ROBOTS ATE MY HOMEWORK

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IMPACTS OF AUTOMATION ON THE FUTURE OF WORK IN THE DESIGN PROFESSION

ROBOTS ATE MY HOMEWORK

Robots Ate My Homework is a research program led by Associate Professor Mark Roxburgh and Dr Benjamin Matthews that investigates the impacts of automation on the future of work in the design profession - offering insights to both industry and educational institutions.

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About FASTLab

At FASTLab our research focuses on human-centred interactions. By harnessing human imagination, empathy, cooperation, co-design, design thinking, visualisation, playfulness and creativity, we offer insights, analysis and tools to help tackle the most pressing issues at the intersection of art, science and technology.

FASTLab is a gateway to the University of Newcastle's internationally recognised research centres, the expertise of researchers and industry partners, and world-leading equipment and facilities. Our transdisciplinary team pursues a broad range of projects, from exhibitions and installations, performances and prototypes, to cooperation with the private sector, NGO's and research institutions.

FASTLab sits within the School of Creative Industries, University of Newcastle, where we conduct research and deliver innovative experiences across design, filmmaking, animation, music, journalism, dance, drama, games design and art.

CONTENTS

1. **Key Learnings**
2. **Introduction and Methodology**
3. **Automation and the Future of Work in Graphic Design**
4. **Is Graphic Design Dying Out?**
5. **Future Design Education**
6. **Conclusions**

KEY LEARNINGS

1.

Artificial intelligence and machine learning are not looming on the horizon.

They are already here. We already rely on AI and ML algorithms in our everyday lives, but there is definitely more change to come. Labour market projections indicate many of the jobs that exist today will no longer exist in the future due to automation. However, many jobs will be created, and many contemporary jobs will shift to adapt.

2.

Graphic design isn't dying out.

There is a level of panic among professional designers that their industry is one that will become obsolete due to automation and self-taught amateurs. However, this attitude is not broadly reflected in the academic literature. Change needs to occur, but it is a matter of adaptation, not extinction.

3.

The role of the human designer is changing as we work with machines.

Many of the 'bread and butter' tasks associated with design are likely be automated to some degree. But there is an irreplaceable role for the human designer in client liaison, project management, business strategy and interpersonal collaboration.

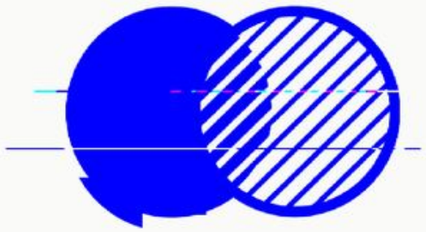
4.

Universities are slow to respond to automation in graphic design, but we can plan ahead.

There are a range of invaluable skills that future design graduates will need to have. Design educators suggest course content that emphasises interpersonal communication, critical thinking, ethical and responsible practices and resilience in a precarious labour market.









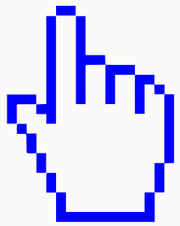
INTRODUCTION AND METHODS

Computers are increasingly able to take on more complicated tasks, including those that would normally require a human. This has obvious implications for the workforce and the broader social fabric. The academic literature and media commentary concerning the impact of automation, artificial intelligence (AI) and its most common form, machine learning (ML), on the future of work is fragmented, and tends to be characterised by broad predictions about the imminent reshaping of the economy.

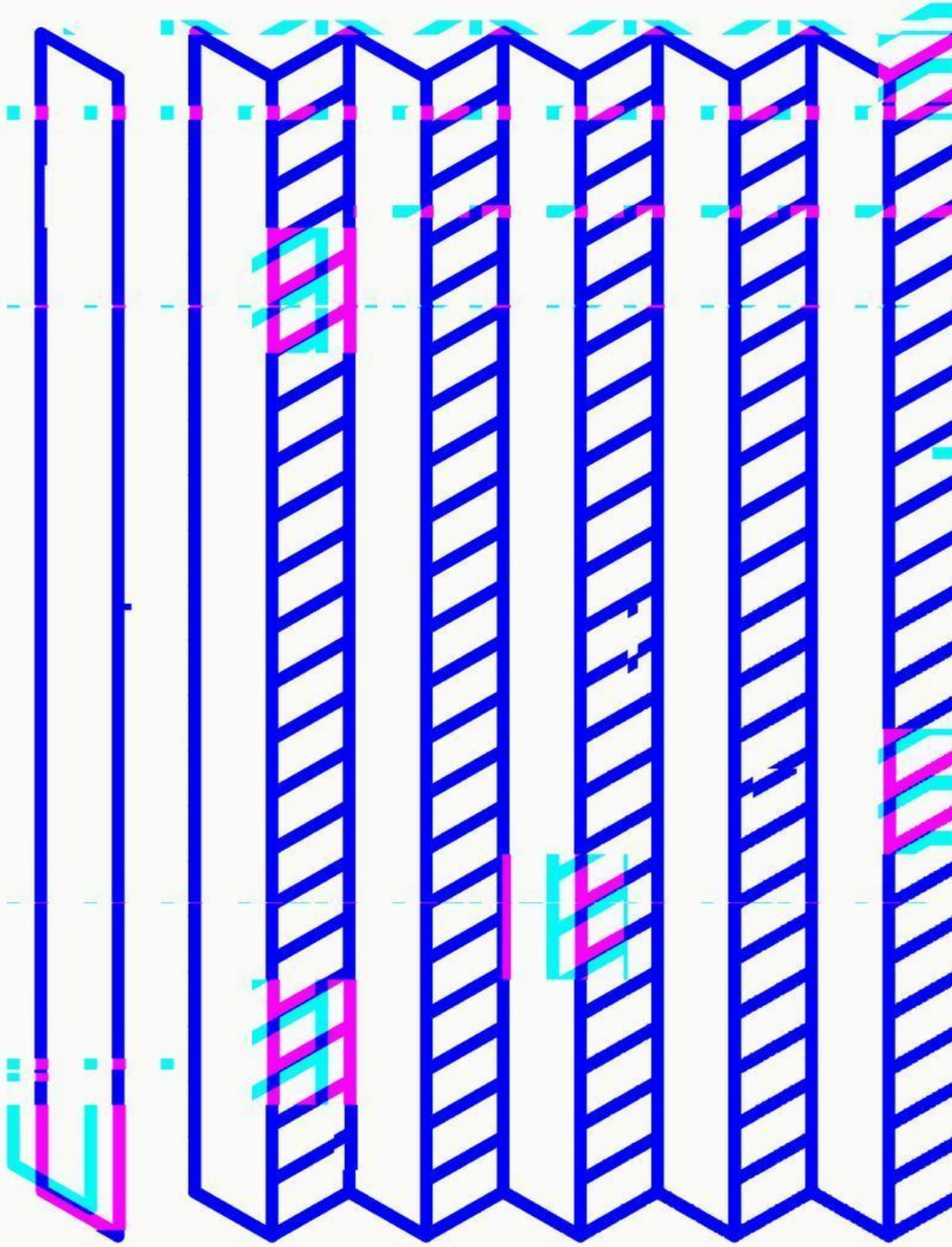
While some are highly anxious about automation and predict catastrophic job losses and dystopian inequalities, others are more optimistic. There is increasing discussion about the potential applications of AI - the primary source of automation - and how it can work with people in a variety of roles. Relatively little has been written in the academic literature specifically on the potential impact of AI and ML on the future of work in the field of visual communication, both for graphic designers and design educators. This report brings these various threads together to explore the following questions that are facing design educators, students, graduates and practitioners;

1. **What does AI mean for the future of work?**
2. **What does AI mean for the future of work for graphic designers?**
3. **What does the future of the field look like, and what can we do about it?**
4. **What are the implications for design education at a vocational and tertiary level?**

To do this, we conducted a brief literature review, by searching within a selected list of prominent design journals and across a selection of academic databases. We also included output from relevant Australian non-government organisations and policy think tanks concerned with work, employment and technology. Our searches aimed to connect terms like '(graphic) design', '(visual) communication design', and 'design education' to others concerning the implications of automation, such as 'artificial intelligence' ('AI'), 'machine learning' ('ML'), 'automation', 'employment' and 'future of work'. Many of these searches returned few or no relevant results, and we believe our review points to a scarcity of analysis of this topic.



AUTOMATION and the FUTURE OF WORK



Automation in the Fourth Industrial Revolution

It's no exaggeration to say that new technologies and digital automation are driving a seismic shift in industries and in our individual jobs. We are in a 'fourth industrial revolution' that will see developed economies change on a scale unseen since the development of mass production. These changes are driven by digital technologies that can compute, predict, design and execute projects with precision and speed that humans simply cannot compete with. These technologies will further disrupt the traditional manual industries that have been upended by mechanical automation before. Beyond this, there is increasing concern about the broader-reaching implications for virtually all (semi)professional industries that involve management, design, data processing and analysis.

The impact of AI is not a future possibility, looming somewhere on the horizon; it is 'transforming our economy and society now, and its further impact is inevitable' . In particular, there are many 'invisible' ways that AI is already central to our daily lives, from our reliance on algorithms that organise and sort data, to the affordances of smart devices and the internet of things (IoT). There is significant societal anxiety about AI replacing human-performed jobs when it becomes cheaper and more convenient to do so. Labour market projections appear to confirm that this will happen to some extent.

+ Experts variously estimate that the proportion of currently existing jobs that will 'lost' to automation is somewhere between twenty and fifty per cent .

+ The 2020 Edelman Trust Barometer found that over half of those surveyed globally fear losing their jobs to automation.

+ Over 60% are worried that technology is progressing 'too fast', and they do not trust their governments to regulate it effectively.

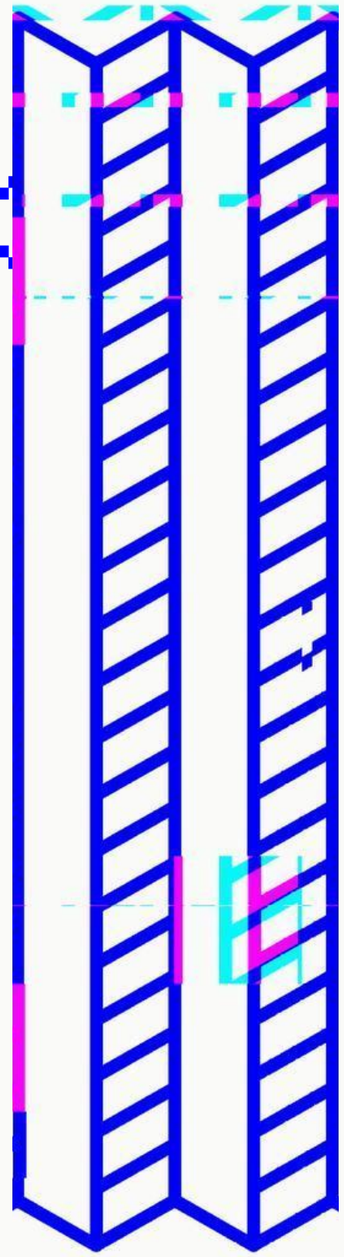
This is not to say that any 'lost' job roles will not be supplanted by other opportunities that AI will introduce. The development and application of AI has the potential to open up a range of new industries while fundamentally transforming older ones, and it is likely that many jobs and tasks can be shaped to sit alongside AI in a relatively seamless way.

> Loris Caruso, "Digital Innovation and the Fourth Industrial Revolution: Epochal Social Changes?," AI & SOCIETY 33, no. 3 (August 1, 2018): 379–92, https://doi.org/10.1007/s00146-017-0736-1;

> Tomás García Ferrari, "Design and the Fourth Industrial Revolution. Dangers and Opportunities for a Mutating Discipline.," The Design Journal 20 (July 28, 2017): S2625–33, https://doi.org/10.1080/14606925.2017.1352774.

> Adam Slonim and Nick Dyrenfurth, "Artificial Intelligence and the Future of Work" (Melbourne: John Curtin Research Centre, 2019).

AUTOMATION and FUTURE OF WORK



Automation, AI and Graphic Design

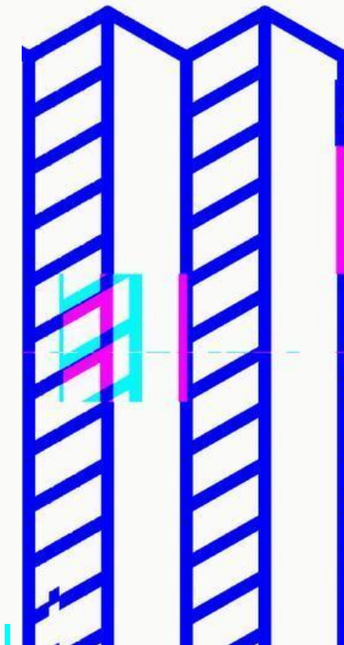
Our review of the literature reveals that in the future, designers will perform roles that are more akin to mediators; placed between clients, and the raw products facilitated by computers . In their everyday work, the human designer would be required to use their expertise and skill to facilitate production of design products, interpreting and refining the result to the satisfaction of the client. Designers might be less associated with simply giving form to the product, but will ensure the product is sound and of appropriate quality. Designers will no longer be the 'master' of tools necessarily, but a participant in a broader, digital ecosystem alongside automated designers .

The relationship between client, brief and execution will become more complex, and less linear; Tomás García Ferrari argues that 'the client is a co-author that participates and guides a lot of the process decisions... the brief is not a to-do job... it is a problem to be solved'. He sees a distinct role for the human designer in this process.

What is required for a designer to be successful in their work, then, are interpersonal skills and careful attention to aesthetic and the context within which the project sits.

We can argue that these are skills that a computer cannot easily develop – if it is possible at all. Indeed, it is these skills that employers of graphic designers are looking for.

Designers are expected to demonstrate skills in 'business strategy, innovation management, branding and service design' , with job advertisements valuing interpersonal and management skills, and competency in research, communication and presentation.



> T Walsh et al., "The Effective and Ethical Development of Artificial Intelligence: An Opportunity to Improve Our Wellbeing" (Melbourne: Australian Council of Learned Academies, 2019).
> Edelman, "Edelman Trust Barometer 2020," 2020, https://www.edelman.com/trustbarometer.
> Ezgi Karaata, "Usage of Artificial Intelligence in Today's Graphic Design," Online Journal of Art & Design 6, no. 4 (October 2018): 183–98.
> Paul Atkinson, "'The Robots Are Coming!': Perennial Problems with Technological Progress," The Design Journal 20, no. sup1 (July 28, 2017): S4120–31, https://doi.org/10.1080/14606925.2017.1352868.
> Ferrari, "Design and the Fourth Industrial Revolution. Dangers and Opportunities for a Mutating Discipline."
> Ibid.; V. Şafak Uysal and Fulden Topaloğlu, "Bridging the Gap: A Manual Primer into Design Computing in the Context of Basic Design Education," International Journal of Art & Design Education 36, no. 1 (2017): 21–38, https://doi.org/10.1111/jade.12048.
> Ferrari, "Design and the Fourth Industrial Revolution. Dangers and Opportunities for a Mutating Discipline."
> Fabricio Teixeira and Caio Braga, "The State of UX in 2020," 2020, https://trends.uxdesign.cc/; Gonçalo Falcão and Rita Almendra, "The End of the 'Briefing' and 'the Client' in Graphic Design.," The Design Journal 20, no. sup1 (July 28, 2017): S1405–14, https://doi.org/10.1080/14606925.2017.1352666;
> Ramneek Kaur Majithia, "What's Next in Design Education? Transforming Role of a Designer and Its Implications in Preparing Youth for an Ambiguous and Volatile Future," The Design Journal 20, no. sup1 (July 28, 2017): S1521–29, https://doi.org/10.1080/14606925.2017.1352676

IS GRAPHIC DESIGN ‘DYING OUT’?

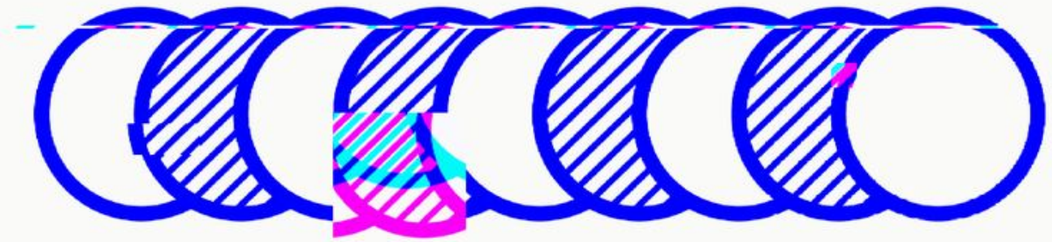
Internet access has changed how we see and value design. Not only can designers showcase their work and find clients using the internet, but there are opportunities to learn design technique, theory and skills beyond the walls of vocational or tertiary institutions. Amateur designers can download professional-grade design software and have largely unrestricted access to internet forums and social networking sites that allow informal, deinstitutionalised teaching and learning to occur. As a result, some graphic designers are understandably becoming anxious about their ‘place’ in the market. Traditional design firms staffed by university-educated professionals are competing with designers who are self-trained online, and who use simple software to create and market design services. Further, professional designers are increasingly required to compete with simple web-based interfaces and graphic editing software that use templates to automatically generate design content such as logos, posters and video.

This is a prominent feature within the discourse on the ‘death’ of graphic design. Rebecca Kelly acknowledges the ‘threat’ of accessible materials and tutorials online that provide a level of training with industry-leading tools for a fraction of the cost of a formal vocational or tertiary education. Some argue that the presence of these online courses cheapens the credibility of the profession in the eyes of outsiders and calls the value of formal degrees into question. Others foresee machines replacing designers entirely, as they become better at undertaking much of the ‘bread and butter’ tasks that would normally require a human designer. There is a level of perceived inevitability that among some designers that, under capitalism, what can be automated will be automated.

But interestingly, much of the anxiety and the negative outlook on the field of graphic design appears to be reflected in design and tech journalism and online think pieces rather than in the academic literature. A quick Google search will reveal dozens of articles in small online publications, blog posts and forum discussions that all declare the ‘death’ of design as a discipline, and that designers are ‘becoming obsolete’. Some online sources engage with design educators and professionals to predict the demise of certain areas of design, including UX designers, visual designers, design researchers, traditional industrial designers and chief design officers. The argument here is that algorithmic learning will replace the manual and data processing tasks that characterise many of these roles, as well as the resulting disruption of corporate hierarchy that has previously characterised design firms.

It is not all doom and gloom, however. Other designers believe the challenges of automation are a matter of adaptation, particularly where vocational and tertiary design education is concerned. In this camp are designers within and outside of the academy who warn that contemporary design curricula are out-of-step with the evolving industry and are preparing graduates for economic conditions and cultural expectations that no longer reflect the reality of the job. For these designers, the human designer has a significant role in managing briefs, facilitating client experience and interpreting aesthetic and context .

Design education must therefore adapt to ensure that graduates are able to flourish in the changing field.



> Paulo Roberto Nicoletti Dziobczenski and Oscar Person, “Graphic Designer Wanted: A Document Analysis of the Described Skill Set of Graphic Designers in Job Advertisements from the United Kingdom,” International Journal of Design 11, no. 2 (August 2017): 41–55.

> Rebecca Kelly, “Design in Decline: Breathing New Life Into an Industry Through Education,” Design Management Journal 13, no. 1 (2018): 41–52, https://doi.org/10.1111/dmj.12041.Ibid.

FUTURE DESIGN EDUCATION

If the landscape of design and design work is undergoing fundamental change, vocational and tertiary design education must also reorient to ensure that graduates are equipped with the skills required for success. Generally, there is a lag by universities in responding to the changes in the visual communication design landscape despite a consensus that the field is changing rapidly . However, design educators warn that any approach to reforming design education should be careful and considered, rather than reactionary, frenetic, or panicked. Design educators must build a curriculum that 'both evolves with and anticipates shifts in the profession' rather than simply changing direction or replacing assessments and pedagogical strategies that will then remain static once again. The literature identifies a range of focus areas for future design curricula, which we summarise below.

Entrepreneurial and Adaptive Skills

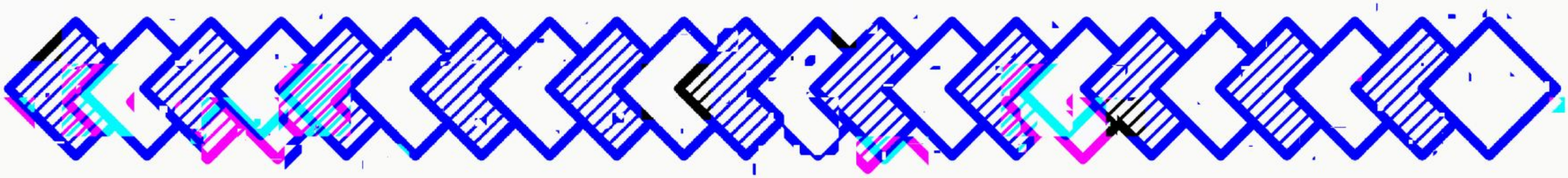
For various design professionals, entrepreneurial skills and the ability to adapt to a constantly changing field are among the most important things that a design graduate will need. An analysis of graphic design job advertisements in the UK show that management, business strategy and innovative service design are among the most sought-after skills. A roundtable discussion of design professionals in Sydney concurred that the best design graduates are those who are not bound by rigid ways of thinking or doing, and who can adapt well to the industry as it continues to develop. Design professionals are looking for graduates who can understand and respond to these developments, rather than simply reacting to them or digging their heels in.

Collaboration and Communication Skills

Design is a team sport, and graduates must unlearn any preconceptions that they will only be working independently. It is a collaborative field that is no longer individualistic or formulaic, but emphasises communication, multi-disciplinarity, networking, research, and data analysis. Collaboration and networking especially are key, underdeveloped skills for future designers. For some design educators it is not only digital literacy that is required to solve problems, but emotional intelligence; designers need 'empathy and sensibility to interpret complex contextual issues', and 'communication skills to translate issues and solutions across their organisation'. Employers are specifically looking for designers who can cultivate client relationships and be active facilitators in project management rather than simply being tool-users.

The communication skills required to facilitate these exchanges need to be developed in design education as it's rare that graduates will encounter client with a fully-formed, reasonable, achievable brief that they will simply follow. Additionally, designers must be able to demonstrate the research skills required to develop ideas collaboratively with the client, with close attention being paid to evolving trends and methods.

This is where the human designer 'fits' in the age of automation.



> Michael Buckley, "The Death of Graphic Design," Medium, March 20, 2020, https://medium.com/swlh/the-death-of-graphic-design-4e830958d8af.

> John Brownlee, "5 Design Jobs That Won't Exist In The Future," Fast Company, September 1, 2016, https://www.fastcompany.com/3063318/5-design-jobs-that-wont-exist-in-the-future.

> Zachary Kaiser, "Creativity as Computation: Teaching Design in the Age of Automation," Design and Culture 11, no. 2 (2019): 173–92, https://doi.org/10.1080/17547075.2019.1609279; Keith Tam, "Can Artificial Intelligence Replace (Graphic) Designers?," Medium, April 6, 2019, https://medium.com/invisibledesigns/can-artificial-intelligence-replace-graphic-designers-90b7ad82b212; Atkinson, "'The Robots Are Coming!'"

> Meredith Davis, "Introduction to Design Futures," AIGA | the professional association for design, 2018, https://www.aiga.org/aiga-design-futures/introduction-to-design-futures/; Kelly, "Design in Decline."

> Kelly, "Design in Decline."

> Alexandra Crosby et al., "Digital Work Practices: Affordances in Design Education," International Journal of Art & Design Education 39, no. 1 (2020), https://doi.org/10.1111/jade.12231.

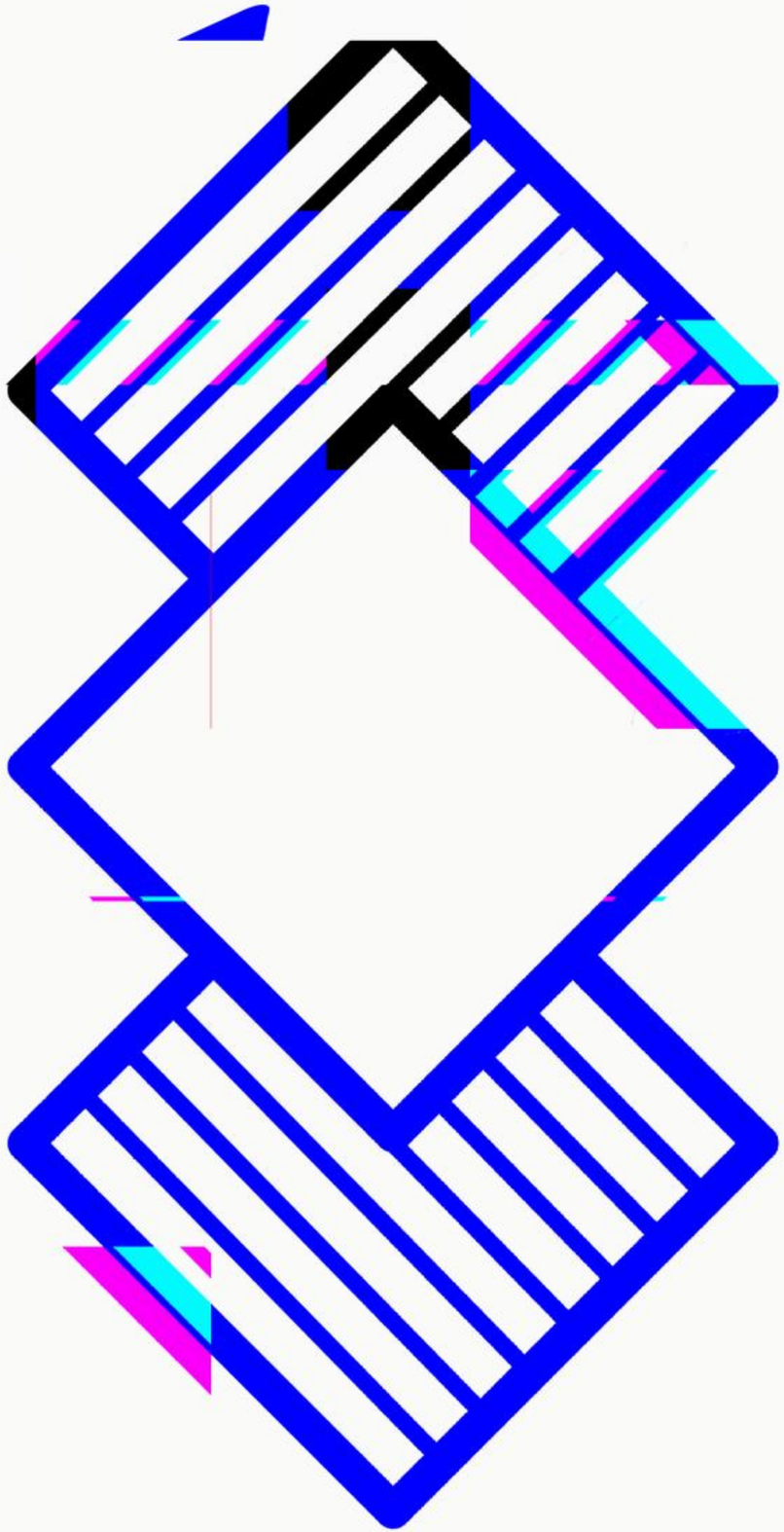
> Majithia, "What's Next in Design Education?"

> Crosby et al., "Digital Work Practices."

> Sapna; Lotz Singh, "Envisioning Futures of Design Education: An Exploratory Workshop with Design Educators," Dialectic 2, no. 1 (Summer 2018), http://dx.doi.org/10.3998/dialectic.14932326.0002.103.

> Crosby et al., "Digital Work Practices."

> Brave New Alps, "Notes on Design Education and (Prefigurative) Work Politics," Art, Design & Communication in Higher Education 16, no. 1 (April 2017): 117–23, https://doi.org/10.1386/adch.16.1.117_1.
Falcão and Almendra, "The End of the 'Briefing' and 'the Client' in Graphic Design."



FUTURE DESIGN EDUCATION

Critical Reflection and Alternative Pedagogies

Beyond the practical skills that related to the day-to-day tasks associated with graphic design, design educators are increasingly concerned with critical thinking and multidisciplinary pedagogies. New approaches should incorporate a broader set of academic perspectives rather than a narrow focus on vocational skills . Among these approaches is content that encourages students to reflect critically on their relationship with technology going forward. Industry leaders in Australia want to see design graduates to critically reflect on their roles and on the industry, 'the role of things such as technology, the role of the customer and the ability...to create their own ecosystem.'

A critical reflexivity will encourage students to think about responsible and ethical practice that is ecologically and socially just. Italian design collective Brave New Alps acknowledges that the design profession is largely white-male dominated despite the fact this doesn't reflect the student body. They suggest that students are encouraged to evaluate the underrepresentation of women and people of colour in the profession, through engagement with diverse voices in course materials and guest lectures. Comparative perspectives on beauty, aesthetics and design can help students unlearn an ethnocentric view of the field.

Cross-cultural and cross-disciplinary insights will strengthen students' capacity to think outside the box, developing the entrepreneurial and adaptive skills that employers increasingly interested in.

Preparing for a Precarious Labour Market

Design educators and academics are urging universities to properly prepare students for the changing labour market they will find themselves in after graduation. It is the reality of the contemporary field that designers face the precarity of piecemeal, so-called 'bulimic work patterns', poor work-life balance and tough competition. Brave New Alps are concerned that students are 'left in a bubble of cruel optimism' where it is taught that designers will do well if they work hard enough, and their work is good enough. However, this meritocracy myth does not necessarily reflect the reality of design as a career. Design educators should engage with this dilemma, through content and guest lectures that engage in dialectical exchange with students surrounding the job market, the economy, solidarity, precarity and work-life balance.

CONCLUSIONS

The field of work for designers is already undergoing drastic changes due to automation. Software incorporating AI and ML can cheaply and quickly create products that used to require significant, professional human labour. These algorithms are becoming smarter and more efficient, and the range of tasks they are able to automatically complete is likely to grow. We must ask questions about what the future role of humans in this field will be. We have explored the various debates about automation and design, including those who believe graphic design are 'dead' or 'dying', and those who see automation as an opportunity for humans to adapt as members of a 'digital ecosystem'.

There is evidence to suggest the role of the human designer is not obsolete but changing to incorporate client cultivation, relationship-building, project management and sustainability.

There appears to be broad consensus in the scant academic literature on this topic that there needs to be change in the industry, and that this change needs to happen quickly. As we plan to reform industry practice and design education, designers cannot afford to be reactionary and panicked in their approach. Robots are not here to 'take' design jobs or destroy industries, necessarily. Design professionals and educators are doing a disservice to their colleagues, present and future, if they are unable to critically reflect and evaluate where humans will be in the fourth industrial revolution.

fourth industrial revolution

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