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Towards 4IR and African scholarship: Exploring research capacity in the widening discipline of communication design

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Abstract

Scholarship has many dimensions, such as the scholarship of research/discovery; the scholarship of integration, application, and teaching; and the scholarship of public and democratic engagement where knowledge is co-constructed. These broader notions of scholarship challenge the traditional understanding of a university and position scholars and researchers in a broader socio-economic, historical, and cultural context. Design as a field developed and widened as a result of new challenges and opportunities – for example the fourth industrial revolution – and changes in the discipline. In addition to these shifts, South African design researchers are challenged by the need and capacity that drive the different dimensions of scholarship in the pursuit of locally relevant, African knowledge. Modes 1 to 3 of the Knowledge Development Model is used as a broad theoretical framework.

The purpose of this study is to explore local research capacity in the communication design field in the context of 4IR, African Scholarship and shifts in the domain. The paper starts with a theoretical exploration of the multi-dimensional nature of scholarship, research, and research capacity. This is followed by an analysis of research activities in the widening field of communication design. Insights are based on desk research such as accredited research output and government research reports. The desk research comprised a discussion on purposively selected research projects on communication design and examples of collaborations and was supplemented by explanations from the research leads and participants.

The last part of the paper discusses the indicators, shortcomings, challenges, and opportunities, as identified during the research. The paper contributes to the discourse on the development of research capacity in the pursuit of African scholarship in design, which is relevant to the fourth industrial revolution.

Keywords: 4IR, African scholarship, communication design researchers, research capacity building

Introduction

The central theme of the 2021 DEFSa Conference is the fourth industrial revolution (4IR). The organisers therefore requested papers that considered the past, present and future of design education, seen through the lens of African scholarship. The fourth industrial revolution is viewed as a new chapter in human development, building on previous technologies and potentially presenting people with the opportunity to “enjoy more freedom, better health, higher levels of education” and security and economic certainty (Scwhab, 2018, p. 7, 11). Schwab (2018) describes four principles of 4IR. The first is that it is about *systems* and *not technology* (and integration); second, about

empowering, not determining (giving people choices and control); third, by *design* and not *default*; and last, *values* are seen as a feature and not a bug. These four principles present design as a discipline and way of thinking with new possibilities and opportunities. Similarly, higher education in 4IR (HE 4.0) presents the opportunity of a new kind of university with a new and different way of teaching, research and service (Xing & Marwala, 2017).

The purpose of this paper is to explore local research capacity in the communication design field in the context of 4IR, African Scholarship, and shifts in the domain that aim to answer research questions on nature of research output by local scholars and to identify strengths, challenges, opportunities, and threats. Insights are based on desk research and an analysis of articles found on the WorldCat Database. A keyword search of a 10-year period was conducted and analysed according to the number of articles per year, place of publication and central theme. Higher Institutes of Education's websites and other conference sites were consulted to identify projects and other forms of research activity and participation, and purposively selected examples were discussed. Information was supplemented by primary e-mail communication where available data needed clarification or confirmation. Permission was obtained to quote respondents.

The Knowledge Production Modes 1–3 provide an underlying structure for the paper (Caryannis, Campbell & Rehman, 2016). Mode 1 knowledge is seen as scientific knowledge – basic research that is less concerned with application and quality controlled by disciplinary peers (Boehm, 2015). Mode 2 knowledge production centres around inter-, trans- and multi-disciplinarity, social accountability, civic engagement and reflexivity, with overlapping phases of discovery and application and with quality determined by the usefulness of solutions (Boehm, 2015; Nowotny, Scott & Gibbons, 2013). Mode 3 knowledge is a catch-all term for a multi-level, knowledge-systems perspective where Modes 1 and 2 can be integrated and combined and extended beyond the university and industry to include society and environment (Caryannis, et al., 2016).

Design from 1IR to 4IR

Schwab (2018: ix) describes the world at a crossroads – on the one hand, the failure of social and political systems, the destruction of the natural environment and widening inequality; and on the other hand, the disruptive potential of 4IR technologies and new ways of creating value for “organisations and citizens”.

The first industrial revolution (1IR) in the mid-eighteenth century resulted from mechanised spinning and weaving, manufacturing, steam engines and railways (Schwab, 2018). Design focused on functionalism, and communication design was concerned with the marketing and advertising of consumer goods (Manzini, 2015; Roxburgh & Cox, 2015). The Second Industrial Revolution (2IR), during the period 1870 to 1930, is attributed to the power of electricity, the internal combustion engine and the availability of new materials (Schwab, 2018). This was also the time when design became a field of formal teaching and learning at academic institutions such as the Bauhaus and the Ulm Hochschule für Gestaltung (Ferrari, 2017). The differentiation of labour created different design fields, and design knowledge was driven by functional needs, the establishment of design principles and a focus on production (Ferrari, 2017).

The Third Industrial Revolution (3IR) lasted for the second half of the twentieth century and was brought about by information theory and digital technologies (Ferrari, 2017; Schwab, 2018). The possibilities changed the way designers worked and put the tools of production into the hands of the communication designer. The focus shifted away from how things should be designed and produced to what messages should be communicated – consequently shifting knowledge needs.

Communication design in a 4IR post-industrial world echoes the development away from consuming 'things' to experiences. It shifted to a design practice where multi-disciplinary teams work in the fields

of service design, customer experience design, interaction design, experience design, and visual storytelling (Roxburgh & Cox, 2015). Accompanying this new chapter in development are changes in designers' roles, from form-givers to seeding the system and facilitation. Through co-design, they have become facilitators of others' creativity (Calabretta & Kleinsmann, 2017; Sanders, 2017).

The ubiquity of design and the interplay between design and the social context requires a critical evaluation of the role of 4IR technologies in our humanity, as well as the ethical considerations that should guide how we use them to create a more humane, liveable world for everyone (Escobar, 2018; Mann-Kler, 2019). Rapid development in 4IR technologies and the global interconnectedness of people impose a new set of rules for design, based on interactivity and user participation. Design has become a critical co-creative practice embedded in the local context, where technology supports local culture (Escobar, 2018; Manzini, 2015). Accordingly, any effective 4IR education should include a critical consideration of the cultural, socio-economic, and -political effects of new technologies on humanity in a way that fosters deep intercultural understanding and abiding respect for freedom and human rights (Penprase, 2018).

A new culture and practice raise questions that demand new design knowledge (Bonsiepe, 2012) and requires an integration of design practice, design research and design education to explore a new landscape for innovation and growth (Sanders, 2017).

4IR, African scholarship, and design research

The fourth industrial revolution heralds a new chapter in human development where innovation is based on combinations of fast-developing technologies such as artificial intelligence, digital fabrication, and nanotechnology, which cause a global disruption of social, economic, and environmental systems and power structures (Schwab, 2018). These disruptions can potentially bring about gains in productivity, efficiency, safety, longevity, and general quality of life but can also widen social and economic inequality and perpetuate social injustice (Schwab, 2018). These shifts also challenge the traditional understanding of a university and position scholars and researchers in a broader context that includes not only technological changes, but also socio-economic, historical, and cultural contexts.

The characteristics of 4IR scholarship are therefore driven by the needs of social and environmental good, the integration and democratisation of technologies and knowledge systems (and inclusion), and collaboration among people across all disciplines and all socio-economic levels (Escobar, 2018; Penprase, 2018). Knowledge needs in 4IR design are now directed at three major clusters. The first is knowledge of new technologies – such as digital fabrication with new materials and 3D printing, which provides experiences such as augmented and virtual reality – and interacting through technologically mediated user interfaces (Meyer & Norman, 2020). The second cluster relates to new design practices and processes, and leadership in complex socio-technical systems such as interdisciplinary and intercultural collaborative and participatory design practices, with negotiation being a part of design skills (Escobar, 2018; Meyer & Norman, 2020; Sanders, 2017). The last cluster relates to the need for sustainability, and the impact of design on humanity, including racial and gender equality and social justice (Escobar, 2018; Meyer & Norman, 2020). It must be noted that these new knowledge needs do not replace, but build on previous knowledge needs in communications design – for example, strategic purpose, form and function.

Locally, a critical reflection of how local knowledge is constituted and developed, to what purpose this is done, on what assumptions and choices it is based, and about whose knowledge is or is not included is becoming ever more urgent and part of the decolonising debate (Motala, 2015). The #Decolonise! theme of the 14th DEFSa Conference (2017) is an example of such critical engagement. Scholars at this conference highlighted the need for different forms of knowledge, comprising multiple perspectives, origins and cultures instead of a purely Eurocentric understanding of knowledge (Botes & Giloi, 2014). Historically, universities in South Africa have mimicked European institutions, resulting in a form of

cognitive colonialism where Eurocentric knowledge is regarded as “the way of knowing” rather than “one way of knowing” (Du Preez, Ramrathan & Le Grange, 2018, p.6; Mapaya, 2016; Soudien, 2015). Cognitive colonialism has permeated even locally produced knowledge as South African scholars rose through an education system that was built on a Eurocentric epistemology (Soudien, 2015). Globalisation has further perpetuated cognitive colonialism through processes of research and publications, which are governed by a publishing system that regulates what is published (Du Preez, et al., 2018).

The challenges of decoloniality re-engage with knowledge from the context of one’s society or environment (Oparinde & Govender, 2019). The possibilities afforded by a need for local knowledge, rapidly developing technologies and 4IR-aligned teaching and scholarship puts communication design as a young discipline in South Africa at a crossroads. This is somewhere between the opportunity to develop new forms of scholarship and fighting for a place in the modes of traditional scholarship.

Communication design research capacity – where are we now?

In South Africa, scholarly capacity is aligned with Mode 1-type Western measures of peer-reviewed research output and impact factors. The following types of research output are recognised and rewarded: peer-reviewed articles published in journals approved by the Department of Higher Education and Training (DHET) (one unit), scholarly chapters and books (units based on page numbers), peer-reviewed conference proceedings (half units) and creative output (one to three units) (Government Gazette, 2015). Furthermore, DHET provides information on the research output per capita and weighted output where research master’s and doctoral production is incorporated.

Mode 1: Traditional output in the communication design sector

The DHET reports annually on research output, using the Classification of Educational Subject Matter (CESM) as fields of study (Department of Education [DOE], 2008; DHET, 2021). Communication design falls into CESM 03: Visual and Performing Arts.¹ DHET reports only on main CESMs, making discipline-specific analysis difficult. Many of the new fields in design are also absent in the current classification. The lack of more detailed data makes it impossible to determine the output per capita for the field of communication design. The latest 2019 output indicates that CESM 03 reported 174.09 units – less than 1% of the total number of units² (DHET, 2019).

Table 1: Research outputs recognised by the Department of Higher Education and Training

Mode 1 - type of research capacity - DHET Model					
Type	Journal Articles	Chapters and scholarly books	Peer reviewed conference papers	Creative ourput / innovations	Masters and doctoral students graduated

Journal articles and scholarly books

To get a sense of how many articles are produced by local communication design researchers seemed to be a daunting task in the absence of discipline-specific publication data. A search using the WorldCat

¹ CESM 03: VISUAL AND PERFORMING ARTS comprises 0301 Dance; 0302 Design and Applied Arts; 0303 Drama/Theatre Arts; 0304 Film/Video and Photographic Arts; 0305 Fine and Studio Art; 0306 Music; 0399 Visual and Performing Arts, Other

² Only two CESMs (CESM 10: Family Ecology and Consumer Sciences; and CESM 16: Military Sciences) reported lower output (DHET, 2021)

database was conducted for a 10-year period (2011–2020).³ Searches were filtered and further analysed to determine patterns (Table 2).

Table 2: Snapshot of journal articles in a 10-year period in the field of communication design in South Africa

Filtered article search: keywords (2011 - 2020) = n 89					
Graphic Design + SA	Communication Design + SA	Co-Design + SA	Illustration + Visual Narrative + SA	Visual Culture + Design + SA	
51	13	5	1	29	
Journal Patterns					
International	Image & Text	De Arte	SA Journal of Art History	Educational (all combined)	Other < 5 articles per journal
10	17	10	7	20	25

South Africa has one recognised journal that is dedicated to the visual culture and related fields: *Image & Text*. This journal stands out as the number one place of publication (Table 2). The journal was accredited by DHET in 1996 (Lange, 2012; SciELO, n.d.). It is now published yearly and, although starting out with a focus on design, has since 2011 evolved to include interdisciplinary topics such as visual and design culture (Lange, 2012). *Image & Text* was indexed by SciELO SA in 2018; data on impact factors and citations are still developing. There is currently not a dedicated design-specific research journal in South Africa.

Thematically, articles on design for humanity, design culture, and education tend to dominate, with a smaller focus on industry or technology. This confirms the observation that in the Global South, more of a Mode 2, civic-oriented value system for research prevails (Boehm, 2015). One such example is the 2018 publication of the first scholarly book on design by South African scholars, titled *Educating citizen designers in South Africa* (Costandius & Botes, 2018). This book is, according to Pretorius (SUNScholar, n.d.), the first of its kind that focuses on critical citizenship education that is driven by an overall aim for the need for social change. The book comprises case studies and examples of projects in the disciplines of architecture, graphic design, and product design.

Peer-reviewed conferences

One way to build scholarly capacity is through the development of an academic community of practice, with conferences a dominant platform and often the first opportunity for young academics to participate in research. South Africa is fortunate to have DEFSA, which, as a non-profit, hosts a biennial conference and publishes selected papers. It provides design scholars with experience in the formal processes of the peer review of abstracts and papers, strengthening the community. Opportunities for developing papers and posters also provide a space for young academics to participate.

The conference themes frame the development of local knowledge such as the 2000 Reshaping South Africa by Design, the 2001 Mapping New Territories in Design Education and the 2014 Redesigning Design Education. Peer-reviewed papers are indexed and freely available on the website

³ The lists were saved and further filtered down to articles that were deemed relevant. This may not be the most accurate method, but is sufficient in providing an idea of patterns and number of articles

(defsa.org.za). An analysis shows that website pages received 48 114 page views during 2020, with 3 299 downloads during that period (Volek, Google Analytics, pers. comm., 30 Oct, 2021). The 2014 #Decolonise! Conference is still a favourite, with papers regularly accessed.

Postgraduate numbers

The DHET uses master's and doctoral numbers as a further indicator of research capacity. The Higher Education Management Information System (HEMIS) reports data on graduates in the public sector. Communication Design falls under the second CESM level: 0302,⁴ which includes Communication Design, Industrial Design, Photography, and Fashion Design. The NQF 10 graduates in CESM0302 show a small rise, with 16 PhDs in the last five years compared to 11 in the previous five-year cycle. There may still be Communication Design graduates with PhDs in other CESMs, but even if these were included, the numbers are very small. Honours-level (NQF 8) numbers seem to be projecting a slight upwards curve after a worrying drop (Figure 1).

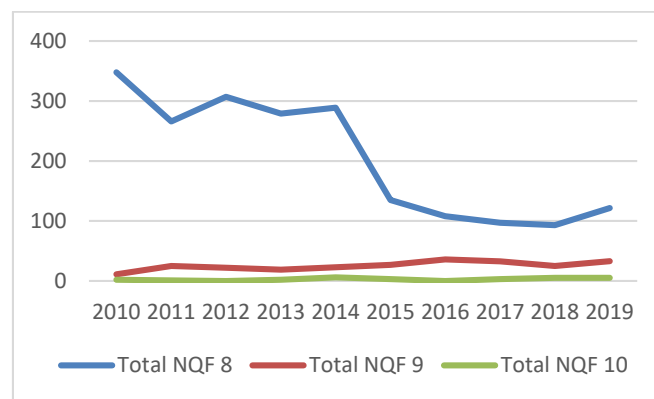


Figure 1: Ten-year comparison at public institutes of higher education (based on available HEMIS data – CESM 030200)

The top five institutions in the master's and doctoral space in CESM 030200 are CPUT, UJ, DUT, TUT and UP. Van Zyl (2014) found that the communication design industry saw little value in the research produced at universities and found access to research journals challenging; the universities' postgraduate qualifications did not seem to offer any career advantages, apart from teaching. Sauthoff (Lange, 2012, p. 6) echoes this and points out that design is dominated "by intuitive practitioners who are more likely to consult a trade magazine instead of a scholarly publication". However, Sauthoff adds that there are invisible networks of people with specialist knowledge in design. The question should therefore be asked about whether other forms or modes of critical scholarship, such as the ones mentioned by Motala (2015), exist and if these could bridge the gap between industry and academia to take design research in a different direction.

⁴ 0302 Design and Applied Arts: 030201 Design and Visual Communications, General; 030202 Commercial and Advertising Art; 030203 Industrial Design; 030204 Commercial Photography; 030205 Fashion/Apparel Design; 030206 Interior Design; 030207 Graphic Design; 030208 Illustration; 030299 Design and Applied Arts, Other

Creative output

The DHET also recognises and subsidises research outputs from the creative and artistic disciplines⁵ (DHET, 2021). Design is a subfield among fine and visual arts, music, theatre, performance and dance, film and television, and literary arts. An older system of evaluation was replaced with a new peer-review system (DHET, 2021). Unfortunately, out of the 100 approved outputs, not one communication design project was awarded research credits and no communication design submissions were made. A high rejection rate of 80% in the design subsector was noted. The critique in the design field related to the lack of creation of new knowledge, poor-quality images, a lack of articulation of process, and a shortage of reviewers (DHET, 2021).

Shifting modes towards Modes 2 and 3 knowledge production

The examples presented in the previous section reported on Mode 1-recognised research output that conforms to the local and international rules of knowledge production, mostly aimed at peer audiences. The next section briefly discusses purposively selected examples where the boundaries of knowledge generation modes are blurred and extended to Modes 2 and 3 (Figure 3).

Table 3: Examples of Mode 3 knowledge production

Mode 3-type of research: Extending research capacity and creating new opportunities			
Type	Integrating design and knowledge production	Working conferences	Virtual communities of knowledge and practice
Nature	Participatory and Integrative	Collaborative, transdisciplinary and virtual	Collaborative and Inclusive
Participants	Industry, community, more than one institute	local and global	Industry, scholars and general public, fast-paced, open and accessible
Type of knowledge production	Unique to design, situated in the design problem e.g. local or society, solution is part of the project, visual language	Intra- and transdisciplinary possibilities for young researchers, verbal, local languages	Networked, accessible, local language
Review and judging	Combinations of modes 1 and 2, seed projects that are shared across accredited and other platforms	Combinations of modes 1 and 2, shared in conference space, could lead back to mode 1 peer reviewed papers	Community of practice determine the value. If not perceived as relevant, they disengage.

Integrating design activity and knowledge production

The first example selected here, the Mandela Poster Project, was not initiated as a research project but is an example of a social entrepreneurship design project that also led to knowledge production. The design-led project was initiated in 2013 by South African designers Mohammed Jogie and ico-D's former president Jacques Lange, comprising 95 posters that visually narrated the life of icon Nelson Rolihlahla Mandela (1918–2013). These posters were selected from designers' contributions from all over the world. The proceeds of the project contributed to the Nelson Mandela Children's Hospital

⁵ As guided by the Policy on the Evaluation of Creative Outputs and Innovations Produced by South African Public Higher Education Institutions (2017) in the Government Gazette No. 395

(Hanekom, 2015). The collection was to date shown in 12 countries. This project, in addition to the original intention of a social entrepreneurship project, created the opportunity for reflection. Lange (pers. comm., 1 July, 2021) calls this a “research seeding project” that has so far resulted in several critical articles aimed at the general design community, a peer-reviewed article in an academic journal and a master’s dissertation (Du Plessis, 2018; Du Preez, 2013; Hanekom, 2015). The scholarly value of such a project is found in the collaboration between the local and global design community and academia, with a truly South African theme.

Another such participatory research project was a collaboration between US and UJ. Stories were collected from communities, then documented and illustrated. Corporate and NRF funding contributed to the project, and 16 wordless picture books were created (Haese & Costandius, 2021). The processes and outcomes resulted in a book chapter, a journal article, three conference papers, workshops, and further postgraduate studies, all focusing on creating solutions *with* communities that face challenges in terms of conventional reading skills (Haese, pers. comm., 5 July 2021).

The value of both these ‘seed projects’ are found in the collaboration between institutions, industry, community and scholars, grounded in the practice of design with benefits that extend to both the scientific community and society.

Alternative working conferences

Digital technologies are making international conferencing more accessible and have extended possibilities for collaborations (Bottas & Junginger, 2021). The 2021 Design as Common Good Conference process started with a double-blind abstract review, followed by authors’ development of their own papers (Design as Common Good, 2021). Subsequently, authors from diverse design fields were assigned to working groups (Bottas & Junginger, 2021). The diversity of such an approach is resulted in a presentation that integrated a South African scholar’s photo-ethnographic work about the Khoisan, with work by Italian, Portuguese and Australian scholars in diverse field such as form and quantum thinking; eco-friendly plastic in furniture design; and design as a catalyst for sustainable oceans (McKenzie, pers. comm., 1 Jul, 2021).

The 2020 Participatory Design Conference explored forms and understandings of participation, collaboration, intervention, design and technology; and traditional social and cultural systems as sources of learning and a means to contest essentialist views on participatory design (PDC, 2020). South Africa participated in a workshop on “Decolonising participatory design practices: Towards participations otherwise”. This workshop explored how participatory designers in diverse global contexts are working together and adapting modes, methodologies and concepts of participatory design into decolonising practices (Del Gaudio, et al., 2020). Following a co-design session, participants debated the ideas and critiqued the participatory methods and processes employed (Carstens, pers. comm., 18 June 2020).

These examples extend beyond Mode 1 scholarship as the participatory processes resulted in an additional layer of knowledge production that is transdisciplinary and collaborative.

Virtual communities of knowledge and practice

Other platforms that contribute to knowledge generation are networked communities of practice. Examples of these are the South African User Experience Design Forum, a public group consisting of UX practitioners and scholars, Speculative Design South Africa and Think Design, platforms for design practitioners and scholars to engage in dialogue and exchange knowledge (Jooste, 2017; Meyers, 2020; SA UX, 2021). These platforms bring together designers, academics, and futurists for the purposes of knowledge sharing. Another example is the 2021 DxZA Conference, organised by a community of UX practitioners. Their aim is to connect industry, students, and scholars to share

knowledge and engage in dialogue about technology, practices, and disciplinary intersections (DxZA, 2021). Another well-known example is TEDx's local, self-organised events that bring people together to spark grassroots discussions (TEDx Johannesburg, 2021).

Although these examples do not strictly fit the Mode 1 or Mode 2 criteria for scholarship, the existence of these platforms and the active participation of design practitioners and scholars may suggest the emergence of an intellectual activism as suggested by Motala (2015).

Conclusion

The paper set out with a seemingly impossible task – to explore research capacity aligned with 4IR and African scholarship, in the context of the widening domain of communication design. Research capacity was contextualised in the traditional Mode 1 production and extended to Modes 2 and 3 where potential was aligned with 4IR and the need for African scholarship. The paper contributes a starting point supported by evidence on research output and capacity specific to the communication design field.

It is clear when looking at the insights gained in this study that communication design consists of a small community of scholars that produces Mode 1 scholarly research. The small number of postgraduate students remains a challenge, however, a slight increase provides hope. The DEFSA conference is a strength in the design research space and plays a major role to provide a space for not only directing themes and sharing knowledge but also developing young researchers. New opportunities are presented when looking at Modes 2 and 3 of knowledge production that are collaborative and interdisciplinary. However, only a few such research projects, that also include design activity, could be identified. This area, if grown, may increase output capacity. Participation by local researchers in the newer online and working style-conferences presents fresh opportunities for networking that may also contribute to the strengthening of local capacity.

Further research is needed better to understand the challenges experienced by design scholars and to identify and develop strategies to improve research capacity and output. The opportunities for collaborative projects, alternative conference styles, and integration with industry need further exploration. The absence of a dedicated journal for design remains a challenge and the possibility of a journal needs to be investigated. The potential of 4IR in the design and design scholarship space was also only touched on in the paper and needs more research and exploration.

The widening domain of the discipline of communication design provides an opportunity for scholars to embrace the transdisciplinary shifts and combine strengths with others. As a final remark, design research provides the opportunity to embrace the challenges that our local society and industry faces and develop the knowledge and solutions that can make a difference.

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