Chapter 8
Supporting and Enhancing the Future of Degree Education in Graphic Design: A University of Gloucestershire Case Study

Claudia Brewster and Grant Pooke

Abstract This collaborative paper authored by Claudia Brewster and Grant Pooke derives from the experience of teaching and managing the delivery of a practice-based Graphic Design (GD) BA Honours degree pathway at the University of Gloucestershire, UK. Supported by two curriculum-based case studies, it explores and discusses examples of new and emerging Design practices in Industry 5.0. The experiential timeframe extends from the start of the academic year in September 2022 through to the student assessment period in June 2023. How might some of the brand-based contexts of emerging technology and the social platforms they utilise be incorporated into a framework which supports modular learning and skills acquisition for First Year (Level 4) Graphic Design students? What additional skill sets and aptitudes might Virtual Design applications require from a student cohort and how might student learning gain be effectively assessed and developed?

Keywords AR · VR · Next generation vocational/professional practices · Employability skills and aptitudes · C21st world of work · Innovative pedagogies · Instructional design

8.1 Introduction

Digital and immersive technologies have driven the evolution of the creative design industry. The paradigm of Industry 4.0, our present technological age, has been outlined as the legacy of connected communities, national, international and global. Elangovan defines Industry 5.0 as the future industrial age which is predicted to expand connections between humankind and digital platforms (Elangovan, 2021).

C. Brewster (✉) · G. Pooke (✉)
University of Gloucestershire, Cheltenham, UK
e-mail: cbrewster@glos.ac.uk

G. Pooke
e-mail: gpooke@glos.ac.uk

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Innovative technologies and futuristic, immersive environments provide opportunities for re-imagining the creative industries. These new conjunctions underpin creative design practice as a highly specialised form of late modern cultural production. These profound shifts and the opportunities they herald will be negotiated by a new generation of creative design practitioners on the cusp of graduation.

In response to Industry 5.0, this paper will consider some inclusive approaches to incorporating emerging technologies into modular learning schemes to support the skills acquisition and learning gain of First Year Graphic Design (GD) students at the University of Gloucestershire, UK (henceforth UoG). Education 5.0 refers to the progression of educational delivery in order to match the pace of industrial change, thereby preparing our students for Industry 5.0. In devising the next generation curriculum, we propose that introducing emerging technologies right at the start of year one of the tertiary journey, rather than cumulatively at penultimate or final year stages, better supports students in becoming agile and adaptive creative practitioners. Two proposed industry briefs have been designed to introduce industry principles in Virtual Reality (VR) and Augmented Reality (AR) using creative problem-solving and interactive methods of pedagogic delivery. More broadly, both assessed project briefs have also been conceived to support a more holistic engagement by students, recognising both underlying socio-economic contexts and the ethical imperatives of sustainable and progressive design practice. As Halpern et al. state: 'Each of us can bring the practice of wisdom into our careers, our lessons, and the life choices we make, deepening and empowering our work for a more just, sustainable, and reflective world' (Halpern, 2008).

8.2 Augmented Reality and Social Media in Education 5.0

Typically, the majority of incoming Generation Z students within GD have an underpinning in digital literacy arising from previous online social interactions and digital creative development. As Rienties et al. suggest, students are increasingly accustomed to communication through social learning tools, such as Facebook or Twitter, with new expectations on lecturers to use this knowledge in the seminar room, (Rienties et al., 2013). Experientially, these online exposures provide a basis through which to transition our students' technical development and confidence with virtual media by ensuring that initial and subsequent assessment briefs recognise these formative and interactive engagements. The design world has recognised and embraced the value of these tools for future expansion. For instance, Galer has recently noted that augmented reality can increase online engagement by up to 200% (Galer, 2021).

AR brand experiences are an expanding focus for the design sector. Successful AR brand activations include those by Adidas, Black Lives Matter (BLM) and Kinder. In 2019, Adidas became the first retailer to sell directly from an AR snapchat game. Snapchat's popular imagesharing functionality creates interactive and engaging experiential opportunities. Adidas's baseball-themed activation generated broader interaction and association with their brand and products, evidenced by outcomes which

surpassed their key performance indicators (KPIs) by 115% in less than 12 months (Toth, 2021). Kinder created an AR game to explore virtual environments using social media. This integrated brand environment engendered a playful and interactive reflection of the Kinder brand which resonated with their target audience. Kinder reported that parents discovered an 87% enhancement in child 'playfulness', with a 43% increase in family 'togetherness,'–both outcomes accompanied by an 8.2% increase in Kinder revenues (The Drum, 2021). Toni Adeyemi developed an AR filter for BLM which seeks to raise awareness for related organisations and donations. The AR filter aims to direct people towards associations, charities and movements committed to fighting racial inequality and supporting justice reform.

These examples of brand activations demonstrate the societal advantages of AR filters, using social media as a platform for collective debate and collaborative change. As evidenced here, Graphic Design as a creative and inherently social practice, is a fundamental component in realising immersive and interactive AR experiences. It is therefore taken as axiomatic that responsive pedagogic practice should reflect the AR expectations and requirements of brands in Industry 5.0. The 2017 Quality Assurance Agency for Higher Education (henceforth QAA) UK subject Benchmark Statements for Art & Design recommended teaching approaches 'with integrated digital technologies, which mirror the context of professional practice'. Consonant with these examples the aspiration at UoG is to align an inclusive approach to assessment practice and technical skills acquisition to real world commercial needs.

Attitudes towards social media platforms continually evolve as different societies and the consumer demographics they comprise debate the benefits and challenges of freedom of content through social channels. Stasi reflects that the vast scale of our expanding social platforms and their impact on our lives has led to inevitable concerns. (Stasi, 2019). Although social media can be a positive tool within education, there are inevitable caveats. For example, Flavin argues that students may wish to keep the technologies used in their social lives separate from their studies (Flavin, 2017).

However, it seems reasonable to suggest that the social channels where students share personal successes and accomplishments can also be used to expand skills development and to establish professional attributes. As Kelly notes, during Industry 4.0 people have been sharing streams of creativity and their successes online. This process has increased recognition within education that that we learn more effectively when we share (Kelly, 2017). Therefore, incorporating social media into a First Year GD assessment brief enables our students to expand their understanding of content sharing with the additional benefits arising from the curation and critique of such practice with peers across and within the wider creative design community.

There are various factors which influence and help shape social media channels such as social judgements, time consumption and global commentary. As Stasi notes, social media companies have revolutionized the way people communicate, access and circulate information and participate in public debate (Stasi, 2019). These considerations have led to extensive discussion regarding the efficacy of social media in education, such as reports by *The Guardian* newspaper and by Poore reviewed below. The 2016 *Guardian Education Report*, while initially celebrating the use of social

media in universities, also recognised that many academics still view Twitter, Facebook and Instagram as distractions rather than educative tools (Ross, 2016). Instead of viewing social media as a diversion best left out of the seminar room and lecture theatre, such platforms can be responsively employed to support meaningful teaching collaboration between users and technologies. The recognisable and approachable social qualities of these channels may affirm student confidence in using both new and otherwise potentially intimidating technologies. As Poore reflects, social media tools have 'how-to' guides and recognisable features which educators can now harness by integrating them into their own pedagogic approach.

The challenges of social arbitration and global commentary might be suggested as considered and potentially moderating strengths within a pedagogic setting. The critically contextualised use of social media platforms in tertiary teaching contexts also enables students to connect with Industry 5.0 and a global network of knowledge. Poore suggests that students are more motivated when they know that their work will be published online. They are recognising the impact that this worldwide review can have, which provides a high incentive (Poore, 2016). These online social media exposures may correspondingly benefit students' professional and vocational development in both key and transverse skills acquisition. Similarly, from personal observation at UoG, there has also been a noticeable trend in GD students securing positions in industry by using platforms like Instagram as expanded portfolios to showcase their developing professional practice.

Our contention is that encouraging first year students to recognise the value of social networking in the creative industries is highly likely to have a beneficial impact on their own employment recruitment. As educators there is a shared onus in developing responsive approaches to harness the benefits of these tools to expand our students' skills development. As Echenique et al. observe, universities should make use of social networks, and take advantage of the positive attitude students have towards them. The academic potential of these social tools could revolutionise our methodologies and education systems. (Echenique et al., 2015).

If one of the principal challenges regarding the ambivalent perception of Education 5.0 is apprehension of the unknown, then educators may also benefit from students' security in accessing and realising some of the more professionally relevant, if transactional benefits of social media platforms. For example, the discursive (and diverse) exchanges which characterise forum use may support self-reflection in developing more advanced digital design skills and competencies (Strampel, 2007). Therefore, social media may offer an approachable and inclusive pathway into teaching AR skills for Industry 5.0. In the context of Education 5.0, as Johnson notes, we should no longer question the use of social media in our classrooms, but rather integrating and supporting its educational inclusion (Johnson et al., 2016). This critical perspective has influenced our AR brief planning for First Year GD students at UoG. The first proposed brief would aim therefore to extend learning engagement in developing AR outcomes by circulating achieved resolutions through social media platforms. This very much reflects the perceived ethos of Industry 5.0 which enables shared creative content to build both digital competencies and connectivity.

In summary, the first proposed academic brief for UoG GD students will focus on Augmented Reality (AR). The outcome for this summative assessment would be defined as a creative AR response to a particular societal issue, which could be shared via existing social platforms. For example, an interactive AR filter for social media which raises awareness for a particular cause or campaign.

8.3 Emerging Virtual Environments in Industry 5.0

Industry 5.0 has also been defined as the connection between human and technological environments. The term used to express this is the 'embodied internet' which aims to consolidate and recreate methods of communication from our physical world into the digital realm (Bertrand et al., 2018). These online spaces are predicted to be valuable methods of integrating humankind's future use of technology and its generative possibilities. To develop this next step into virtual environments, designers are required to challenge and interrogate existing technological constraints in relation to their own developing creative practice. This process begins in Education 5.0, as this paper will outline below.

Industry 5.0 has been characterised as the broader expansion and universal use of digital spaces (Tiwari, 2022). Brands have been exploring and experimenting with creating digital communities for decades. Many of these developments have been inspired by the successful expansion of online communities in social media. Facebook's recent innovations are a ground-breaking example of this. Facebook's rebrand into 'Meta' and their 'Metaverse' proposal was launched in 2021 in order to design virtual environments for social interactions (Meta, 2021). This announcement has already led to new and intriguing opportunities for Graphic Designers and has been heralded as a call to action for designers of the future (Galer, 2021). The Metaverse incorporates some of the established attributes of Facebook to connect societies by building bespoke environments which reflect and mediate the interests of its users. It is predicted that their Metaverse and other succeeding proposals could be the successors of the internet and build the foundations of Industry 5.0 (Meta, 2021).

The predecessors of Meta such as AltSpace, Rec Room and VR Chat have generated innovative new modes of connection and communication. In these exciting and disruptive platforms, users are directly building their own worlds and connecting with technologies to ground-breaking new levels (Hackl, 2020). From these emerging immersive environments, digital communities have begun to expand. Meta have used their existing digital credentials to make significant steps towards acclimatising user communities to wider audiences. Meta have also made aspirational predictions for the socio-economic benefits which these immersive communities may deliver. For example, $50 million has been pledged to establishing socially responsible practices in the design of the Metaverse (Meta, 2021). Meta have correspondingly focused research into wellness, digital safety, inclusive practices and in creating social-economic benefits. The Meta immersive expansion *Horizons* is described as

a social experience with new and extraordinary ways to explore, experiment and create. Therefore, encouraging supportive interaction and experimental collaboration between users, much like a creative classroom. (Meta, 2021). This clearly defines the sense of community, inclusion and creation that its makers envisage as intrinsic to the future of Industry 5.0.

Global brands are already exploring opportunities within these emerging digital environments and immersive technologies. This has inevitably led to industry brand activations in virtual venues such as those by Adidas, Gucci and the National Society for the Prevention of Cruelty to Children (NSPCC). The Gucci Garden, is a unique virtual exhibit where users create avatars by exploring their fashion range in virtual form. The Gucci Garden also reflects another valuable characteristic of virtual environments: neutral and inclusive avatars in which models are without apparent race, age or gender characteristics (Archetypes, 2021). Adidas launched *Delicatessen*, a VR experience of exploration and adventure, in order to both promote their products and to offer escapism during the 2020 Covid-19 lockdown. Their goal was to appeal to their 'adrenaline junkie' consumers, with the added benefit of inviting everyone else. As Stuart Wells, global Director of Brand Marketing for Adidas noted: '…immersive technologies like VR, enable us to replicate experiences that customers might not consider or be able to do otherwise' (Takle, 2017).

The NSPCC have also employed VR in order to establish new tools for assisting children in sharing their experiences of abuse and neglect. These immersive scenarios were designed as a new way to train adults and carers in methods of support in these difficult scenarios (NSPCC, 2020). Their summative report of testing the use of VR in navigating these complex societal issues established that 98% of their test group would recommend the NSPCC VR tools for supporting children (NSPCC, 2020). This innovative solution to complex societal issues provides a promising prediction for the future of VR capabilities. As each of these case studies demonstrate, Graphic Designers have a significant professional role and responsibility in developing socially meaningful and consequential VR experiences. As industry brands are increasingly drawn to VR, it is vital that Graphic Designers are able to deliver the technical skills required by these nuanced and socially accountable interventions.

The second GD brief will be formulated to support students in proposing and fashioning a VR environment which establishes ideas of a creative community for their users. Through researching and analysing a chosen community and problem to resolve, students should develop an informed visualisation of an inclusive and metacognitive VR environment for their target audience. This outcome might be realised as renders of a VR space which establishes an inclusive and supportive environment for a particular target audience. Students will be able to reflect on the impacts of immersive environments in order to develop proposals for impactful and well-informed virtual communities.

As Industry 5.0 is being constructed around increased VR interactivity in the commercial world, our students will be expected to acclimatise to these new virtual spaces. Therefore, introducing fundamental VR practices early on in our students' tertiary education should enhance vocational capability and future adaption. Within the contemporary world of work and emerging Industry 5.0, students will be required

to expand their professional practices and to demonstrate wider technical skills and lateral, problem-solving ability.

8.4 Emerging Technologies in Education 5.0

The university sector has continued to develop teaching practice within the Digital Age of Industry 4.0. Industry 5.0 should replicate this but with a more integrated response across pedagogic practice. As a component of this, students may require guidance in current practices, alongside informed judgements and predictions regarding future industry standards. As Molias reflects, current university students have progressive methods of learning from multiple sources, increased digital literacy and further reaching methods of interaction with each other (Molias, 2015). Educators should be routinely prepared to deliver content on emerging technologies which inform and support platforms such as AR and VR. As Anyanwu notes, educators should strive to become more comfortable with, and fluent in, new technologies in order to apply such appropriately, and be conversant with new technological tools, resources, and approaches. By reaching these goals, educators would also empower and advance their own professional skills (Anyanwu, 2017). In recognition of these imperatives, the GD degree pathway at UoG has developed strong links with local Digital Design agencies. By building upon these industry connections through networking events and agency presentations, our teaching team are consistently developing and refining their existing and emerging technological practice.

The 5.0 expansion of technology also necessitates developing approaches to creative thinking. Present concerns around creativity in Industry 5.0 are based on the premise that technology should not challenge creativity. Hegarty recognises this conviction, reflecting that, '…technology may expand our capacity to express ourselves, but it can also mask creativity' (Hegarty, 2014). Concerns such as these should be addressed early on within the tertiary education journey. As educators we can work collectively to dispel these apprehensions by developing creative projects each of which should recognise a nuanced and holistic approach to the design process. For example, to generate digital designs, students would continue to follow a reflective design process through enquiry, analogue conceptualisation and reflection. In summary, the value of a rigorous and integrated approach to Graphic Design making will remain central to generating more effective digital outcomes.

The value of emerging technologies is continuously expanding within the Graphic Design sector. Significant adaptions have been made to establish Graphic Designers within the digital revolution of Industry 4.0. As Hegarty explains, our world is expanding with new and exciting technological developments. The next digital revolution of Industry 5.0 is transforming the way that we create and do things (Hegarty, 2014). During Industry 4.0, designers largely retained the autonomy of the creative process, however their project curation was often restricted by a lack of digital literacy in the face of these fast-paced developments. Hegarty goes on to warn that '…sometimes we forget technology should be the handmaiden of our creativity' (Hegarty,

2014). If Industry 5.0 is to be characterised by further collaboration between technology and humankind, establishing deeper digital literacy within tertiary education will be imperative. Expanding digital skills in applied design education will support creative collaboration between practitioners and their technologies, rather than either being a secondary consideration. If Graphic Designers can adapt and fashion their technological tools to these aims, creativity and technology should be able to operate synchronously.

Introducing emerging technologies should also be responsive to contemporary definitions of Graphic Design. For example, anecdotally, many students of the discipline are not necessarily already active or experienced in programming or digital applications. With this in mind, a balance should ideally be met between preparation for the broader use of technology in Industry 5.0, and complementary analogue creativity within Graphic Design. Therefore, a pilot review of first year GD students' preliminary digital literacy is proving useful and informative. These informal audits are being explored and proposed as an initial, approachable digital task.

For example, generating a Flourish Data Visualisation is one possibility which is being explored in curriculum. Flourish Data Visualisations are digital responses to research data which are simple to construct and engage with, while also teaching the fundamental principles of UI and UX Design. In previous pedagogic practice within UoG's GD degree pathway, Flourish has proved a constructive tool for measuring and assessing the digital literacy of our students. By reviewing levels of digital literacy and defining learning outcomes responsive to this, we seek to remain sensitive and alert to the range of our students' previous educational and experiential backgrounds. This reflective practice should continue to support an inclusive learning environment with assessment criteria placing equal value on the various component stages of the design process whilst avoiding overly prescriptive definitions of a final outcome.

Within our design pathway, we seek to provide bespoke technical educational support as part of the module assessment process. These technical delivery sessions help to enable our students to experiment, explore and to challenge skills, without any perceived goal-orientated pressures. In order to incorporate and replicate vocational and professional practices for our students, workshops are redesigned to incorporate a wider range of technical delivery processes and programmes. These adaptive learning technologies aim to be responsive towards next generation vocational and professional practices. In order to meet the challenges of the future of design and the redefinition of our industry, students are encouraged to expand their risk-taking capabilities without fear of erroneous outcomes. Sharpe et al. reflect that twenty first century students increasingly have confidence in technology, and the support that this provides can often increase their willingness to take creative risks. (Sharpe et al., 2010). This affirmative response to technology is conceived to facilitate safe and supportive experimentation within technical workshop sessions from the first year of the tertiary learning experience.

Consonant with the 2017 QAA Benchmark Statement, our GD degree pathway at UoG provides '…spaces with integrated digital technologies, which… enables students to work in an iterative manner to generate solutions more effectively'. In

order to create integrated digital learning, the technical sessions are closely interconnected to module delivery. Our lecturers incorporate digital literacy into workshops, lectures, seminars and formative assessments. Keengwe reflects the shared ethos that teachers must be continually renewing their technological knowledge and be able to apply new technological tools and approaches confidently (Keengwe & Anyanwu, 2017). Every member of our delivery team has digital industry experience enabling relevant and supportive teaching which is reflective of industry standards. As technologies change at pace, so must the knowledge of our delivery team; establishing and maintaining strong and informed industry connections will therefore continue to contribute to retaining the currency of industry relevant knowledge. The digital skills explored in these proposed briefs for first year students are therefore envisaged to enable and to support next generation vocational and professional practice. In preparing our students for the world of work, they recognise the interconnection between technical skills and next generation industry practice.

8.5 Community and Ethics in Industry 5.0

Another attribute of Industry 5.0 is that anything created should have purpose and beneficial impact. Immersive technologies are valuable tools for empathetic engagement, mitigating barriers of physical distance and with the potential to strengthen communities. As Saniuk suggests, the new processes and structures of Industry 5.0 will be influenced by three ethical attributes of development: human-centricity, sustainability and resilience (Saniuk, 2022). When developing pedagogic practice for Industry 5.0, we should also consider the ethical goals for the future of the creative industries more broadly. A commitment to inclusion would seem to be an essential component of human-centricity. To reflect a clear commitment to sustainability, informed and relevant design practice should ideally introduce and support deeper, critical enquiry and reflections on practitioner agency as an integral part of the process. In recognising the importance of resilience and future-proofing content delivery, curricula should aim to support students in adapting to new environments through problem-solving and creative innovation.

Industry 5.0 provides for significant opportunities for developing connected, inclusive and progressive communities. Immersive technologies are often referred to as effective and transparent empathy machines (Milk, 2015), which adds a valuable perspective on establishing inclusive environments. Industry 4.0 has resulted in escalating interconnection across and throughout global societies. Through digital forums, global societal issues are more visible, enabling important platforms for discussion, ideas dissemination and education. Users are able to access information and perspectives from diverse backgrounds and situations. Immersive digital environments may also enable members of society who may have been previously disconnected. As Dick states, multi-user AR/VR experiences enable isolated members of our society to build virtual communities without the constraints of physical distance

(Dick, 2021). This adds further value and dimensions of social responsibility to the role of the design creators of these environments.

Informed by the successes of existing online forums, Graphic Designers can now create interactive spaces connecting wider and larger user demographics. Similarly, AR and VR tools have the potential to create a more inclusive society. Dick explains that AR/VR devices and applications can assist people with disabilities, by making physical environments more accessible by adding virtual interactions (Dick, 2021). These opportunities for establishing broader and more supportive environments are vital for the social and economic future of the design industry. As educators we are obliged to prepare our students for these design futures. Therefore, the proposed VR brief for our first year students is conceived to encourage reflection upon their wider role and vocation as designers. For example, using the successful NSPCC VR campaign as a case study, students are enabled to research problems faced by a particular community and to design solutions in response. The outcome of our students' concepts and design prototypes could be visuals of an interactive immersive VR environment which supports their target audience's requirements or which raise awareness of a societal issue. The VR communities so created are assessed in response to their ethical and potential societal impacts, as well as in relation to the level of technical proficiency achieved.

Industry 5.0 also enables further inclusion within work environments. The collaboration between humankind and machine is predicted to lead to increasingly decentralised professional power. As Tiwari notes, Industry 5.0 will sponsor increased productivity, efficiency and wider connections within the work environment by merging human intelligence with digital capability. This should inevitably lead to further collaborative productivity and decentralised power (Tiwari, 2022). The premise is that the inevitable skills-share through collaboration with technology will further democratise and expand inclusive opportunities across the workforce. Future professional opportunities may increasingly be reflective of seniority involving digital skill sets and knowledge, with tenure and rank being less fundamental to success. As Judkins reflects, technology has a significant impact on all aspects of society, thereby encouraging informed alignment with its progression. (Judkins, 2015). Correspondingly, educators have a responsibility to support our students with enhanced digital skills in order to prepare them for the future of work and a rupture with the industry status quo. More speculatively perhaps, encouraging technological skill development, effective problem-solving and resourcefulness may lead to a design industry predicated on skills and less reflective of societal bias.

As the United Nations (UN) reflected in a 2015 resolution, '…the spread of information and communications technology and global interconnectedness has great potential to accelerate human progress, to bridge the digital divide and to develop knowledge societies' (UN, 2015). Solving, among other imperatives, the digital divide created by global inequalities is a significant driver for the UN and has seen some promising improvement over the last decade. As Huang reflects, recent technological advances in art and design have developed as a bridge between people, products, the environment delete comma and society (Huang, 2022). However, graphic designers should also perhaps be mindful of the limitations of digital resources as

the world continues to increase connectivity. As Georgiadou notes, companies have already begun to implement Virtual Reality training in order to promote inclusion within their workplaces (Georgiadou, 2020). The onus is on and with Education 5.0 to respond in kind, expanding immersive technological skills to improve employability as the basis for wider social and economic equity. Developing the take-up of these skills by and for future designers could also achieve significant steps towards a more inclusive society.

However, VR is still challenged by cost efficiencies and differentiated access to technological equipment and supporting infrastructure. In part response, industry agencies have begun to develop more cost-efficient opportunities for engaging in VR, such as the Google cardboard headset. VR can also be adapted to gaming engines which expands user accessibility. However, many of these VR systems rely on extensive digital literacy or server systems which are often restricted and expensive. As industry advances, there are also inevitable concerns raised within creative communities. As Hegarty puts it, '…technology allows us to do more things and to do them faster than ever before. But that doesn't mean that what we're producing is any better' (Hegarty, 2014). Therefore, educators should retain the core value of creative problem-solving as integral to their pedagogic practice, enabling the expansion of innovative thinking alongside the pace of technological advancement.

The predictions for Industry 5.0 envisage new ways that design practitioners might influence societal change through creative problem-solving. As noted by the organisers of the 2019 Cheltenham Design Festival, this is a very exciting time for designers, but it requires curiosity, creative risk-taking and innovative problem-solving to make positive societal impact (CDF, 2019). This is echoed by the 2017 QAA benchmark statement for Art & Design which states that: 'Experiential, active and enquiry-based learning are features of art and design in honours degrees. Students not only develop the ability to solve set problems in a creative way, but they also develop the ability to identify and redefine problems, and to raise and address appropriate issues'. By incorporating these lateral and problem-solving skills into tertiary education, our students are better prepared for the fast-paced challenges of Industry 5.0 and the evolving futures of work.

Developing a project using AR and social media necessitates both an understanding of community (however defined) and a central ethical purpose or drive. Social media can have many benefits in the educational setting when applied to the correct tasks (Poore, 2016). To support this project proposal for first year design students at UoG, a new topical project focus would be introduced for each academic year. These ethical purposes would reflect current and relevant societal concerns. For example, students could be tasked with developing an AR engagement in response to the loneliness experienced within many isolated communities during the Covid-19 pandemic lockdowns. By independently identifying a wide range of relevant research sources in relation to the creative challenge, students should be able to generate ethical and responsive solutions to the problems outlined in the brief. These in-depth student investigations would also provide new information and experiential insights, encouraging valuable self-reflection regarding the broader role and accountability of

the designer. As Jarvis suggests, as educators and reflective practitioners, development comes through reflection, learning new skills and adjusting our attitudes where necessary (Jarvis, 1999).

The next consideration regards incorporating ethical design practices within the proposed VR brief. The 2021 Design Research Society conference (DRS, 2022), noted that designers have significant moral and social responsibilities, shaping the future products and services which inform the way we live. Therefore, designers must challenge themselves and respond to ethical issues conscientiously. Industry 5.0 offers valuable potential for creating virtual communities which reflect the anticipated inclusive principles of the future. GD students should be encouraged to research and evaluate their designs in response to ethical and socio-economic issues. For example, virtual environments and avatars allow society to challenge the constraints that many individuals with protected characteristics routinely face (Bertrand et al., 2018). VR also establishes opportunities for building further connections across international boundaries. These developments are likely to create profound societal impacts. As the architects of these environments, the ethical responsibilities of designers will expand substantially.

8.6 Sustainable Practice in Industry 5.0

In the past, the Graphic Design sector has come under scrutiny for sustainable practice. As a 2016 report from the Australian Government reflected, the sector relies on a variety of resources of extensive quantity (BV, 2016). Therefore, designers should make considered decisions around the sustainable life cycle of their designs. This intervention highlights the opportunities for more sustainable, or at least more considered usages of resources and the design community's responsibility for such. Sustainability has been universally highlighted as a significant challenge for our industry. Industry 5.0 allows design practitioners to conceive of new solutions to this global societal challenge. In 2016, the World Economic Forum noted that, Industry 5.0, and digital development could actually assist the world's sustainability. This is a powerful reflection of the role of digital processes across the economies of the future. As Industry 5.0 emerges, so does the potential of digital platforms for helping to address some of the key ecological imperatives of our time. This establishes fundamental accountabilities for the ecologically and climate-aware graphic designers of the future.

Immersive technologies have the potential to create connections across global societies and to re-imagine, if not to break, more physically tangible boundaries. For example, the often discretionary 'need' for international travel has profound environmental and climactic effects. By part analogy, the Metaverse is establishing translation capabilities so that language and travel would no longer be such insurmountable barriers to building international communities. These global connections would help establish essential skill-shares as we work to collaboratively critique and resolve significant societal issues. The United Nations Sustainable Development

Goals Report (UN, 2021), heralded the acceleration of Industry 5.0 and digital platforms through worldwide collaboration which emerged in response to the Covid-19 pandemic. Through this, the report predicts a brighter future, where societies worldwide are further connected through technological advancements. This characterisation supports an understanding of Industry 5.0 which encompasses strengthening interconnections within and between societies as well as those bridging technology and humankind.

However, digital solutions are not yet universally heralded as entirely sustainable resolutions for the creative industries. Researchers from the Centre for Energy-Efficient Telecommunications (CEET) note that the information communications and technology (ICT) industry produces more than 830 million tons of carbon dioxide annually (CEET, 2013). More recently this figure has been revised upward to 10% of the European electricity expenditure and 4% of its carbon emissions (EU Footprint, 2021). This poses a significant contribution to the sustainable issues that global incentives are determined to resolve. However, by recognising constraints regarding the sustainability of digital resources, solutions have quickly emerged and will rapidly continue to make an impact. The World Economic Forum reflected that improved management of energy storage could potentially save 8.8 billion metric tons of CO_2 emissions by 2025 (WEF, 2016). Within the UK's university sector, UoG was among the recognised pioneers of institutional sustainability, having previously been awarded the number one position in the 2019 *People and Planet* sustainability league table for all UK universities (People & Planet League, 2019). The institution's graphic design lecturers use these informed insights and practices in their delivery to encourage a broader and more reflexive approach to the deployment of green technologies.

As educators we should be transparent regarding the constraints and consequences of each design solution that we pose. Companies that have harnessed digital solutions as a means of establishing ethical perceptions without exploring the full extent of environmental impacts have been accused of 'Green Washing'. These and similar practices risk both devaluing and causing reputational harm (through negative user perceptions) in respect of the many truly ethical green practices within the design sector. However, there has been an increased recognition that sustainable design can only be fully achieved through research, ongoing critical review and the setting of, and adherence to, ethical goals. The recent UN Sustainable Development Goals Report advised the collective responsibility of developing digital processes which support climate-sensitive outcomes, respect biodiversity whilst remaining resilient (UN, 2021).

Design practitioners in Industry 5.0 should be accountable for ensuring that these responsibilities and affiliations are respected and upheld. Resilience, fundamental to the future of sustainable practice in design, can only be achieved by informing, supporting and encouraging future generations of designers through responsive and adaptive education. The proposed UoG briefs for developing AR and VR Graphic Design BA solutions incorporate a commitment to the values of sustainable practices. First year students are encouraged to research, to strategise and to promote the sustainable benefits of the virtual environments which they create. An informed

awareness of sustainable practice in emerging technologies is an invaluable learning outcome not just for this assignment brief but equally for our students' onward professional development and sense of vocation.

8.7 Proposed Design Assessment Practice and Rationale

The proposed UoG AR and VR Briefs will be assessed through portfolio submissions. These documents shall be evaluated on the basis of the acuity and clarity of investigation, the innovation of design process and its corresponding ideation with each submission measured with reference to five assessment criteria. These are provisionally formulated as follows: Research, Analysis, Concept, Development and Outcome. Each of these criteria will be assessed equally in order to reflect the parity of each stage of the design process, replicating best industry practice. The underpinning pedagogic rationale being that thorough, well-defined individual research and cogent analysis should inform principled design solutions. A clear and ethical purpose is expected to inform the student's pedagogic development, while also instilling ethical considerations when participating in social platforms. Each student will also be encouraged to use their cognitive and practical skills to formulate appropriate and workable responses in order to resolve the challenges of their brief and the context(s) of its proposed use or application.

By articulating a variety of relevant concepts, students should be able to explore and understand the broader value and application of research and analysis within the design process. This should support more refined design solutions and further opportunities for exploration and professional progress. Holistically, students' skills development should be reflected in and through experimentation with innovative technologies achieved through technical workshops, module delivery and independent study. The final outcomes for each brief will be carefully formulated to enable freedom of exploration and creative expression. It is our shared contention that more openly defined outcomes also uphold a commitment to an inclusive educative environment which is especially relevant for supporting the confidence of first year students. This brief has been designed to allow our students to develop technical proficiencies from different skill foundations, while also exploring a social cause in which they have personal conviction.

Both of these set assessment briefs would be used developmentally as case studies for implementing further Industry 5.0 relevant content into GD delivery at UoG. The success and learning gain of these assessed briefs will be measured both quantitively and qualitatively via formative course reviews, student feedback, industry insights from visiting (external) professionals and summative assessment results from the participating cohorts. The input of External Examiners will also be requested in relation to broader comparators of practice elsewhere within the university sector. Once these outcomes have been subject to further reflection, peer discussion and review, we anticipate using these case studies as a basis for further course and module development, reflecting the ethos of Education 5.0.

8.8 Concluding Observations

Industry 5.0 has far-reaching ramifications for Graphic Designers as it has for all practitioners within and across the creative industries, whether in the UK, transnationally or globally. Alongside these expansive opportunities and the challenges they pose, the professional role and expectations of the contemporary design practitioner have changed to accent further social and ethical accountability. As outlined, the proposed and exploratory academic briefs for our first year GD students aim to incorporate the expansion of technical proficiency, an awareness of ethical design considerations and the broader context of their operation.

Student feedback and outcomes from the introduction of these proposed briefs will inform the development of our next generation curriculum for the future of work. As suggested in this paper, the potential for incorporating ethical and sustainable practices into each brief will also support our students' development and their understanding of the future challenges faced by the design industry. The complementary delivery of technical skills acquisition and an awareness of ethical contexts will not only enhance the vocational opportunities for our student cohorts, but will crucially reflect the stringent standards of the contemporary design sector and the imperatives of Education 5.0.

These interventions are conceived as part of an exploratory stage in re-fashioning and further enhancing the design curriculum at UoG and, as centrally, the student learning experience. Naturally, curriculum assessment tasks are of, and in themselves, just one experiential component of a broader design education. Our aspiration here is to deploy such to further help and support a dynamic, creative design environment which fosters critical challenge and supported progression, enabling self-reflection, student confidence and agency in their tertiary learning journeys.

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Claudia Brewster (FdA, BA Hons, FRSA, FHEA) is the Academic Course Lead for the Graphic Design BA Hons Pathway at the University of Gloucestershire, UK. Claudia is an internationally exhibited, award winning Designer. She was previously a Junior Fellow for the Design Cluster, University of the West of England (UWE) and an Associate Lecturer at Bath Spa University. In industry, Claudia was Head of Design at EyeSpy360, a highly recognised VR Company, where she was involved in UI/UX Design. Claudia was also an Experiential Designer, working with high profile brands worldwide. UoG graphic design students mentored by Claudia and colleagues presented work at the 2021 London Design Festival.

Dr. Grant Pooke (MA, MPhil, PhD, PGCHE, FHEA) is the Academic Subject Lead for the Design area at the University of Gloucestershire, UK. A graduate of the University of St Andrews and the University of Southampton, he is an Art and Design Historian with publications including *Fifty Key Texts in Art History* (Routledge, 2012), *Narratives for India's Modernity: The Aesthetic of Brij Mohan Anand 1928–1986* (co-author, Harper Collins, India, 2016) and *Introduction to Contemporary British Art* (Routledge, 2012). Grant has a longstanding commitment to art and design pedagogy evidenced in the co-authorship of *Art History The Basics* (Routledge, 2008, revised edition 2021).