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INCLUSIVE DESIGN

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ABOUT US

With a long tradition of innovation, entrepreneurship and commercialisation, the product design sector is one of Scotland's key industries. Through advances in technology, designers are providing innovative products across a number of global markets, including healthcare, energy, communications and mobility. Integration of these technologies into viable, efficient and commercially attractive products is key, and the partnership between technology and product design is becoming ever more important.

Product Design Scotland, managed by Technology Scotland, the representative body for Scotland's Enabling Technologies Sector, has been established to support the product and industrial design sector in Scotland. The network aims to be the focal point for the community, raising awareness of the critical importance of design to future growth and competitiveness and creating

a thriving, collaborative network to drive innovation.

By working with companies and organisations across Scotland, we support the sector through:

- Promoting the value of strategic design to government and industry
- Raising the profile of Scotland's product/ industrial design sector
- Increasing visibility of those operating within relevant supply chains
- Improving competitiveness through collaboration and knowledge exchange
- Creating new networks to shape the future of design in Scotland.

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TOPIC INTRODUCTION

WHAT IS INCLUSIVE DESIGN?

Inclusive design is an approach to product development that is intentionally inclusive. It can result in products, services, technologies and businesses that are more competitive.

Inclusive design involves proactively and intentionally taking measures to ensure that the product, service or technology being designed enables equity of performance and usability for everyone.

The decisions made during the design process lead to outcomes that either enable or disable users: improving equity or creating greater division.

Designers rarely intend to exclude people but there is a natural tendency to extrapolate personal experiences and project assumptions onto people who have quite different needs. As the use cases demonstrate, at worst the results can be catastrophic. At best, it's a missed opportunity to deliver or exceed satisfaction for customers.

Inclusive design is a mindset and approach that mitigates against this natural tendency, aiming to minimise and recognise bias and increase understanding of wider user needs and experiences.

Inclusive design maximises your chances of success. It might seem obvious and easy but actually, it takes deliberate and intentional effort. The good news is that the rewards are substantial.

- By recognising and acknowledging challenges rather than accepting assumed limitations, access to new and underserved markets can be realised.
- Products are more likely to work as intended and meet a real market need. There is less risk of unintended consequences.
- Products designed to be inclusive by providing equity of opportunity can often have benefits for the mainstream markets that are already widely served.

Failure to practise inclusive design can result in exclusion of intended customers, lack of delighted customers, missed market opportunities, sub-optimal financial performance, lower innovation and proliferation of systemic bias.

Inclusive design is responsible design. It is an ethical obligation, good business practice and sometimes a legal requirement.



USEFUL DEFINITIONS

EQUITY

Equality means everyone is given the same opportunity. Equity recognises that everyone has different circumstances and requires different resources to reach an equal outcome. Product designers and entrepreneurs have a responsibility to make sure that those who could potentially be disadvantaged are enabled so they have fair access equivalent to their peers.

DIVERSITY

Diversity is about a wide range of people having a seat at the table. Although measuring diversity is an essential starting point and an indication that there is potential for a variety of perspectives, hearing and integrating diverse perspectives is the real goal.

INCLUSION

Inclusion means creating an environment where everyone feels valued and able to contribute. Products designed to create equity enable inclusion. Products that are exclusive disadvantage specific demographics (usually unintentionally). Where organisations are not inclusive or diverse, understanding of challenges faced can often be limited. This can result in unintentionally exclusive products and services.

PROTECTED CHARACTERISTICS

Protected characteristics are those legally protected under the Equality Act 2010¹. These are:

- Age
- Disability
- Gender reassignment
- Marriage and civil partnerships
- Pregnancy and maternity
- Race
- Religion or Belief
- Sex
- Sexual Orientation

From an Inclusive Design point of view, Designing for Protected Characteristics is a good starting point. It can also be useful to think about other characteristics such as neurodiversity, level of education and different life experiences.

INTERSECTIONALITY

Intersectionality is the term used to describe instances where two or more protected characteristics intersect. Everyone has intersectional characteristics but the term is mostly used to refer to people who identify with two or more under-represented groups. For example, black women or disabled black women. Data shows that intersectionality can compound prejudices and bias².



CASE STUDIES



As well as spotlighting where Inclusive Design is done well, case studies can illustrate the potentially catastrophic effects of failing to give inclusivity due consideration. We can learn at least as much from failure as we can from success.

As you'll see from the examples, this is a challenge and opportunity for large sophisticated firms and small start-ups alike.

The first two case studies focus on good examples of inclusive design. The last three case studies focus on examples where inclusive design has not been applied.

INCLUSIVE DESIGN APPLIED

SAMSUNG AND SPECIAL PROJECTS: MOBILE PHONES FOR THE ELDERLY



Recognising that elderly people often struggle with technology but also that they are not inherently unable, Special Projects set out to understand the key issues with mobile phone accessibility.

Where other approaches had gone with big buttons and simplification of functionality (often to the point of no practical functionality) Special Projects sought to understand the challenge. Mapping the user experience they noticed that getting home from the shop and opening the box created anxiety in older users and that behaviours during this step were very different between younger and older users.

Where younger users didn't bother with instructions, the instruction manual for older users was key. Careful and respectful observations of this process enabled Special Projects to innovate by developing an instruction manual specifically geared at making the phone set up process simple and clear.

This is a great example of where Inclusive Design can inform strategic direction.

INCLUSIVE DESIGN APPLIED

OXO GOOD GRIPS: UNIVERSAL UTENSILS



OXO Good Grips is a range of household gadgets and utensils designed to be usable universally (i.e. by the greatest range and number of people possible).

Products have been designed with elderly users in mind. Rather than having the user crouch down to counter height, measuring jug scales are visible from above; handles and mechanisms have been created for minimal strength requirements.

OXO Good Grips provides a classic example of an inclusive product range. Designed to be usable by people who have weak or painful hands, the products have improved usability for everyone. Inclusive functionality doesn't come at the cost of aesthetics and desirability.

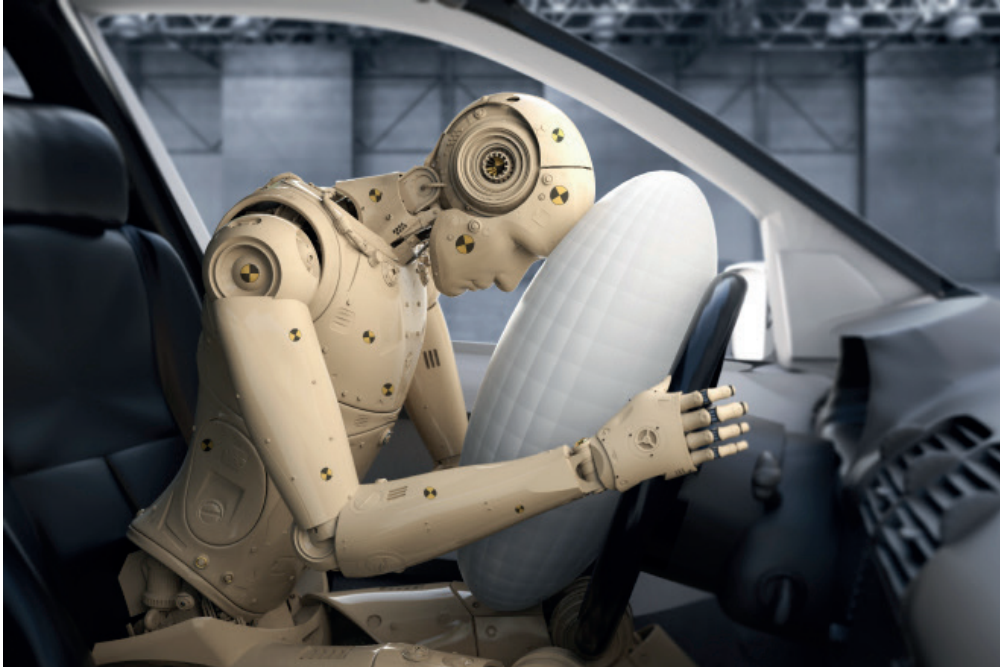
INCLUSIVE DESIGN NOT APPLIED AUGMENTED AND VIRTUAL REALITY



Augmented and Virtual Reality (AR/VR) systems are intended to enable users to experience the virtual world in three dimensions via a headset. The technology is used in gaming and entertainment but also within training across a wide variety industries.

AR/VR Headsets tend to be oversized for women⁴ who are more likely than men to experience motion sickness when using VR⁵. This is not just an ergonomics issue; the way depth perception occurs differs between men and women, but this has been ignored by tech developers. VR systems have been developed exclusively for men⁶.

INCLUSIVE DESIGN NOT APPLIED CRASH TEST DUMMIES



Cars are rigorously tested for safety but crash test dummies based on the anthropometrics of a male have traditionally been used. The consequences of this highlight the folly and consequence of the assumption that the average male is a reasonable proxy for all experiences⁷.

In car accidents, women are 47% more likely to sustain serious injuries, 71% more likely to be moderately injured and 17% more likely to die⁸. For pregnant women, the situation is worse still⁹.

INCLUSIVE DESIGN NOT APPLIED SPEECH RECOGNITION



Automated Speech Recognition (such as that developed by Google) is trained on data mainly composed of male voices¹⁰. Consequently, the software tends to only 'hear' male voices. Perhaps more alarmingly, racial bias in ASR systems is also a recognized problem¹¹.

With AI, being aware of and mitigating against the inbuilt bias in data sets is crucial¹².



SIX WAYS TO PRACTICE INCLUSIVE DESIGN

There are practical measures you can take to help ensure that your product is as inclusive as possible.

1. BE EMPATHETIC

The most significant thing you can do is to be deliberately respectful and empathise - whether this is altruistic, for commercial gain, or a combination of both, being intentional in seeing things from the point of view of users; seeking to understand their challenges and experiences will put you at an advantage.

A range of specific inclusive “empathic” design methods exist to enable designers to experience some sensations and limitations of people with disabilities¹³. In reality, there is no substitute for talking with a diverse group of users directly - understanding their feelings and a lifetime of experience cannot really be approximated with temporary tools or conjecture-based empathy¹⁴. Understanding takes time and respect. Reading books and watching films that describe the wider experiences of people with diverse requirements can help provide insights outside your own context¹⁵.

2. MAKE INCLUSION OF DIVERSE PERSPECTIVES A FOUNDATION OF YOUR PRODUCT RESEARCH

When conducting initial user research, include diverse perspectives from as early on as possible. The insights can help shape the direction your product takes.

Think about the impact and systemic effects of your product being exclusive or underserving a particular market. You might find that you can open up or lead in a whole new market if you can understand and conquer challenges that are not being solved by everyone else.

Did you know:

- The blind and partially sighted community represents a market at least three times the size of the United States¹⁶.
- Women drive 70-80% of all consumer purchasing decisions¹⁷. Yet only 4% of Venture Capital Dollars go to businesses founded by women¹⁸.
- In the UK, it is thought that some seven million people of working age have a disability. This is known as the "purple pound" and is worth around £249bn to the economy¹⁹.

3. MAKE ASSUMPTIONS EXPLICIT

As humans, we all have biases and assumptions ingrained into our view of the world. We are more likely to favour people we have commonality with, for example. To help simplify decision-making it is easy to default to previous experiences or to generalise or even stereotype. Sometimes our assumptions are well-intentioned, favourable and even correct but often they are limiting and discriminatory.

Having open conversations about assumptions and attitudes can help identify where bias exists.

Recognising the bias is the most significant thing you can do to mitigate against it.

As well as reflecting on your own assumptions, foster a culture where it's ok to challenge societal and organisational assumptions about how things work or ought to work.

4. PROTOTYPING AND TESTING WITH DIVERSE USERS

Often people test products with their peers and the workforce. Frequently these communities are fairly homogeneous (i.e. made up of people who have similar characteristics such as education, life experiences, ethnicity, gender, nationality, age etc) and often fail to have an in-depth understanding of the nuanced complexities of life with a diverse range of perspectives.

You can't include everyone in your testing and evaluation but the more diverse the range of people you can include, the better. Don't assume that the people using your product will have the same needs as you.

Sometimes people say "I'm never going to understand everyone so why even try?" The more diverse people you talk to, the less likely you are to unwittingly exclude.

Design with people, not just for them.

5. LOOK FOR INCLUSIVE TEAMS

Did you know that inclusive teams outperform others?²⁰. In fact, they are twice as likely to exceed financial targets and have six times the propensity for innovation²¹.

Look for teams and organisations that are diverse and inclusive. Observe who is included in conversations and meetings and seek out partners who welcome and hear under-represented voices.

Although you'll never be able to reflect every potential product user in your team, having different perspectives and experiences will open up healthy debate and help avoid echo-chamber thinking.

Did you know:

- 50% of product design graduates are female yet only 5% of product designers (both in house and consultancy) are female²².

6. THINK ABOUT THE SYSTEMS-LEVEL IMPLICATIONS

Good inclusive design helps to ensure that your products and services work as intended and enables them to be used by as wide a demographic as possible. The effort invested in identifying the requirements from different points of view, testing with a variety of users and paying attention to the second and third order effects of the product will lead to an all-round better design.

A recent report by Innovate UK KTN describes how technologies which disadvantage protected characteristics can exacerbate the lack of diversity in the workforce and create a vicious, reinforcing cycle²³.

Inclusive design is just good innovation practice: empathetic and systems-aware.

CONCLUSION

Inclusive Design is not difficult but it requires intentional and respectful consideration of users and systemic effects. Often designers are not incentivised or paid to take the time required to challenge assumptions and explore the systemic effects of a product or service but this is where they can add substantial value.

As you engage with Product Designers, be sure to give them room and remit to explore inclusivity - it's sure to pay off.

For support connecting with good design, contact [Product Design Scotland](#) or [email the Innovate UK KTN Design Innovation Network team](#).

REFERENCE LINKS

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INNOVATE UK KTN PROFILE

[Innovate UK KTN](#) exists to connect innovators with new partners and new opportunities beyond their existing thinking – accelerating ambitious ideas into real-world solutions. Innovate UK KTN is part of the Innovate UK Group – the UK’s innovation agency.

[The Innovate UK KTN Design Innovation Network](#) has been established to encourage innovators to embrace design as a forethought rather than an afterthought and to a greater extent.

We use the term ‘design’ in a broad sense to encompass tools, methodologies and mindsets that encourage consideration of systems beyond the specific technologies. Specifically, we are interested in design activities that address the question of “doing the right thing” as well as “doing the thing right”; design that is people-centred, and system-aware, inclusive and sustainable.

We will work with the innovation community to determine the impact of design on innovation performance and mitigate the barriers to its adoption. With the Network, we will explore how design needs to change, and develop tools to maximise its impact. These insights will also help shape Innovate UK’s evolving Design in Innovation Strategy.

In addition to addressing innovation at an individual project level, the Network will explore how design can respond to complex and uncertain multi-stakeholder challenges such as decarbonisation, food supply, critical materials and inclusion.

We are keen to understand how you use design and what excites you about design in innovation. To explore the possibilities for design in your sector or technology area, [please contact us](#).



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