules within the ferrite (iron) material and creates heat. The heat is then conducted to a pot or other utensil for the purposes of cooking [12].

[12] G. D. Cook – *Cooking Appliance Selection and Operation: Contemporary Views on Function and Efficiency* – Miami, University of Florida, 2002, pp36-45.

These devices are highly efficient as most of the energy is expended into the cooking utensil. This technique is in itself not a great departure from existing induction cooking systems [12].

Each tile is cast with a small aperture in the sides to accommodate the fitting of supplementary components that will adapt the tile to a specific purpose. For example, the single heating tile can accommodate the fitting of polyester resin walls (to survive temperatures of 250 degrees plus). These components provide the formation of other appliances such as the steamer, toaster and kettle (figure 4). The connectivity of electro-magnetic induction overcomes the problem of cable management referred to in the user focus group as well as providing an easy to clean surface.



Figure 2.
Computer modeled rendition of the basic cast ferrite 'tiles'.



Figure 3.
Card and plastic mock-up for evaluation purposes.

The author's philosophy was to create iconic symbols of the appliance functions as they appear to the consumer. The heat rings remained as rings with a ripple profile as a metaphor for the spreading out of heat. The larger tile elements are built into appliances and are intended to be iconic form statements. The toaster has simple uncluttered lines that are intended to convey the classic image of a toaster. Similarly, the wok and kettle utilize this iconic symbolism.



Figure 4.

A populated cook top, kettle, toaster and basic cooking tile.

Whilst the proximity of high temperatures to human activity is inherently dangerous the new concept seeks to minimize this risk. The cook top has a borosilicate glass surface. The cooking tiles sit upon the surface and remain cold until the top is switched on and the power increased. Only ferrite-based material will become hot in a high frequency magnetic field. Even with the unit activated, a hand placed over the magnetic field will not burn, thus improving child safety.

Activation of the cook top is by a 'pull' switch to avoid the accidental power up that could be caused by a push switch. All interface graphics are non-language specific. Their arrangement is as unambiguous as possible with the layout responding to the arrangement of the burners or adjacent to the oven. (Figure 4)

The bench surface of the proposed cooker represents a complete departure from the traditional hierarchy of bench devices. The individual units can be lined up in a row to make a long bench or placed in an island setting. This allows the user to link back to traditional object placing.



Figure 3.

Above, a bench arrangement of three units. On the left a complete unit with interface, induction units and an oven. The two units to the right consist of basic frames and a top enclosure capable of adaptation.

3.1 Evaluation.

Evaluation of the concept was carried out by interviewing experts in particular related disciplines. A response sheet devised by the author attempted to identify design components important in user satisfaction. The author chose the following experts to give feedback on the design:

- An ergonomist.
- A food technologist.
- An industrial designer, expert in cooker appliance legislative approvals.

Their responses were based upon the following criteria:

- Needs / usage (such as feedback expectations, affordances, safety).
- Emotional responses (such as satisfaction and potential enjoyment).

The ergonomists feedback was as follows:

- The general observation that behaviour changes (in users) are slow. The implication that the design would struggle for user acceptance.
- The lack of graphical indications to where the cooker ended and preparation areas began might confuse the user.
- It was observed that the control system is intuitive without need for language.

The food technologist's feedback:

- Questioned how the tiles would look when hot.
- That the concepts modular visual appearance suited an apartment or 'nomadic' existence rather than a fixed location.
- Integrated storage for the tiles is essential for the concept.
- The weight of iron tiles might also be prohibitive to the elderly.
- A very positive response to the interface and expandability of the system.

The industrial designer selected for evaluation works in the area of overseeing the application of legislative standards upon imported units. His feedback points were as follows:

- The modularity of the design would bring economies of scale in production.
- There were reservations concerning the construction of key electrical components by the end user in some sort of kit form. Legislation in does go some way to dictating connectivity issues for appliances requiring a cookers power rating.

4.Conclusion

The author has attempted to discover how responding to societal stimulus and applying a relatively uncommon technology can improve a basic and common human activity. In the opinion of the author, with the exception of the microwave, there have been only modest developments in kitchen appliance technology whilst evidence suggests that cooking behaviours have changed markedly [2] [3] [4] [5] [10] and [11].

The author has applied the pragmatic and intuitive aspects of industrial design methodology to re-evaluate cooking appliances in the light of written commentary and focus group evidence. The methodology has proved appropriate so far as new learning has been derived from mock-ups and models. However in the absence of a fully working prototype, opportunities for further research remain.

The author's design attempts to demonstrate that significant steps can be made to evolve the domestic kitchen cooker into an appropriate tool of the present whilst acknowledging the past, cultural conventions and values. For example the basalt arrangement of the cook top acknowledges the heated stone of the hearth or even the domestic barbecue. The dimensional specifications comply with international accepted standards.

The appearance prototype creates a visual and physical link between a specific cooking task and a component of the cooking appliance. The systems approach responds to sociological and demographic changes by way of its flexibility, creating the widest possibility of technique without compromising the performance of individual components. This allows those users, so disposed, to use their own culinary experiences to develop new uses and functions.

5. References/Bibliography

[1] R. Nelson – *Expressions of purpose in Australian Design* – Melbourne, Monash University, 1992, p42.

[2] Australian Bureau of Statistics, 2003.

[3] Victorian Government – *2030 report* – Melbourne, 2001.

[4] Unknown author - *Sunday Herald Sun* – Melbourne, March 3 2002, p16.

[5] F. Popcorn - *The Popcorn report* – New York, Random House, 1992, p78.

[6] *Design Style* - London, Design council, 1995, p36-48.

[7] A. Forty - *Objects of Desire* – London, Thames and Hudson, 1986, pp207–214.

[8] K. Williamson - *Research Methods for Students and Professionals* - Wagga Wagga, NSW – Charles Sturt University, 1999, p143.

[9] N.F.M. Roozenburg and J. Eekels - *Product Design Fundamentals and Methods* – place John Wiley and Sons, 1995, pp151–152.

[10] M. Caraher, P. Dixon, T. Lang R. Carr-Hill - *The state of cooking in England the relationship of cooking skills to food choice* – Reading, Thames University, 1999, pp197 -199, and p595.

[11] T.Lang and M. Caraher - *Cooking skills and health* - Reading, Health Education Authority, 1999, p31.

[12] G. D. Cook – *Cooking Appliance Selection and Operation: Contemporary Views on Function and Efficiency* – Miami, University of Florida, 2002, pp36-45.

General reference:

M. Bellini - *Eating as design* – Milan, Gruppo editorala, 1981, p73.

P. Dejean, P. Bonhoure and L. Joblet - *Pleasure and sensorial feedback as interfaces* – Paris, Compiegne University of Technology, 2001, pp1-6.

V.Routley, K. Ashby - *Safe Home Design* – Melbourne, Victoria Health Hazard Magazine, Vol 248 Monash University, 1997, pp 34 –35.

S. Leather - *The making of modern malnutrition: an Overview of food poverty* - London, Royal Society of Arts Journal, November / December 1997, p14.

M. Bogle - *A domestic revolution (Development of domestic kitchens as an indicator of cultural change)* – Sydney, Journal of Australian Studies, Volume no 42 September 1994, pp59-69.