A Necessary Shift in Design Education: From Outputs to Outcomes

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Abstract

Traditionally, design – and by extension design education – has focused on the creation of distinct outputs (forms, artefacts, and objects) that satisfy a specific purpose and need. Historically these needs – and often the designed outputs themselves – have been dictated not by the designer but by clients and also through established disciplinary practices. Design was broadly framed as a commercial industry, where a client needed something (a poster, a chair) and the designer provided the requested output. Design education practices grew out of a master-apprentice approach, where students often learned by recreating idealized outputs repetitively. This didactic and skills-acquisition approach was sufficient when design focused on distinct fields (e.g., graphic, industrial, or fashion design), specific outputs, and traditionally understood challenges. As the field of design has expanded – in the scope of practice, the complexity of challenges tackled, and the range of collaborators – there is a need to re-examine our pedagogy. Traditional design education approaches are insufficient for the role that design needs to play in the 21st century. In this paper, I argue that a critical consideration of this re-examination is the reframing of a central tenet of design education, which is the production of outputs. Instead, what is needed is a re-focus considering the outcomes of design practice – the processes involved, and the effects of our design actions and artefacts. I identify seven principal and interconnected factors that drive the need for this shift in focus.

Introduction

"We need to fear the consequences of our work more than we love the cleverness of our ideas." (Monteiro 2017).

Historically, design practice – and by extension, design education – has focused on the creation of discrete outputs (forms, artefacts, and objects) that fulfil a specific need and purpose (Davis 2017). Traditionally these needs – and often, the designed outputs themselves – have been determined not by the designer but by external clients, customers, and also through historical and disciplinary constraints (Rowe 2013; Rodgers & Bremner 2017). As such, design has been broadly framed as a commercial service industry, wherein a client needed something (poster, chair, or house) and the designer provided the requested output (Stebbing 2016).

Design education practices grew out of a master-apprentice approach where the apprentice/student would learn at the hand of the master/instructor, regularly recreating idealised outputs in a repetitive fashion (Friedman 2012). This didactic and skills-acquisition-based approach was sufficient when design positioned itself as a technical craft that focused upon discrete fields (e.g., graphic, industrial, or fashion design), specific outputs, and set and understood challenges (Norman 2010).

As the discipline of design has continued to expand – in its scope of practice, the complexity of challenges addressed, and the range of collaborators – there is a persistent need to re-examine our existing design pedagogy. Traditional means and methods are insufficient for the role that design can and needs to play in the 21st century (Swann 2002; Meyer & Norman 2020).

In this paper, I argue that a key consideration is the reframing of a central tenet of design education, which is a focus on the production of *outputs*. Instead, I put forth that what is more important is a concentration on the *outcomes* of the design process. The focus needs to continue to shift from the aesthetic, physical, and formal to the effects and consequences created during, by, and through design. To better understand and support this needed shift, I identify seven underlying and interconnected factors that are driving the need for design education to reconsider what Thiessen (2017, 148) terms "prioritizing the object". These seven factors – regularly emerging from the vanguard of design practice and research – represent the evolving direction of the discipline of design and contribute to its growing significance, application, and possibility.

This paper is presented from the perspective of design education in North America, where the author is a professor in a department that teaches design across a range of areas (visual communication design, industrial design, interaction design, etc.) in a large, research-intensive university. While situated within and informed by this context, there is both experience and enlightenment from other areas – both geographical and philosophical – that feed into this argument.

I begin by briefly discussing the changing landscape of design and design education, and I then discuss existing precedents for this shift, noting progress. Finally, before concluding, I describe seven broad interrelated factors driving the need for this shift.

Changing spaces of design: growing possibilities

Design has evolved as an artisan-based practice often focused on the production of artefacts in response to specific conditions (a brief, a client, a context, etc.;

Davis [2017]). The latter half of the 20th century saw a substantial change to the field as new technologies – first, the popularisation of home computers and design software, and then, the rise of online and interactive spaces – shattered old roles and created a myriad of new possibilities (Bennett & Vulpinari [2011]). Change persisted through the 21st century with designers continuing to question their purpose and to expand their roles, and as Furniss ([2015], 4) notes, designers "are becoming engaged increasingly with social, environmental and political agendas, and are recognising that they can apply innovative processes and transferable design skills across a spectrum of settings".

In addition to this expansion of disciplinary application by designers, other fields have recognised the unique practices of design and the value they add. While design has always worked extensively with other fields and partners – a defining feature of design – these collaborative opportunities have grown in scale and scope, and importantly, evolved beyond transactional to relationships that are more extensive, strategic, and impactful. Increasingly, as Irwin (2014, 91) states, "designers play key roles in many domains such as business, government, not-for-profit sectors, and grassroots activism".

While there is still much to criticise and reason to advocate for change concerning design practice, there is strong evidence of the evolution of design as a discipline and serious practice. However, design education has not always been as forward-thinking and quick to adapt.

Education and practice: changes needed

Historically, design education has often followed a skills-attainment master-and-apprentice approach (Swann [2002]; Souleles [2017]). The discipline of design evolved as a craft-based practice, and as such, has traditionally focused on the outputs of design, whether poster, chair, typeface, or building (among other examples) (Norman & Klemmer [2014]). While the initial years of design education regularly focus on skills acquisition and "form-giving" (Cheatham [2017], 76), the further students progress, the more frequently do briefs centre upon the imitation of professional practice where students work on "diluted versions of real-world briefs within the class studio setting" (Rowe [2020], 51). These briefs are often framed through the instructor's experience and where they might play a variety of roles including client, design director, and final assessor. The content and context of these projects frequently also reflect instructors' involvement in previous projects and are moulded to fit within the curriculum (timelines, outputs, etc.) (Canniffe [2011]). This highly structured pedagogical model often forgoes the most valuable learning opportunities – the unexpected, the contradictions, the unknowns, and the possibilities – that are found within live design projects.

As Davis ([2011], 73) has noted, the "vast majority of design curricula promote a 20th-century vision of the field that is increasingly irrelevant for contemporary issues and scholarship demands".

Both of these learning experiences – the focus on craft-based skills and the simulation of existing professional practice – can offer an atavistic pedagogical model that centres on the past, rather than the futures of design. This is problematic for contemporary design pedagogy (and by extension, for society).

Design is further challenged by being situated in a variety of academic settings. Liem and Sigurjonsson ([2014]) identify three typical locations for design

education. In the first, design is taught within an expanded art school model, and while there are benefits to this model, there are distinct challenges, including a lack of comparative academic models and natural collaborative opportunities. In the second setting, design is taught within a system that is not only independent but also positioned within a university setting – creating a situation where a design school is "administrated and assessed according to different criteria" (Liem & Sigurjonsson 2014, 52) than other academic areas. In the third and final setting, design is situated within a larger established university context, where it is often a fairly recent addition – at least in comparison to many traditional academic subjects – and yet, frequently an outlier among departments and faculties. In all three settings, although at different levels, design suffers from a lack of established and robust processes, theories, and practices that lend substance and criticalness to its academic practice. These challenges potentially highlight the longer-term objective of positioning design as a critical and significant academic discipline, where design educators can "abandon the idea of training designers, and get on with the practice of educating them" (Frascara 2007, 7).

The challenge now is how to design and provide learning and teaching experiences for students that support them in becoming designers who can address the complex, interconnected, and interdisciplinary challenges faced in the 21st century.

Precedent of calls for change in design education

There have been consistent calls for pedagogical shifts in design education, for example, in the work of Jorge Frascara (see Frascara 2007, 2012, 2020), Don Norman (see Norman 2010; Norman & Klemmer 2014 (with Klemmer); and Meyer & Norman 2020 (with Meyer)), and Meredith Davis (see Davis 1998, 2008, 2017), among many others. These calls have frequently resulted in slow and localised adjustments with less overall change to broader design pedagogy. Recently, these recurring individual voices have found resonance and generated momentum, resulting in more serious conversations around design pedagogy. A resonant example is the Future of Design Education initiative that brings together a wide range of global experts in design education to advocate for pedagogies that can help address the growing complexity of contemporary design problems.

In addition to these individual and collective voices calling for change, some schools and programs serve as exemplars. For instance, recently, the Transition Design program at Carnegie Mellon University (USA) has worked to reposition design education to "prepare students with the flexibility, knowledge, and skillsets needed to address the problems confronting society in a globally interconnected and interdependent world" (Irwin 2016, 91). The curriculum created treats design as a serious and consequential activity with the opportunity of contributing to addressing complex societal problems. Importantly, these educators have also written and shared extensively about their processes, ideas, and the results of their work, ensuring that other academics can build upon their practices.

Earlier, we have also seen the evolution of the conceptualisation of design education with the establishment of the Ulm School in 1953. Building on from the Bauhaus – with possible advancements that have frequently been forgotten – Ulm focused on interdisciplinary work, broadly rejecting design as an artistic activity and focusing on the "design of the system rather than the object" (Baraona Pohl 2012). This holistic and ambitious approach to design was a crucial shift in

rethinking design education and placed designers and their actions at the forefront of improving the world, as Müller and Spitz (2014, 26) note, the founders of Ulm "wanted to design society". And while the pedagogical advancements of Ulm have been built upon in some quarters, generally, it is the work of the Bauhaus that is recognised as fundamental to the field of design education over that of Ulm. As Davis (2017, 30) notes, "[s]o strong is the Bauhaus impact on first-year curricula that many schools still resist any challenge by alternative approaches arguably better suited to contemporary times".

There are a variety of possible reasons for the slower evolution of design education – including issues of inertia, the recency of design as an academic field, the conceptualisation of professional design practice as being a responsive capitalistic field, and the challenge of an academic discipline that has a strong practitioner focus (although, this can be seen in other areas as well; for example, nursing sciences). Broader change is further hindered by the growth of design programs (at undergraduate and graduate levels) that are commonly driven by the conception of design as a technical- and skills-based degree, and one that has a finite set of digital practices to learn, with the promise of an identifiable job upon graduation, where "universities exist just to supply the labor market with its needs for intellectual capital" (Willis 2015, 70).

As Noël (2020) states, if a field claims to understand and improve situations – as design does – it is problematic when it cannot address issues in its own pedagogical practice.

From outputs to outcomes: shifting demands

In this section, I identify seven underlying and interconnected factors driving the need for design education to further re-consider the primacy of the output.

Repositioning focus on the outcomes of design practice allows for a more holistic view of the entire design process, enabling consideration of each phase from the initial steps to assessing the long-term effects of introducing the design response (Stebbing 2016; Ulloa 2020). This more complete approach shifts the analysis from one that often focuses on aesthetics and final form to one that contextualises the design process, allowing for a more robust, critical, and useful assessment of our activities and their impacts (Swann 2002; Monteiro 2017).

These seven factors are interrelated and interdependent and, as such, are challenging to separate. These drivers are reflected in and found more readily at the vanguard of design practice, research, and education, where designers are responding to societal needs and disciplinary opportunities.

These factors are not meant to be read as a checklist for application, nor do they need all to be incorporated or present in educational practice for success. Instead, they serve as reflection points helping to identify, discuss, and create the necessary pedagogical environments needed for contemporary design education.

As designers continue to devise and incorporate new practices – and improve existing ones – the disconnect between design pedagogy and the applications of design practice continues to widen. There is a distinct need to re-examine design pedagogies against the future of practice, rather than in light of past precedents. It is hoped that these seven factors aid this endeavour.

Growing complexity of problems being addressed by and through design

While there have always been designers working to address complex issues, the last two-plus decades have seen significant growth in the breadth and depth of challenges that design is involved in addressing (Golsby-Smith 1996; Redström 2020). This growth has not only been driven internally by designers and design researchers looking to expand their realm of action (Sanders & Stappers 2008; Furniss 2015) but also pushed by external disciplinary recognition of the unique tools, processes, and methods that design employs (Miller & Rudnick 2011; Wildevuur 2017), where other disciplines look to work with – and through – design and designers. These interdisciplinary collaborations – across fields as diverse as nursing, business, public health, and social policy – mean that designers are working as part of larger teams addressing complex problems that do not sit comfortably within any one discipline (Kimbell 2011; Rodgers & Bremner 2017).

This increased scope of practice is exciting and consequential for the field, and while addressing complex problems is new for many designers, design has a long history of acknowledging these challenges and opportunities. A prominent example is evident in the work of Rittel and Webber (1973) and their conceptualisation of *wicked problems*, where they put forth that nearly every problem that a designer works on falls into this problem category. Buchanan (1992, 15) described these problems as a "class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing". Rittel and Webber described wicked problems nearly 50 years ago, and the scale and scope of the problems faced today have grown considerably since that time.

The range and complexity of current problems regularly preclude the possibility of specific design outputs that address the stated problem. As Norman (2010) notes, "complex problems are complex systems: there is no simple solution".

A continued shift to participatory approaches

There is growing recognition of the value of involving users meaningfully in the design process (Souleles 2017; Ulloa 2020). While designers have often involved users in their processes, that involvement has frequently been very specific and focused (e.g. initial interviews with clients, or final user testing). The increasing acknowledgement of participatory approaches further recognises the value and expertise of people in the broader design process.

Falling under a variety of terms (user-centred design, co-design, participatory design, etc.), what is common is an attempt to involve users in the design process more genuinely. This shift has been accelerated by the increasing depth and breadth of issues that design is presently engaging with. As Sanders and Stappers (2008, 6) note, traditional forms of design "cannot address the scale or the complexity of the challenges we face today". Where designers were once creating specific products for users, now designers are devising experiences and services that span interconnected environments, communities, and cultures.

Importantly, these collaborative practices recognise the values and complexities of people engaged in and affected by the design process, noting the significance of their experiences and actions (Katoppo & Sudradjat 2015; Dimopoulos-Bick *et al.* 2018). This shift in design practice creates richer and more robust processes helping to broaden the discipline and acknowledging a fuller range of design activities, moving the main focus purely from the final designed output.

Increased range of design interventions

In addition to the growing complexity of problems being addressed by and through design, there is also an increasing range of design interventions. These interventions regularly span existing fields, disciplines, and practices, and this can be challenging for design pedagogy and practice which is historically "organised into specialist domains, linked to materials, tools or industries" (Ward 2015, 229). Buchanan (1998, 13) attempted to capture this range of activity by describing four areas of design practice: communication, construction, strategic planning, and systemic integration. Earlier, Buchanan (1992, 10) explicitly noted that these four areas are not only "simply categories of objects that reflect the results of design" but also "places of invention shared by all designers, places where one discovers the dimensions of design thinking by a reconsideration of problems and solutions". He also noted the prospect of moving beyond strict artefact-based classification while recognising the possibilities for design to work across existing fields and disciplines.

Since Buchanan devised his broad areas of design, the expansion of practice has resulted in an increased range in the scope, form, and impact of design. As noted earlier, the growing complexity of problems and enlarged interconnectedness often means that the work being produced frequently covers many of Buchanan's areas and pushes further into unimagined territory (at least from his time).

Returning to Ward (2015, 243), he notes, "[n]o longer can we retreat behind the walls of disciplinary specialisms". Design education needs to recognise – and more importantly, seize the opportunity – of this expanded range of design possibility.

Growing interconnectedness

The discipline of design has also seen a drastic increase in interconnectedness within its practice, and this is reflected at a variety of levels. As noted earlier, there has been an increase in the use of participatory approaches within design, establishing and furthering connections between designers and the people they are designing for and with (Furniss 2015). Additionally – as discussed previously – the necessity for designers to work in and amongst interdisciplinary teams blurs the lines across disciplines and fields connecting researchers and practices (Irwin 2016). Furthermore, Kimbell's (2012, 129) work reinforces the idea that design is always located in a variety of contexts, positioning "design as a situated, local accomplishment involving diverse and multiple actors".

Importantly, there is growing recognition that any design intervention – whether a product, system, or service – does not exist in isolation. This interconnectedness means that every design response has consequences and effects

beyond the specific project or brief at hand. Stebbing (2016, 22) describes this idea as a shift from design being conceptualised as a linear to a cyclical process and notes that "the designer now has to also consider how their design will relate to and interact with the biosphere beyond!"

With the need to conceptualise the design process in a more holistic manner – where nothing exists in isolation – there is even more of a need to move away from framing design as a singular output-focused practice.

Recognition of design's impact: social, ecological, political, etc.

While there have always been individual designers who recognise the extensive impacts of their activity (see Fuad-Luke (2009), Fry (2003, 2008), and Papanek (2006), among others), commonly, there has been little understanding – or at least little recognition and acceptance – of the broader implications of design activity within the larger design community. As Stebbing (2016, 25) notes, the existing design paradigm is often "concerned with human welfare in the short-term micro-context while ignoring the macro-context". This move to further acknowledge the impact of design has been driven by many factors, including shifting societal goals towards global sustainability and work to address issues of diversity, inclusivity, and equity (Jamieson *et al.* 2022). Rittel (1987, 7) also recognised this broader setting when he noted that design "takes place in a social context" and in his earlier discussions of the interrelationships between design and "cultural, social, economic and political factors" (Rittel 1971, 22).

In addition to the growing acknowledgement of the complex intentional and unintentional consequences of design activity (Noël (2020, 8) refers to this as a "problem's ecosystem"), there has also been increased recognition of design's potential for impact in meaningful ways. While often from within design, this is also seen in other disciplines' recognition of the power of design (Irwin 2016; Rodgers & Bremner 2017). Importantly, Miller and Rudnick (2011, 7) – two non-designers – note this when they describe design as "a potential resource in bringing knowledge to action". Lupton and Xia (2021) extend this, stating that "[d]esign is a tool for diagramming and exposing structures of power". Ward (2008, 138) identifies an opportunity here as well, pushing for designers to embrace this prospect and to play a "key role in political, technological and environmental change, where design's double action can be utilised to both question and mobilise possible futures".

A need for rigour and criticality

While there has always been a need for design to employ more rigour and criticality in its practices, this necessity is even more urgent as design ventures into more consequential arenas (Norman & Klemmer 2014).

Historically, this has been challenging for design education, where there is a long precedent of master-and-apprentice education models that have relied on both a "romantic notion of creativity", where intuition is highly valued (Frascara 2017, 128), as well as a focus on formal, visual, and skill-attainment concerns (Meyer & Norman 2020). In earlier work (see Rowe 2013, 2020, among others), I have noted the lack of formal, established research practices in design and the

benefits of looking to other disciplines for inspiration. Cheatham (2017, 78) also notes this growing need and recognises new and emerging design disciplines – where he lists "designing for service, experience, social impact, and transition" – as areas that are developing and utilising more rigorous and critical methods. Perhaps, the lack of disciplinary precedent for these new and developing areas – in addition to the fact that many of these emerging design disciplines directly work with other areas (e.g. computer science, public service) – allows greater opportunity for repositioning design's processes.

As Thiessen (2017, 147) notes, there is a distinct need for critical thinking where designers and design students can "consider the evidence in a systematic, objective and rational way and to form a logical conclusion as a result". Frascara (2017, 126) reiterates this need for rigour – and links it to evidence-based practices – stating that "[w]hen design is conceived as a way to tackle complex problems in society (all problems involving people are complex), it becomes necessary to resort to evidence-based design". This critical evaluative possibility increases the prospect of success for design and also helps to promote accountability for results.

A lack of rigour and criticality has always been problematic in design and is growing more evident as the range and breadth of problems design addresses continues to expand (Golsby-Smith 1996). As Souleles (2017, S927) notes, there is a vital need for design education to "adopt user-centred and evidence-based approaches" as a means of educating designers who can work in and address contemporary challenges.

Acknowledgement of design as an ideological practice

Building on the previous factors is the need for broader recognition of design as an ideological practice, one that is powerful, consequential, and sits within wider societal contexts. Historically, design and design pedagogy have often been framed as a neutral and reactive activity largely in service to commercial interests, overshadowing and limiting design from its greater possibilities as a proactive shaper of society. As McCoy (2003, 3) notes, these practices – largely built upon 20th-century modernist ideals – have often positioned the discipline where "political or social concerns are either extraneous to our work, or inappropriate". Fry states that this weakness of design (and design education) sits within broader failures of "modern thought and its institution", declaring that design has been preoccupied with the question of "how" and "has neglected to ask basic questions of 'why'" (2003, 278).

As Rittel (1987, 6) succinctly states, "[t]here is no neutral, objective design. Design is subjective. Of course. Why shouldn't it be?" And Ward (2008, 134) declares that "[d]esign is always ideological, whether this is grasped or utilised by the designer or not". Recognising the ideological nature of design helps to ensure that design educators and students acknowledge the complexities, consequences, and power(s) involved.

Additionally, this recognition offers opportunities for design. Ward (2013) acknowledges this, stating that these "ideologies need to be exposed, interpreted and explored". Pedagogically, this recognition of design's ideological context needs to be experienced in the studio space rather than only situated in design history or general education courses, as is often the case. Rittel (1971, PP) broadly

supports this by noting that "[p]hilosophy belongs in the studio". Similarly, Kimbell ([2011](#), 300) calls for the recognition of designers' theoretical, political, and ideological obligations, and asserts that "we must make such knowledge part of practice and research analysis".

Framed through an ideological lens, design opens up new avenues to explore and contribute to our complex, often contradictory, and nuanced society. Importantly, it also better recognises the true power and possibility of and for design.

Context and pause for reflection

The seven interconnected and underlying factors described above are neither an exhaustive account nor a simple checklist. They are complex and shifting. Some may have more particular need and relevance in certain educational scenarios, and some may be easier to implement, recognise, or expand in other pedagogical settings.

Thinking, discussing, debating, and writing about the emerging needs in design education is crucial for the fields, areas of application, and futures contained within it. And while this work is challenging for many reasons – inertia, workloads, observance of the past, etc. – it is vitally important.

In the first instance, such an approach enables the opportunity to recognise, build upon, and further incorporate these ideas into existing pedagogical practices. As Davis ([2017](#), 45) notes, there is a need for more than the "logical progression of artifact-based curricula and pedagogies" to respond to our "radically changed environment and scale of activity". Simply doing what has been done in the past will not suffice. If design and designers want to continue to work in complex and shifting environments where design has the power and possibility to enact real change, then educators must look at *how*, *what*, and – perhaps most importantly – *why* they teach design.

Second, these conversations and examinations enable opportunities for critiquing and recognising the strengths and weaknesses in these practices and existing design pedagogies. Much like design itself – where iteration and reflection are celebrated practices – design pedagogues also need to be able to iterate and reflect. Design educators must try, experiment, reflect, and try again. As Noël ([2020](#), 5) states, it is difficult to validate the claim that designers can address complex societal problems, where if "we cannot improve design education, then our claim cannot be sustained".

It is important to note that I am not arguing against the value of the designed artefact, the formal requirements of designers' work, or the process of making. What I am arguing for is a shift in focus, one that recognises that just as the field of design is changing, so must design education. There must continue to be the recognition of the unique role that design plays in bringing form to life. Although the process of making is crucial to design education, as Heller and Talarico ([2011](#), 85) state, "[m]aking must be emphasised as a consequential act".

Design pedagogues – those that shape and define the educational experience – must recognise that the final designed output is one part of the overall design process and that these outputs always sit within larger contexts where the ultimate goal is the changes they enact and the outcomes they achieve. As Frascara ([2007](#), 6) states, "design projects should not be the focus, but rather the means to achieve these goals".

Conclusion

There is a continued and growing divide between the expanded opportunity afforded to design – in the scope of practice, the complexity of challenges addressed, and the range of collaborators – and how it is taught in much of higher education (at least within a Western context) (Norman & Klemmer 2014; Furniss 2015). Atavistic approaches, those that focus solely on aesthetics and form, are insufficient for the 21st-century problems that design is working to address (Canniffe 2011; Scupelli, Wasserman & Brooks 2016).

What is needed is a reconsideration of a long-standing principle of much of design pedagogy, that of a focus on the design and production of *outputs* – that is, the things designers make (whether poster, chair, dress, or typeface). There is a distinct need to focus on the *outcomes* of design – the processes involved, and the ramifications of our design actions and artefacts. To support this refocus, I have identified seven underlying and interconnected factors that are driving this necessity: the growing complexity of problems being addressed by and through design; a continued shift to participatory approaches; increased range of design interventions; growing interconnectedness; recognition of design's impact; a need for rigour and criticality; and acknowledgement of design as an ideological practice.

These seven factors – that permeate the vanguard of design practice, research, and education – are often not well reflected or supported in traditional output-focused design pedagogies. As Norman and Klemmer (2014) declare, design "is an exciting powerful field, filled with promise", to fulfil this promise and to contribute to meeting our growing challenges, we must continue to ask questions about the education of designers in the 21st century. Further consideration of these seven factors and the recognition of the importance of the outcomes of our design processes and activities is a crucial means for fulfilling this promise.

Acknowledgements

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