

Design and Emotion: Time for a New Direction?

Dr. Terence Love*

* Curtin University of Technology
Perth, Western Australia, t.love@love.com.au
IEED, Lancaster University
Lancaster, United Kingdom
UNIDCOM, IADE
Lisbon, Portugal

Abstract: This paper describes research investigating why the extensive effort in Design and Emotion research and publications has not had more significant effect in improving design theory and practice in spite of the large amounts of funding expended, the number of research projects and research centers and the large number of publications. The analyses point to two foundational research issues that appear to have been overlooked and which point to why Design and Emotion research culture is failing to make radical and significant impacts on design theory, design research, design practice and design education across all the major fields of design in the art and design, technical design and other design sectors. The paper concludes with a brief outline of the changes likely to make the Design and Emotion field more effective in improving design outcomes, design practice, design research and design theory.

Key words: *Design and Emotion, theory failure, design practice failure, cognitive neuroscience.*

1. Introduction

Over the last decade, there has been a large amount of interest, research and publications in the area of Design and Emotion. In particular, this can be seen in the Design and Emotion conferences connected with the Design and Emotion Society in 1999, 2001, 2004, 2006 and 2008 with typically around 50-90 papers per conference. [1-5].

The implicit and explicit claim of the design and emotion research field is that the intention of all this research is to improve design theory and design practice. For example, the Design and Emotion society via their website claim the intention of the research of members of the society and its publishing commitment is to raise issues and facilitate 'dialogue among practitioners, researchers and industry, in order to integrate salient themes of emotional experience into the design profession' (<http://www.designandemotion.org/society/about/>). Although the exact website text would not stand up to careful logical critique, the meaning is clear. The intention of research into design and emotion is to help people design improved outcomes in which emotional considerations are better included in part by improving design theory.

The research reported in this paper suggests that the endeavours and effects of the 'Design and Emotion' research field have fallen short of what could have been expected. Emotion is central to design activity and the use of designed products, systems services, organisations and behaviours. Yet, the extensive recent research into

design and emotion over the last decade has not had led to the kind of radical changes that might have been expected and have been claimed for it in terms of the large amounts of funding expended, the number of research projects and centers and the large number of publications. There has been a feeling as if something is happening, a large amount of work and resources has been committed and used, yet the outcomes both in the development of general design theory and in terms of design guidelines for designers have been limited in application and scope. The paper suggests that this is due to two fundamental issues that have not been adequately addressed in the Design and Emotion field and that avoiding addressing these issues may have compromised much of the research and the research and design literatures on Design and Emotion over the last decade.

The critique presented in this paper is based on a predictive critical analysis of the Design and Emotion research field presented in a paper at the 2001 Design and Emotion conference at Loughborough and published as a chapter in the 2004 review of the Design and Emotion field, 'Design and Emotion' by McDonagh, Hekkert, van Erp and Gyi [6]. That critique point to weaknesses in the research approaches and theory foundations of research into design and emotion prior to 2001 and forecasted the weaknesses in the development of the field that would occur if these were not corrected. The research reported here indicates that the changes to research approach identified in 2001 were not made and the predicted weaknesses of the field developed. This paper builds on the 2001 paper to drill further into the issues in five key areas to identify in more detail the central issues.

To recap, this paper describes findings of critical research into the outcomes of the Design and Emotion research field from the point of view of delivering practical design outcomes and changing the foundations of design theory. It does this with reference to a paper presented at the 2001 Design and Emotion conference identifying weaknesses in research approach and in future developments in the Design and Emotion field. The paper concludes by identifying two issues as central to improving the relevance of efforts in Design and Emotion research to improving design theory and practice.

2. Method

This research used a critical analytical perspective to review the theories, research, and literatures of Design and Emotion. The research looked at five issues:

- Role of 'Design and Emotion' theory in relation to development of Design guidelines
- Role of 'Design and Emotion' theory in terms of design education
- Role of 'Design and Emotion' theory in terms of defining Design content and features
- Role of 'Design and Emotion' theory in terms of the broader dimensions of Design Theories
- Coherency of 'Design and Emotion' theory with findings from cognitive neuro-science

The paper describes the research findings in each of these areas.

The paper then describes the reasoning that indicates there are two key reasons why Design and Emotion research field is failing to make radical and significant positive impacts on design theory, design research, design

practice and design education across all the major fields of design in the art and design, technical design and other design sectors.

The paper concludes with a brief outline of the changes likely to make the Design and Emotion field more effective in improving design outcomes, design practice, design research and design theory.

3. Role of Design and Emotion theory in relation to development of Design guidelines

The primary practical reason for undertaking research into design and emotion is to create improved guidelines for designers to create specifications for improved products and services that include emotional considerations (<http://www.designandemotion.org/society/about/>). This can be tackled at three levels or, rather, three different dimensions, of research into design.

The first is in terms of general design theory. That is investigating research into design and emotion informs general design theory in terms of how we understand how design activity occurs and how people use designed outcomes.

The second is the equivalent of applied research. In this, it is expected that design and emotion research has a general applicability for guiding designers in ways that focus on the production of design guidelines for particular areas of design activity or *types* of designed objects, systems or services. An example might be the design of driver interfaces (dashboards and controls) in vehicles. This is as distinct from 'general theories =about interfaces' on one hand and the object specific 'design guidelines for a Porsche 12B (2004) dashboard' on the other.

The third area of design and emotion research as it applies to design guidelines is in relation to specific objects, systems, services and organizations (as in the Porsche 12B (2004) dashboard). This is where researchers investigating emotion considerations of designers relating to *specific* single object artifacts and services and processes. An example of this might be research to investigate individuals' emotional relationships with for example an iPod Touch (as distinct from more general guidelines about iPods in general or other MP3 players in general).

To improve design guidelines through the above second and third roles of Design and Emotion research requires a detailed understanding of individuals' interactions with objects. This has two sides. On one hand it requires understanding of the basis of individuals interactions as users of the actualized outcomes of design activity. On the other hand, it requires understanding the underlying processes leading to the functioning of individuals as designers dealing with partial mental conceptualizations of future potential designs with the admixture of their own emotional responses and their mental projections and opinionated guesses as to others' emotions responses to partial compositions of potential design solutions. There is relative absence of depth of understanding in both of these dimensions in design and emotion research. Reviewing the research literature as represented by the Design and Emotion conference proceedings shows that the dominant focus is first on the details and features of

designed objects and second, only subsequently, on users and designers opinions about their 'emotional attitudes' to the designed object features. The need for the two dimensions of the above in-depth understanding is simple. Without them, all research findings relating to Design and Emotion are almost irrelevant. Without depth understanding of both the above dimensions, it is not possible to develop justified causal explanation that can lead to design theory or design guidelines that apply to anything other than the specific instance and situation investigated in each piece of Design and Emotion research. That is, the research cannot be generalized for use by other designers and researchers.

At least as important are the problems caused by the enormous range of tacit assumptions in the epistemological arena located between 'understanding individuals' emotional responses' in the Design and Emotion research literature and 'the logical development of design guidelines'. To put it bluntly, information about emotions or behaviors of individuals to designed objects, services or systems does not in the slightest provide a basis for directly deriving design guidelines of any significant detail from that information.

Failure to realize this is a major epistemological failing of the Design and Emotion research community. Understandably, it echoes a similar failing in other areas of design research.

This failure means that typically the claims for validity of most development of design guidelines in the Design and Emotion research literature are false.

To give an obvious example, the information that individuals in a particular culture have a particular emotional response to the color red does not provide a basis for developing guidelines for (say) the details of a web interface (which things should be included, where they should be, what the functional priorities are, what shades should be used in particular photos or images....) beyond some very general considerations. These would be at a level that would not actually provide specific guidelines for designers. This argument has been elegantly argued by both Dym [7] and Michl [8] who pointed out that the idea that Form should follow Function provides no specific guidance to designers because in any design situation there are a potentially infinite number of solutions in Form terms that can provide any particular Function solution. Michl extended this argument by suggesting that modernists in Architecture and architecture research chose to 'overlook' or positively promote this misunderstanding because it benefited their status and claim to expertise and funding. Michl's arguments could be seen to apply in parallel to the Design and Emotion research field and its literature.

This fundamental epistemological and practical problem in the development of design guidelines from design and emotion research has not been given any significant attention by the Design and Emotion community, yet it lies at the heart of their claims as to why one should undertake design and emotion research. In effect, the problem that this issue has not been addressed contradicts and annuls most of the Design and Emotion research and literature undertaken and written to date. This is not to say that individuals (designers and others) do not get benefit from increased understanding of our emotional lives and our relationships to products. It does, however, challenge the assumption that design and emotion research outcomes are of direct usefulness in designing products, services, systems organizations etc.

The above issue extends deep into the design practice realm. It also suggests a lie is undertaken and propagated by all involved. The lie occurs when designers pretend or claim that their designs are directly connected to particular aspects of design and emotion research.

The underpinnings of the above lie (and problem) are echoed by, and to some extent explain, the pattern of research reported in the design and emotion conference proceedings. The distribution of focus and topics of the papers is typically 'clinical' in nature. Typically, reported research is founded on analysis of emotional issues relating to specific designed outcomes and from which, without justification, in many cases are derived general design guidelines.

The above confusion from failure to address epistemological linkages is also echoed in the use of the term 'design research' by practicing designers applying it to getting information about users in ways that have no generalisable outcomes.

To recap, the assumption that the present research approaches and culture of Design and Emotion research in its present form is of benefit to designers through the development of design guidelines is problematic and not justified. There has been no obvious widespread attempt in the design and emotion research literature to derive or explain the necessary epistemological connections, foundations and reasoning. Until that is done, the current status of the epistemological validity Design and Emotion research remains subject to serious question.

4. Role of Design and Emotion theory in terms of design education

Design and Emotion research has potentially two roles in relation to design education. The first is via practical design guidelines (as discussed above) that are usually central to education aimed at design practice. An example is the design guideline given to students that a line of text in a book has highest readability of around 65 characters [9]. This suffers from all the problems identified in the preceding section.

The second is where Design and Emotion research could potentially offer an improved understanding of how designers and users of designed objects, systems services and organizations emotionally respond through their thoughts, behaviours and feelings. This role of design and emotion research could truly provide a useful depth of contribution into all aspects of design education. It requires, however, a study of how emotions, intuitions and feelings are related to individuals' thoughts, creativity, decisions and behaviours, particularly in ways that are coherent with understandings of the biological and neurological processes by which they are actualized.

This problematising of emotion in order for the concept of emotion to be a satisfactory foundational element of 'design and emotion' research is almost entirely absent from the design and emotion research literature. In the Design and Emotion research literature, emotion is almost exclusively taken, in a functionalist manner without any attention to the problematic issues this raises, as a given, well understood abstract entity. The Design and

Emotion field as a whole appears to be fixated firmly on the design issues around the physical and functional properties of designs, and how people ‘emotionally self report’ their responses to designed outcomes.

Both of these are weaknesses that indicate that to date there has been a lack of beneficial input into design education from design and emotion research that isn’t already implicitly and more usefully addressed in more conventional approaches to design education via the lenses of semiotic and behavioural analyses, marketing, advertising, human factors. In addition, this reinforces the argument of the preceding section that the lack of adequate epistemological foundations compromises research findings and publications in the Design and Emotion arena.

5. Role of Design and Emotion theory in terms of defining design content and features

The relationships of Design and Emotion research and literature to both ‘choice of content’ and ‘choice of features’ in a design are subject to the same foundational criticism as described in the earlier section on the relation between Design and Emotion research and design guidelines: the lack of a direct justifiable relation between Design and Emotion research findings and the detail of design guidelines.

The problem has two aspects:

- There are an infinite number of ways to create specific emotions
- The ways of understanding individuals’ emotional responses can only be identified in retrospect having fixed the details of the design solution.

In terms of defining design content and features, this is like trying to find out where one is going by looking at the speedometer after the car has stopped. Neither indicates there is an obvious benefit in using the current lens of design and emotion research to define content, or choices of features for a design.

In the case of content, a reasonable question to ask is,

‘How does knowledge of people’s emotions in general define exactly what content that someone should provide in a document film, animation?’

Second,

‘How would this offer advantages compared to already well established behavioural and psychological approaches used in e.g. advertising and branding etc?’

Similarly, how does knowledge of people’s emotional responses to specific (as opposed to general – which cannot be tested) objects, systems, services and organizations dictate for designers the features that designers should choose for their designs that are different from the specific designs that were researched? In this case, a

suitable comparison might be between design and emotion research findings and findings of individuals through other modalities of conventional research aimed at understanding peoples' attitudes, opinions and subjective responses and changes in behavior to those objects. In both of these cases, however, the knowledge is only available in retrospect and is not specifically obvious how it can be used in ways that can be projected forward in time in specifying the design details of new design solutions. To do that, requires a means of converting research into specific situations into general design theories – something not yet widely undertaken in a well justified manner in the Design and Emotion field as described below.

6. Role of Design and Emotion theory in terms of the broader dimensions of design theories

Two central questions around which this section focuses are,

‘How do individual Design and Emotion theories and the body of Design and Emotion research literature integrate with and cohere with general theories about design activity?’

And,

‘What does this say about the Design and Emotion field’s trajectory of development?’

Implicit in many of the papers of the Design and Emotion literature is the claim, sometimes also explicitly expressed, that Design and Emotion research and the field as a whole is central to the creation of general design theory on the basis that it includes emotional aspects of how designers design and how users use designed outcomes. From the previous analyses and what follows, I suggest this claim is naïve as it requires several preconditions not yet in place, and perhaps not possible through the predominant approaches to Design and Emotion research. This suggests the Design and Emotion field needs a new direction.

The problem reveals itself at both the gross and the detail levels. The analyses of the previous sections and a closer analysis of the details of central concepts of the design and emotion field indicate that, epistemologically, the conceptualizations for design and emotion and the epistemological foundations of the research findings in the field preclude the design and emotion literature in its current form co attributing significantly to larger scale design theories. At the gross level, reviewing design research papers from design and emotion conferences and papers that focus on emotion and design in other design research conferences such as the Asian Design conferences the IASDR and DRS conferences indicate that the theoretical conceptualization of ‘design’ that is used uncritically to underpin most of the literature is relatively unsophisticated and in most can be seen to be tied to ideas about design from the 1950s, 60s and 70s that have been subjected to in the broader design research literature to hard epistemological criticism. In parallel, the theoretical conceptualization of ‘emotion’ that is used uncritically to underpin most of the literature is also relatively unsophisticated and naïve in most can be seen to be tied to a simplistic romantic idealized view of the phenomena about which there has been substantial hard epistemological criticism over the last 25 years (100 years if one counts say the work of James [10]). Typically, reviewing the Design and Emotion conference literature, which is the dominant theory base of the field, the

conceptualization on emotions is uncritically simplistic. The term ‘emotion’ is typically used without definition and without reference to the complex debates surrounding the contradictions between its common usage and contemporary knowledge of its biological actualization, as a taken-for-granted ‘catch all’ term to include in most cases anything that the author wishes to include – and usually without justification one way or another. Most of the papers found in the Design and Emotion conference series come from the Art and Design design tradition. It is a little ironic therefore that the research approaches and perspectives used by many authors to explore the inclusion of ‘emotion’ in design activity are functionalist with the loose generalizations about human internal subjective experiences and social issues typical of engineering design literature of the 60s and 70s that were widely criticized from the Art and Design design research perspectives. This gross level phenomenon is so widespread that I have not singled out individual papers for criticism.

Exploring the same issues at the detail level shows similar lack of valid justified connection between Design and Emotion theories and general causally-based design theories or design guidelines and reviewing the central concepts of design and emotion field leads to similar conclusions as above. An example is the CASA (Computers as Social Actors) paradigm [11]. CASA is a Design and Emotion theory that is a solidly justified and significant contribution to research in the area of human-computer interaction field (HCI). CASA provides the insight that humans behave towards computers socially in a similar way to how they behave to other humans.

At first glance, the CASA paradigm looks like it might provide a significant contribution to general design theory, at least in the HCI area. Without detailed analysis of its limitations, CASA has been taken up by Design and Emotion researchers and assumed to be of direct use in building design theory and design guidelines..

A more detailed analysis of the CASA paradigm, however, indicates that the research approach on which CASA is derived operates only in one way direction and that direction of theory derivation is the opposite of what is needed to create design theories and design guidelines . In the CASA approach, individual specific social behaviours are first chosen from the literature of Social Psychology and then experiments are undertaken to identify whether the chosen specific social behaviours could be identified in an individual’s interactions with a computer. The research finding is one directional. The start is a choice of a single social behavior identified from the literature. The conclusion is whether that social behavior can be identified in a user’s interaction with a computer. In this research, a designed interface is only needed in the same way that the computer and electricity is needed. There is no derivation of any theories about which features of the designed interface produce the emotional behaviour and why or how they do this.

From the perspective of creating design theories or design guidelines, the CASA approach misses the mark epistemologically because it is on a different path. Designers and the development of design guidelines requires looking at things in the opposite direction in a much more complex fashion and require asking questions such as ,

‘What design guidelines will tell me how to design specific aspects of a computer screen (color, positioning, font, object type etc) in order to achieve a chosen emotion in the user or specific user behavior?’

‘What design theory will enable me to predict which specific screen details will result in which emotional states and user behaviours?’

‘If I want to lead the user in a specific emotionally sequenced dialog, how should I design the specifics of the screens and the activities?’

The problem in design theory terms, and the problem that the CASA paradigm fails to address, is how to identify specific design guidelines, using design theory, from the findings of the CASA research. To understand things from the focus of specific behaviours in the manner of CASA does not say anything about the design details needed to achieve the chosen emotional or behavioural outcomes. Again this echoes Dym’s point that there are an infinite number of forms that can achieve certain functions, and thus function cannot define form.

Similar problems are found with other Design and Emotion paradigms that gather information about the specifics of user responses [12]. In effect, these Design and Emotion research approaches require first that one design the outcome and then one assesses in hindsight whether users liked it or their other emotions towards it or one must try in hindsight to identify the specific attributes of the design that causally initiated the emotional, cognitive or behavioural outcome: a non-trivial task [12]. This situation contrasts, for example, with approaches in many other areas of design where the design theory will guide the details of the solution from the outset, i.e. the design research contributes usefully to design practice in the short term, and to the development of an increasingly useful body of design theory in the longer term.

Taken together, these factors indicate that the current level of development of the Design and Emotion research field there is insufficient development of the underlying conceptual foundations to support the claim that the design and emotion literature can contribute strongly to the development of design theory. It suggests that the Design and Emotion field needs a new direction in order to achieve its potential in this regard.

7. Coherency of Design and Emotion theory with findings from cognitive neuro-science

Over the last two decades, there has been significant research and findings about biological and neurological ways in which humans undertake activities which to date have been loosely called ‘emotions’, ‘intuition’, ‘feelings’, ‘creativity’, ‘insight’ and ‘social interactions’. This research has pointed to inconsistencies and gaps between what have been called ‘emotions’ in the literature not only of design and emotions but also the romantic, fictional and non-fictional literature over the last two millennia. At this point, it is perhaps useful to remember that ‘emotions’ and related concepts are wholly abstract ideas rather than real things. For two thousand years or more, humans have guessed at what is going on inside them and have constructed fantasies (and fantastic conceptualizations) in which we have used ‘emotions’ and related terms, ideas and concepts to help describe and explore what were previously inaccessible aspects of human functioning. This led to a large body of literature and conceptualizations about emotion with an epistemology that most people view uncritically as true in spite of its weak provenance and its dependence on the false vagaries of personal introspection. In part, this literature and

the generation of the ideas of ‘emotion’ were an accidental artifact of the earlier artificial divisions and dualities of ‘mind and body’, ‘mind and soul’ and ‘thought and emotion’.

Research findings of cognitive-neuroscience have now ‘opened the box’ to enable us to understand the detail of the human functioning of what was previously problematically lumped together as ‘emotion’ (see for example, [13]). Rather than following the conceptual guesswork of the previous two or more millennia, we can now increasingly see how these phenomena previously conceptualized as ‘emotions’ are actualized. This enables us to identify and predict the causal relations and produce new theory about the phenomena based on their actuality. It replaces the kind of guesses that permitted the ‘here be dragons’ of the unknown of ‘emotions’ to be regarded as real that resulted in the unhelpful and widespread socially reinforced delusion held by large numbers of humans now have the that ‘emotions’ are real and that the concept of ‘emotion’ is well justified and based on sound evidence – both being false.

The current situation in Design and Emotion research can be seen as similar to parallel historical situations in the field of astronomy. For example, many people might have believed that the moon was made of green cheese (a parallel to ‘emotions are real and the concept of emotion is well justified’) these beliefs are clarified and turned upside down by astronauts bringing rocks back from the moon that proved to be made of basalt rather than well-aged gorgonzola. Another example, is idea that the sun and the universe rotated round the earth (another parallel to ‘emotions are real and the concept of emotion is well justified’). This belief was turned upside down by improved the realization that the earth rotates around the sun. Just as Astronomy was been revolutionized by research findings, The current situation with regard to ‘emotions’ can be seen in this light, that the last 2000 or more years of theories about design, intuition, creativity and all other emotion-related concepts are being transformed by the direct information about how human bodies function. The benefits of this recent research findings are that we now have improved understanding about how the phenomena previously coined as ‘emotions’ are implicated in design and the ways that we use designed outcomes.

Review of the Design and Emotion research literature indicates an almost complete absence of analysis of these direct challenges to the research in the field and to the conceptual foundations of how Design and Emotion researchers understand ‘emotion’, what it is to ‘design’, be ‘creative’ and use emotions in design and in how we integrate these new research understandings to create new forms of design theory and new design guidelines to produce improved designed outcomes.

By implication, this indicates that the last decade or more of design and emotion research literature is not well aligned with the research findings about the phenomena that to date has been called ‘emotion’ and ‘feelings’ (or ‘design’). This supports previous conclusions in this paper that the Design and Emotion literature does not provide a sound basis for creating general design theories and useful well justified design guidelines.

8. Review since 2001

Eight years ago, at the 2001 Design and Emotion conference at Loughborough, a researcher identified that most of the issues raised earlier in this paper were problematic and that the field of Design and Emotion would not fulfill its potential unless these issues were addressed [14]. In particular, the author argued this implied the need for deep epistemological review of the ‘emotional’ aspects of the design and emotion literature to include the emerging findings that have been emerging from the field of cognitive neuroscience relating to the biological and neurological basis for rethinking the concept of ‘emotions’ that had significant research implications for emotion-related phenomena such as design, creativity and intuition.

This paper echoes the findings of the 2001 paper. The changes identified in the 2001 paper as being essential to resolving fundamental epistemological methodological and conceptual problems in the Design and Emotion research have still not been addressed in the research and literature of Design and Emotion.

If the above analyses are correct, this suggests the result has been almost a decade of unnecessary design problems and design failures that could have been reduced or avoided by a redirection of the resources that have been committed to Design and Emotion research to achieve more fundamental outcomes in predictive design theory and design guidelines that would result in positive improvements to design outcomes.

Example 1: failures in building usability as indicated by post-occupancy evaluations show that predictive theories about the emotional dimensions of building use are not yet well addressed by architects. In spite of the current commitments to Design and Emotion research in Architecture and Interior Design, this has not led to changes theories and design guidelines based on Design and Emotion research that will provide direct predictive guidance in the details of designs and design practice.

Example 2: screen interface design is widely understood to involve emotional considerations. Screen interface design is an area in there has been significant Design and Emotion research attention. This has still not yet resulted in a well justified body of practical predictive design theory and specific detailed design guidelines that direct designers in the details of their choice of screen elements and guide their placement. At this point, it appears conventional behaviorally-based design research offers better emotionally related design guidelines than have emerged from the Design and Emotion research effort. One possible reason for this is that, at the moment, conventional behavioural research has a more direct epistemological connection to the specifics of designed outcomes.

Example 3: On a larger scale, there are failures in the design of large scale systems because of a lack of practical predictive design theories and design guidelines relating to emotional dimensions of system development and use in areas such as banking systems, innovation systems. The lack of support from the design and emotion literature for practical predictive design theories and design guidelines in the system design arena has meant that many of these systems have had serious problems and failures where users feel uncomfortable or resistant to using the systems – unresolved emotional design issues leading to design failures.

Other examples are in the areas of educational assessment systems, legal and justice systems, transport systems, and complex document structures.

The above suggests that while Design and Emotion research is focused on the specifics of particular designed outcomes, on general principles without direct epistemological connection to design details, and with weak conceptualization of 'design' and 'emotion', it appears it cannot lead to the development of general, practical predictive design theory and design guidelines needed to actualize its potential benefits for design practice. The result is that the weaknesses of Design and Emotion research will continue to be implicated in design failures across all fields of design.

9. Conclusions

This paper has drawn attention to widespread weaknesses in the approaches commonly used in Design and Emotion research in terms of failure to contribute to general design theory and to provide the basis for the development of practical design guidelines. The paper has analyzed these weaknesses in terms of the relation between Design and Emotion research and literature and design theory, design guidelines, design content, design features, and its alignment with the radical changes in emotion-related theory due to the last 25 years of findings about the biological and neurological basis of emotion from research in areas such as cognitive neuro-science. In addition, it has reviewed the situation in terms of a paper pointing to similar issues presented at a Design and Emotion conference in 2001 to identify changes since that time.

The analyses presented in this paper point to several ways forward for the Design and Emotion field to address the problem issues raised above.

One way forward is for the Design and Emotion field to move away from viewing the 'design' in terms of the conceptual perspectives of product design and engineering design in the 1950s, 1960s and 1970s. This offers the opportunity to problematise the concept of 'design' in order to weed out and avoid the many naïve and oversimplistic views on design. This would then enable Design and Emotion research to ground its research and theory making on a well integrated model of design activity that builds on and has a high level of coherence with better established disciplines, particularly those in the sciences.

Another way forward is to improve the conceptual foundations of the field of Design and Emotion by completely overhauling and problematising the concept of 'emotion', in particular focusing on incorporating the insights from cognitive-neuro-science research and aligning the concepts of 'design' and 'emotion' used in Design and Emotion research with the changes in meaning due to philosophical review of these terms and concepts emerging as a result of the research findings of cognitive neuro-science.

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