

Institution: University of West London		
Unit of Assessment: UOA 11 - Computer Science and Informatics		
Title of case study: Institutionalising the value of Human-Centered Systems Design in Asia, Africa and the UK		
Period when the underpinning research was undertaken: 2003 - 2017		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g., job title):	Period(s) employed by submitting HEI:
Jose Abdelnour-Nocera	Associate Professor	2006 to date
Andy Smith	Professor	2004-2011 (deceased)
Lynne Dunckley	Professor	2003-2008 (deceased)
Period when the claimed impact occurred: August 2013 to December 2020		
Is this case study continued from a case study submitted in 2014? No		
1. Summary of the impact (indicative maximum 100 words)		
<p>The research findings and expertise of the University of West London's Sociotechnical Research Group for Innovation and User Experience has contributed to the effective adoption of Human-Centered Systems Design in Asia and Africa, as well as in the UK. This has enabled several organisations, including universities in South Africa, a major consultancy in India and teams at Heathrow Airport, to better understand how to apply HCI tools, techniques and methods in their local contexts, increasing the effectiveness of automation and innovation initiatives. The findings developed by the Centre have also been fed into HCI curriculum development by global bodies, including the International Federation of Information Processing.</p>		
2. Underpinning research (indicative maximum 500 words)		
<p>The impact case study is underpinned by a body of research carried out since 2004 at the University of West London (UWL) in what is now the Sociotechnical Research Group for Innovation and User Experience (SCIUX). The body of work was initially led from 2003 at the University by Dunckley, whose work focused on research on culture and human-computer interaction (HCI). She was joined there by Smith in 2004, and subsequently by Abdelnour-Nocera who has led SCIUX since 2011.</p> <p>The initial research programme provided tools, techniques and methods that could be used by technology developers and designers to take account of cultural differences in user requirements in interactive systems design and development. [R1]. The insights from this programme presented an audit of local user interface attractors to inform the design process; the concept of cultural fingerprints to contrast websites with the cultural needs of local users; the problems associated with local validity of user centred design methods; and cross-cultural development and design. The last two of these insights emphasised the need to engage with countries where HCI was not well developed but had a growing IT industry.</p> <p>Motivated by this perspective, Smith and colleagues accessed the EU-Asia Information Technology and Communications Programme to support usability research in both India and China. SCIUX was the lead partner in the Sino European Systems Usability Network and the Indo-European Systems Usability Partnership, helping to develop active and sustainable links between Asia and Europe. [R2].</p> <p>Through the initial stages of international networks, it was found that the institutionalisation of HCI required three elements. Firstly, the reconceptualization / redefinition of HCI in the local country</p>		

or culture. Secondly, the embedding of HCI concerns and its importance in local and national organizations. Thirdly, the rollout of usability training and best practice into industry. In practice these elements occurred in parallel; the critical issue was to ensure sufficient feedback between them. [R3]

Following the research activity in China and India, the expertise developed enabled SCIUX to engage in subsequent projects in Africa. This included participating in the EPSRC-funded VESEL: Village e-science for Life project in Kenya (EP/E007198/1) which assessed and incorporated the effects of culture in participatory design and interactive technologies for rural farmers. [R4] Engagements in Namibia helped SCIUX show the local cultural dynamics in co-designing technology and co-creating indigenous notions of user, namely persona, to support the design of systems to preserve cultural heritage. [R5]

These research projects enabled SCIUX to validate and refine its original insights through further evaluation and the production of new human-centred systems design (HCSD) tools and frameworks aimed at eliciting culturally valid requirements and useful interactive systems across different rural and urban work domains. A key new finding in these projects was that the influence of national, local and professional cultures changed as users moved from rural to urban work domains.

Starting in 2012, SCIUX led a programme of research focused on cultural and institutional differences in HCI education. This assessed the work of undergraduate students of HCI in several countries, including the UK, China, Namibia, India, and Mexico, with the objective of comparing how groups of students with different cognitive styles and cultural backgrounds learned and solved interaction design problems. It was found how analytical, adaptive and intuitive cognitive styles and course discipline had a variable effect on students' performance and use of HCSD concepts and methods. [R6]

This expertise was brought together with SCIUX cross-cultural insights to win a British Academy / Newton Mobility Grant in 2016 on socio-cultural and human interaction intervention designs for students at risk in South Africa, in partnership with the University of Cape Town and Cape Town University of Technology, and subsequently with the University of Fort Hare, and the resulting impact is included in section 4 below.

3. References to the research (indicative maximum of six references)

- R1. Andy Smith, Lynne Duncleley, Tim French, Shailey Minocha, Yu Chang, A process model for developing usable cross-cultural websites, *Interacting with Computers*, Volume 16, Issue 1, February 2004, Pages 63–91, <https://doi.org/10.1016/j.intcom.2003.11>.
- R2. Smith A., Joshi A., Liu Z., Bannon L., Gulliksen J., Li C. (2007) Institutionalizing HCI in Asia. In: Baranauskas C., Palanque P., Abascal J., Barbosa S.D.J. (eds) *Human-Computer Interaction – INTERACT 2007*. INTERACT 2007. Lecture Notes in Computer Science, vol 4663. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-540-74800-7_7
- R3. Smith A. (2011) Issues in Adapting Usability Testing for Global Usability. In: Douglas I., Liu Z. (eds) *Global Usability*. Human-Computer Interaction Series. Springer, London. https://doi.org/10.1007/978-0-85729-304-6_3
- R4. Souleymane Camara & José Abdelnour-Nocera (2013) Revealing the Socio-Technical Context of Design Settings: Toward Participatory IS Design, *International Journal of Human-Computer Interaction*, 29:4, 289-307, DOI: 10.1080/10447318.2013.765767
- R5. Cabrero, Daniel G., Winschiers-Theophilus, Heike, Abdelnour-Nocera, Jose and Kapuire, Gereon Koch (2016) A hermeneutic inquiry into user-created personas in different Namibian locales. In: 14th Participatory Design Conference, 15-19 Aug 2016, Aarhus, Denmark. DOI: 10.1145/2940299.2940310

R6. Abdelnour-Nocera J., Clemmensen T., Guimaraes T.G. (2017) Learning HCI Across Institutions, Disciplines and Countries: A Field Study of Cognitive Styles in Analytical and Creative Tasks. In: Bernhaupt R., Dalvi G., Joshi A., K. Balkrishan D., O'Neill J., Winckler M. (eds) Human-Computer Interaction – INTERACT 2017. INTERACT 2017. Lecture Notes in Computer Science, vol 10516. Springer, Cham. https://doi.org/10.1007/978-3-319-68059-0_13

Grant: British Academy Grant / Newton Mobility Grant (NG160087) 2016, “Socio-cultural and human interaction approaches in the design of interventions to support students at risk in South African Universities”. Recipients: Dr Constance Bitso, University of Cape Town; Dr Jose Abdelnour Nocera, University of West London, £9,256.

Quality Statement: R1, R2 and R3 were submitted as underpinning research items for the previous case study in REF2014. R4 was submitted as an output to REF2014.

NB for affiliations in publications: University of West London was known as Thames Valley University until 2010.

4. Details of the impact (indicative maximum 750 words)

SCIUX research and expertise has enabled several organisations to understand better how to apply HCI tools, techniques and methods in their local context, both in developing countries and the UK. This includes impact through public bodies, commercial companies and professional organisations.

Service design in universities in South Africa

Beginning in 2016, SCUIX drew on their research expertise to collaborate with the University of Cape Town, University of Fort Hare (UFH) and Cape Peninsula University of Technology (CPUT) on the introduction and adaption of HCSD methods to design systems for improved University student retention in black communities. Capability development took place at Fort Hare and CPUT where Abdelnour-Nocera trained library staff, researchers and computer science and information systems students on service design methods to help identify and support students at risk of dropping out.

This has led to the creation of local projects and service models managed by the Directors of Libraries of both universities. At UFH, following training by Abdelnour-Nocera in 2018 and 2019, the University began to undertake user experience research and has engaged with its students using the insights gained in the training. It subsequently modified its library spaces using feedback from students and seen an increase in user statistics and overall positive feedback about the library from students. The UFH Director of Libraries has confirmed that they are positive that this process will have a significant impact on enhancing their students' experience in the library and ultimately contribute to students' retention. [S1]

Resulting from this collaboration, CPUT set up a User Services Design Working Group that worked closely with students to assess the value and effectiveness of their service delivery. The results were implemented across their campuses with positive feedback from the users and they expect to see growing impact on student retention at CPUT. Feedback from the students highlighted the need to scale up the digital online services as they increasingly preferred receiving information in electronic form. CPUT's efforts to improve their digital online services coincided with the COVID19 pandemic. This provided them with an opportune moment to test their digital online services as they were forced to go fully online overnight. This enabled the library to be at the forefront of supporting students during the pandemic with a range of services to cater for their information needs. [S2]

mKRISHI Fisheries project with TATA Consultancy, India

SCIUX has engaged with TATA Consultancy Services (TCS) on the mKRISHI Fisheries project (2017-2018) to provide HCI advice on the development and evaluation of an app to aid the 900,000 small-scale fishermen in India. The app drew on HCI techniques to provide information on potential fishing zones, wind speed, wave height, weather forecasts and alerts in a widely accessible format. The app was made free to use via Google Play for the target audience of fishermen who can now have information on their own mobiles and access this as required for planning their fishing trips or navigation.

SCIUX drew on their research expertise to advise on how this could be introduced in a culturally appropriate manner and without disrupting fragile local socio-economic networks. This engagement helped shape TCS approach to incorporate stakeholders' and users' perspectives and on how to involve them in subsequent stages of the mKRISHI Fisheries Service, crucial to the success of this initiative. [S3]

Sociotechnical strategy development with Heathrow Airport

SCIUX expertise was used in 2019/20 by Heathrow Airport's Innovation and Automation team to support development of a sociotechnical strategy and inform the deployment of technological innovations. SCIUX helped the team's sociotechnical approach to the implementation of innovations in the airport from a human-centred systems design perspective, which included the deployment of self-service connection podiums and evaluating the use of passenger-facing robotics in their headquarters.

Working with the Innovation team. SCIUX also ran several participatory design workshops for members of the Heathrow workforce in 2020 to help optimise the use of automation and data in the airport terminal operations. These used SCIUX frameworks and tools, such as Human Work Interaction Design and Ecological Interface Design. [S4]

Expert advice on Interaction Design

In 2017 Abdelnour Nocera was appointed UK Representative to the International Federation of Information Processing (IFIP), a UNESCO organisation, to steer Technical Committee 13 in HCI, enabling him to have a direct impact on global practice and education in this field, in particular as chair of their Interaction Design and International Development working group which promotes the application of interaction design research, practice and education to address the needs, desires and aspirations of people across the developing world. [S5].

Abdelnour Nocera also became Chair of the Sociotechnical Group of the British Computer Society. Activities in this role have included responding to the November 2017 UK Government Green Paper on Internet Safety. He also gave the keynote for the Software BCS Quality Management Conference in 2016 where he briefed computing professionals on the importance of culture on establishing requirements in software engineering.

HCI curriculum development

The findings of the HCI education project informed the Association of Computing Machinery project (March 2011 to December 2014) to design a new HCI curriculum sensitive to different cultural and disciplinary needs. This was primarily through a SCIUX position paper, "Are We Teaching the HCI That We Want to Teach Rather Than What They Need To Learn?" at the CHI 2014 conference held in Toronto, Canada. [S6]

Supporting HCI at Dalian Maritime University

Dalian Maritime University's Sino-European Usability Centre has taken a leading role in establishing HCI approaches in China. SCIUX supported that work, originally through the networks initiated by Smith's research.

The benefit of this work and the collaboration has continued since 2014. The Director of Dalian's Centre has said that because of the original project promoting the value of usability and user

experience successfully in industry and universities in China, they have been able to gain or retain contracts with major organisations. This has included a joint lab with Fotile, membership of CITISAH (China Industry Technology Innovation Strategic Alliance on Housing, <http://www.zzun.org/>) and ENoLL (European Network of Living Labs, <https://enoll.org/>) as well as many projects from industry in recent years. [S7]

This collaboration to expand Dalian's expertise has continued into 2019 with Abdelnour Nocera delivering new HCSD workshops to HCI Masters students who were about to start working in industry in China.

5. Sources to corroborate the impact (indicative maximum of 10 references)

S1 Letter from Director: UFH Libraries, dated 28/1/20.

S2 Letter from Director: CPUT Libraries, dated 23/11/20.

S3 Email from Group Leader, TCS Innovation Lab, Mumbai, dated 12/2/20 and A mobile app mobile app for supporting sustainable fishing practices in Alibaug, Interactions, May-June 2018.

S4 Letter from Innovation Head, Heathrow Airport Limited dated 23/1/20.

S5 Working Group 13.8 – Interaction Design for International Development.

S6 Austin, Ann and Abdelnour-Nocera, Jose (2014) Are we teaching the HCI that we want to teach rather than what they need to learn? In: ACM CHI Conference on Human Factors in Computing Systems, 28 April - 01 May 2014, Toronto, Canada.

S7 Email from Director, Sino European Usability Centre, Dalian Maritime University, China, dated 2/6/18.