RESEARCH + EDUCATION FORUM PROCEEDINGS

HYDERABAD 2019

Humanizing Design

WDO WORLD DESIGN ORGANIZATION

The following document is the published collection of technical papers accepted for presentation at the 2019 WDO Research and Education Forum in Hyderabad (India) on 10 October 2019.

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About this publication

Held on 10 October 2019, under the banner of Humanizing Design, the 2019 WDO Research and Education Forum aimed to share perspectives and explore trends to better prepare young design professionals for new challenges and opportunities.

Bringing together academics, students and industry leaders at the Indian School of Business in Hyderabad (India), the event explored three themes relating to the intersection of design education and sustainability, emerging economies and digital media. Through a series of day-long activities, the forum fostered thought provoking dialogue around new education programmes, areas of research and practices that focus on more human-centered approaches to designing for a better world.

The following Proceedings are the collection of presented papers.

To view the keynote presentations, panel discussions, as well as the poster presentations, please visit WDO.org/world-design-assembly

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Alpay Er

Thomas Garvey

Based on historical practice and with looking forward to the challenges and opportunities of the design profession, the WDO Education Committee proposed to reinitiate the tradition of having research and education events integrated in the 31st World Design Assembly Agenda.

The future of design education is a key priority for WDO and for our members, but also for the design community in general. Under the theme Humanizing Design, our objective was that the forum would help bridge the gaps between academia and industry and help us better prepare our young design professionals for new challenges and opportunities.

Among the key themes that we wanted to highlight in this forum, the introduction of UN SDGs in Design Curricula was a priority. The UN Sustainable Development Goals (SDGs) were set by the United Nations General Assembly in 2015 for the year 2030, as a blueprint to achieve a better and more sustainable future for all. During the 30th World Design Assembly held in October 2017, WDO embraced the UN SDGs as a framework for action. So as we move forward we need to continually better define a range of relationships, conditions, and criteria that will help us measure progress and contribute to best practices.

A growing part of WDO membership comes from regions outside of Europe and North America. It was thus essential to discuss the future of design education in emerging economies. The emergence of university level industrial design programmes in these regions acutely challenge the standards of international design education and the capability of design to meet the relevant local social and economic conditions. Design research and education institutions in emerging countries are now at a critical junction to understand their own unique characteristics, as they identify new problems, opportunities and responsibilities, definitely in order to define themselves, but also in terms of their ability to redefine the global design research and education agenda.

The industrial revolution has provided us with powerful tools, which forged the next revolution – the digital revolution. Digital technologies have radically transformed the way we live, learn, work and play. However, vouching for the progress of technology without understanding the human element acts as a barrier to learning. Design offers a wide range of tools and ways of thinking that can humanize digital media for education and acts as an important way of thinking about complexity as the nature of these challenges is interdisciplinary.

We are happy to see that these themes and issues have spoken to a large audience as we have received a large number of abstracts, papers and posters.

This publication compiles the 15 papers that were selected and presented in Hyderabad on 10 October by international research academics, designers and educators. On behalf of the Selection Committee, we would like to thank them for sharing their insights on these important issues and for contributing to the discussion and endeavor to design for a better world.

Prof. Alpay Er, Ozyegin University
WDO Education Committee Chair and Forum Co-chair

Prof. Thomas Garvey, PhD, Carleton University
Forum Co-chair

Luisa Bocchietto

During the 2017-2019 term, it was a priority for the WDO Board of Directors to resuscitate this Research and Education Forum and to have it organized as part of our Assembly to discuss the future of design education and to share knowledge on key issues related to the future state of design education. This was an exciting opportunity for WDO, as we reinstate this event since it was last held in 2009.

Today, with over 185 member organizations worldwide, more than half of our members are educational institutions. These statistics are evidence that our educational pillar is a priority for WDO and we are committed to providing our educational members with more opportunities such as this one, to discuss how we can develop more our academic programmes in a way that meets the expectations of young designers and is adapted to the current needs of the world.

Thanks to the Government of Telangana, as well as WDO Member the Indian Institute of Technology of Hyderabad, and the Indian School of Business for hosting this event, as well as our sponsors, Anant National University, Indus University and Lumium, without their generous support, none of this would have been possible.

Finally, a special word for the WDO Research and Education Committee: Prof. Alpay Er from Turkey and Chair of the Committee, Prof. Thomas Garvey from Canada, Prof. Deepak John Mathew from India and Prof. Martha Zarza from Mexico, who committed their time and expertise to overseeing the development of the programme.

Luisa Bocchietto, President of WDO (2017-2019)

Srini Srinivasan

Since 1957, WDO has been the international voice for industrial design. As a result of our advocacy, promotion and opportunities such as the Research and Design Education Forum, we are well positioned to share knowledge of industrial design driven innovation that has the power to create a better world. Bridging the gap between the academic and corporate sectors enables us to move forward the discussion around the future of design education.

The abstracts received highlight a real need for pursuing such objectives and we aspire to continue to provide such a platform for our membership, as well as for the global design community to continue to gain insights that will empower the next generations of designers to make more sustainable and responsible decisions that will have a positive impact on the world we live in.

Srini Srinivasan, President of WDO (2019-2021)

Speakers

Moderator

Thomas Garvey
Prof. Thomas Garvey, PhD
Carleton University

Thomas Garvey is an Associate Professor in the School of Industrial Design at Carleton University and was the Director of the School of Industrial Design from 2007 to 2017. He is currently a board member of the World Design Organization. Professor Garvey's research focuses on industrial design for extreme and minimal environments, small-scale living spaces and urban density, integration of the United Nations Sustainable Development Goals in design curricula, and international collaborations. Professor Garvey graduated from Carleton with a Bachelor of Industrial Design. He obtained an MSc in Communications Design from Pratt Institute in New York and a PhD in Architectural Planning from the University of Tokyo.

Keynotes

Rajiv Kumar
Managing Director, Microsoft India Development Centre

Rajiv Kumar is the MD of Microsoft India Development Centre (IDC) and CVP of Microsoft's Experiences and Devices (E+D) India Group. Rajiv's most recent accomplishment is the incubation and worldwide launch of Kaizala (an enterprise productivity chat app) from India. Rajiv worked for the first 12 years of his career in Redmond (USA) and the latter 15 at IDC, where he was instrumental in transforming IDC from a being a Distributed Center focused on execution excellence to an innovation center that delivers Microsoft products globally. He holds a bachelor's degree in Computer Science from IIT Roorkee and a master's in Computer Science from the University of Texas, Austin.

Geetha Narayanan
Founder, Srishti Institute of Art Design and Technology

Dr Geetha Narayanan is an academic, a scholar and an institution builder with over four decades of experience in the fields of education and change. Well known as the Founder Director of Srishti Institute of Art Design and Technology Geetha has served on the Board of Icsid (now the World Design Organization; has been a Director's Fellow at the Media Lab at MIT (USA) and has contributed as a visiting faculty to the Future of Learning Summer Institutes held at the Harvard Graduate School of Education (USA). Geetha currently holds the UNESCO Chair in Culture Habitat and Sustainable Development at Srishti. She is also Principal Investigator of Project Vision, an international research collective.

Panelists

Carla Cipolla
International Coordinator, DESIS Network

Carla Cipolla is Associate Professor at COPPE – UFRJ – Federal University of Rio de Janeiro (Brazil). Since 2004 her research and design activities are been focused on design for social innovation, emphasizing international cooperative projects. She is also international coordinator of the DESIS Network (Design for Social Innovation and Sustainability), a network of Design Labs based in design schools and in other design-oriented universities and operating with local, regional and global partners to promote and support social change towards sustainability in higher education institutions so as to generate useful design knowledge and to create meaningful social changes in collaboration with other stakeholders.

Alok Nandi
President, IxDA

Design director and innovation strategist at Architempo, Alok B. Nandi brings experiences in multiple media (film production, events, exhibitions, interactive media publishing for Tintin's publisher) as well as R&D combining tech and storytelling (AR, VR, MR): interaction design, exhibition design (red dot design museum, St-Etienne Design Biennale), strategic design and innovation. He is a regular speaker in international conferences (Amsterdam Interaction14 Chair) and frequent jury member (in design, new media, cinema, start ups). Professor at the Institut Paul Bocuse (Lyon, France), he is working on innovation by design with hospitality/ culinary professionals. In 2007, he launched PechaKucha Night in Brussels and got engaged with Interaction Design Association (IxDA). He is global president of IxDA (2018-2020).

Lou Yongqi
Dean of the College of Design and Innovation, Tongji University

Prof. Dr. Lou Yongqi is Dean of the College of Design and Innovation at Tongji University, a Vice President of China Industrial Design Association, and the fellow of Royal Swedish Academy of Engineering Sciences. Lou has been the pioneer in China for design-driven innovation that connect creativity, business, and technology. He is the founder of Design Harvests, a design-driven urban-rural interaction project; Tongji-Huangpu School of Design and Innovation, the first design thinking K12 school in China; and She Ji – the Journal of Design, Innovation, and Economics. Lou is the Editorial Board Member of the journal Design Issues and the chairman of the international advisory board of University of Applied Arts in Vienna.

Theme 1

Integration of United Nations Sustainable Development Goals (UN SDGs) in International Design Curricula

The UN SDGs were set by the United Nations General Assembly in 2015 for the year 2030, as a blueprint to achieve a better and more sustainable future for all. During the 30th World Design Assembly held in October 2017, WDO established the World Design Agenda to help achieve the UN SDGs, using design to bring new perspectives to some of the world's complex problems. Together, with more than 100 delegates from over 40 member organizations from around the world, we have embraced the UN SDGs as a framework for action, but as we move forward we need to continually better define a range of relationships, conditions, and criteria that will help us measure progress and contribute to best practices.

Title:
Art-integrated learning and community design in rural communities in Kenya

Authors:
Young Eun (Sarah) Sin
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Institution:
Mtree

Abstract

Mtree is a non-profit organization with a mission to build healthy communities that celebrate individual identities and cultural diversity through art and design. Art and design enrich the way people perceive themselves, others, and the world around them.[1,2] Believing in this transforming power, Mtree chose art education as the most approachable means of achieving this mission of “artful change”.

In 2015, the Maya community in Kilifi County of coastal Kenya became Mtree’s flagship site for art education and art-integrated community design project. Maya has 1,400 residents, whose primary source of income is fishery with limited access to electricity, water, and general education. Mtree conducted community-based ethnographic research through home visits and town hall meetings to understand the community. Based on these findings that included needs and resources of the community, Mtree designed visual art and fashion design programmes with accompanying evaluation tools, focusing on a sense of self and a sense of community. In partnerships with the University of Nairobi, Pwani University, and the Nairobi National Museum of Kenya, Mtree is implementing multiple training workshops to expand its existing international volunteer artist model to sustainable local teaching artist workforce model with a service-based learning framework in areas with limited access to art education. These activities meet Sustainable Development Goal (SDG) 4: Quality of Education and Workforce Development. Mtree plans to continue to inspire, mobilize, and activate teaching artists in Kenya aligning with the recent Kenyan Educational Reformation that highlights arts and design in public education. At a community-level, Mtree developed the first Maya map using Google satellite and identified community landmarks for future economic and sustainable development together with community members. Mtree remodeled Maya Island Primary School and built common spaces with locally available materials and demonstrated to the community how visual and structural design can meet the needs of the community. Artworks from Mtree’s art education programme also generated significant resources and built locally appropriate clean water system. These initiatives are well aligned with SDG 11, Sustainable Cities and Community, to build Maya as an inclusive, safe, resilient, and sustainable community. In the future, Mtree plans to build a design-centered vocational school for youth, especially for teen girls who may have limited options for a career due to early marriage and pregnancy.[3] Mtree plans to continue to have an open, transparent, and collaborative partnership with Maya and other local entities by integrating art, design, and culture into design-led solutions.

Mtree

Mtree is a non-profit organization with a mission to create “artful change,” a renewal of marginalized communities in developing countries to become healthy, sustainable communities through art and design. Art and design enrich the way people perceive themselves, others, and the world around them.[1,2] Believing in this transforming power, Mtree chose art education as the most approachable means of achieving this mission. Since its inception in 2011, Mtree has expanded its programmes to the level of community development and have served more than 1,000 children and youth in developing countries along with 200 international artists, designers, and architects. This has been achieved through artful engagements in education and community development initiatives, including programmes in visual art, fashion design, global citizenship education, and design-centered community development planning.

Partnering community: Maya

In 2015, Maya community, located in Kilifi County of coastal Kenya, became Mtree’s flagship site for art education and art-integrated community design projects. Maya has 1,400 residents, whose primary source of income is fishery with limited access to electricity, water, and general education. Beyond these physical constraints, Maya children crave learning. This fundamental need has driven our work in Maya and continues to inspire us to engage in closer, deeper ties with the community. Mtree conducted community-based ethnographic research through home visits and town hall meetings to better understand the community. Based on the findings, Mtree designed visual art and fashion design programmes with accompanying evaluation tools, focusing on a sense of self and a sense of community.

Mtree Learning-in-Art Programme

“Why Art?” many ask. The Universal Declaration of Human Rights Article 27 states that “everyone has the right to freely participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits.” (UN, 1948)[3] Consequently, art is considered fundamentally instrumental in enhancing creativity in children and enables us to expand our creative limits and discover something unique about ourselves and the world. Through art, we can transform communities from the inside out. By engaging in hands-on art experiences with children and youth in underserved communities, they take their first steps toward self-discovery and reflection. As one develops a stronger sense of self, art becomes a language of hope that allows each child to express themselves and tune into other perspectives, molding them into compassionate members of their community.

Mtree provides four learning-in-art programmes specifically for children and youth in underserved communities in Kenya: Brush with Hope programme for young children, Fashion for All for adolescent girls, Sing for Hope and Dance with Hope for children and adolescents. Mtree’s Learning-in-Arts programme is a two-week arts education delivered by teaching artists, musicians, fashion designers, dancers, and other professionals from around the world. They bring their experiences, knowledge, and ideas to inspire hope in the children and youth. Additionally, each programme has its own unique curriculum in collaboration with local artists, which has been implemented since 2011. Every year prior to the launch of the programmes, teaching artist volunteers and researchers meet over several months online and in-person to generate new ideas for the curriculum and improve their teaching content, centering on the community’s values and needs.

“Why Art?” many ask. The Universal Declaration of Human Rights Article 27 states that “everyone has the right to freely participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits.”

Learning-in-art programme outcomes

We observed significant improvements in the children and youth in areas of sense of self, creative expression, diversity, and collaboration – or artful change – in our partnering community, Maya. These changes were measured by a series of quantitative and qualitative evaluating questions pre- and post-programme. These evaluating tools were developed by international art educators and artists, who have participated in the programme for more than two consecutive years. In 2018, the impact of Brush with Hope children's art programme included children becoming more visually and verbally articulate in describing their hopes, depicting their identity, measured quantitatively by teachers' evaluation changed from 2.2 to 4.7 after the two-week programme. The children's level of creativity and expression, measured by teachers, increased from 1.3 to 4.8 after programme participation. Compared to before the programme, children also became more open to different perspectives (mean score changed from 1.9 to 4.6). Fashion for All programme outcomes showed that the participating teenage girls' understanding of basic fashion skills noticeably improved from a mean score of 2.4 before the programme to 4.7 after the programme. Also, the students' level of experimentation in exploring new fashion tools and skills changed from a mean score of 1.5 to 4.5. Compared to before the programme, the adolescent girls became more confident in describing their dreams (mean score changed from 2.7 to 4.9). Lastly, students became more open to understanding and accepting differences that exist among them (mean score changed from 2.0 to 4.7).

Art + design integrated community development

Our understanding of Maya also comes from the extensive efforts of the Fit in Community architecture team. Volunteer members lived in Maya for over four months in 2015-2016 to gain a hands-on grasp of the landscape, study its natural resources, and renovate the Maya Island Primary School. In the same course, Mtree developed the first Maya map using Google satellite and identified community landmarks for future economic and sustainable development together with community members. This extended stay deepened the rapport between Mtree and the people of Maya. The team joined with community members, skilled carpenters, and builders, to build outdoor community commonplace and renovate the Maya Island Primary School using local materials such as sea stones for floor work, soil for the wall, and shells for decorations. It was a celebratory feat for the community lacking in educational and recreational compounds for their children. Through these integrated design features, the new spaces embraced the cultural values and characteristics of the community, keeping in mind: by the community, for the community.

The genuine efforts and collaboration of the local community also led to winning the SEED Award, global recognition for sustainable development and green economy under the United Nations Development Programme in 2016. Beyond the community-based projects in Maya, Mtree's art education programme has generated significant resources through 'art journals' and helped to construct a locally appropriate clean water system in Maya in collaboration with Team&Team. These initiatives are well aligned with SDG 11, Sustainable Cities and Community, to build Maya as an inclusive, safe, resilient, and sustainable community.

In regards to the development of the arts and culture in community regeneration, arts programmes supply meaningful and effective ways to reaffirm cultural values, strengthening a sense of being and place. This, however, needs to be viewed in the context that although the community has great talent and rich cultures, it is lacking in institutions to train and support their culture. Access to and participation in the arts, cultural expression, and the preservation of heritage are basic human rights; they are not luxuries, nor are they privileges as many have been led to believe.[4]

Artful change with sustainable workforce

Recognizing the major shortfall in access to art, art education, and lack of teachers trained to teach it as a subject in Kenya, Mtree is currently constructing an art education programme that encourages sustainable teaching artist workforce development. Groundworks for this initiative first began as partnerships with University of Nairobi and Pwani University, Kilifi, where local artists joined as teachers for our programmes in Maya. For the last few years, Mtree has conducted a series of art education workshops at the University of Nairobi to train teaching artist workforce who can deliver experiential art education to children in Kenya. Our collaboration with the National Museums of Kenya also extended into a meaningful exhibition of children's artworks and raised awareness for the lack of access to learning opportunities in art design in Kenya. Mtree is also in the process of building a service-based learning model for a teaching artists workforce in Nairobi, which is an extended 3-month long curriculum based on our visual art and global citizenship programme. These initiatives in training teaching artist workforce meet SDG 4, Quality of Education and Workforce Development. Mtree plans to continue to inspire, mobilize, and activate teaching artists in Kenya aligning with the recent Kenyan Educational Reformation that highlights arts and design in public education.

Artful community: the future

In the future, Mtree plans to build a design-centered vocational school for the youth, especially for teen girls who are the most vulnerable group in coastal Kenya. Research shows that Kilifi county, where Maya is located, has the highest teen marriage rate in coastal Kenya. One in five teenage girls have begun childbearing, cutting them short from chances for education and opportunities to be in charge of their future.[5] We hope to plant seeds of empowerment for these girls through the power of art so that they can become positive, strong leaders with the independence to freely express themselves in their surroundings.

The work in Maya is young, but our foundation is firm. The fundamental humanitarian right that connects us through art and design will continue to be the driving motivation that will help us, along with the people of Maya, who witness its growth into a flourishing, sustainable community. It will also affirm our plans to build a vocational school where children and youth will have the freedom to learn and live out their lives to the fullest. With this foundation, Mtree will continue to have an open, transparent, and collaborative partnership with Maya and other local entities by integrating art, design, and culture into design-led solutions. This is only the beginning.

References

- UNESCO. (2012, May). Arts Education. Retrieved from http://www.unesco.org/new/en/culture/themes/creativity/arts-education/
- Clapp, E. P., Ross, J., Ryan, J. O., & Tishman, S. (2016). Maker-centered learning: Empowering young people to shape their worlds. John Wiley & Sons.
- Article 27 of The Universal Declaration of Human Rights, UN 1948.
- Joubert, L. (2004). Creative communities: The arts, social responsibility and sustainable planning and development. WIT Transactions on Ecology and the Environment, 72.
- UNFPA News (2017), Teen Mums of Kilifi. Retrieved from https://kenya.unfpa.org/en/news/teen-mums-kilifi

Title:
Design + Change
in Afrika

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Abstract

Design education is evolving in Afrika and sustainability is becoming an integral part of the change process in Higher Education Institutions (HEIs). Designing as experimentation has shifted expert designers' attention from designing things to designing for specific purposes, hence the need to design for sustainment. The United Nations (UN) Sustainable Development Goals (SDGs) (UN Report, 2018) provides a framework from which designers can explore and design for sustainability within Afrikan contexts.

In this paper, we present sustainability cases and activities conducted in HEIs in Afrika. In this context, the SDGs were introduced as part of an advertising course for learners to deepen their knowledge on design for sustainability. Learners' activities on sustainability indicated that they have deepened their knowledge on SDGs and sustainable futures. Also, positive mindsets on sustainability have been acquired by participants, which would inform future design processes and respond to sustainable advertising practices.

Keywords: Afrika, Afrikology, Design, Education, Sustainability, Ubuntu

Introduction

Design education is embryonic in Afrika and sustainability is becoming an integral part of the change process in Higher Education Institutions (HEIs). Design is changing from 'designing of things' to 'designing for specific purposes'. Design experimentation essentially calls for a paradigm shift to move designing from only functional to satisfaction approach (Vezzoli et al., 2018:105-106) to widen the scope of solutions for sustainment in Afrika. The UN SDGs (UN Report, 2018) provides a framework from which designers can explore and design for sustainability within Afrikan contexts (Figure 1). In this article, we present design cases conducted in an HEI in Afrika. In this learning environment, the SDGs were introduced as part of an advertising course for students to deepen their knowledge on design for sustainability. So that learners can apply these concepts in their professional practice and influence behavioral change in their indigenous contexts.

Fig. 1 - UN SDGs

Methods and design framework

Participatory design research methodologies were adapted, which fostered collaborative ideation and active participation among learners in the sustainable design activities. The participants were learners in year three in a design school with a specialization in advertising. Learners participated in a Design + Change project with a focus on the various SDGs. These projects focused on identifying problems in society which could be solved through design to affect change in society. Lessons on sustainability were introduced as part of the semester activities to provide learners with the desirable foundation to design sustainably. These lessons were structured in two modalities using an experiential learning approach (Jose et al., 2017:270-271). These activities consisted of research and design studio projects on sustainability. Participants engaged with the learning activities in two semesters over a period of 24 weeks. The first 12 weeks (Term I) were mainly dedicated to research and engaging with sustainability concepts. The other 12 weeks (Term II) focused on experimenting and creating sustainable prototypes of Product-Service Systems (PSS) (Vezzoli et al., 2018:105-106). These learning activities were designed reflecting on the Double Diamond Design process (Davies & Wilson, 2013:6), Kolb's reflective cycle (Jose et al., 2017:272) and Bloom's Digital Taxonomy (BDT [Figure 2&3]) with an emphasis on the Higher Order Thinking Skills (HOTs) (Churches, 2008:1-2; Tarling & Ng'ambi, 2016:560).

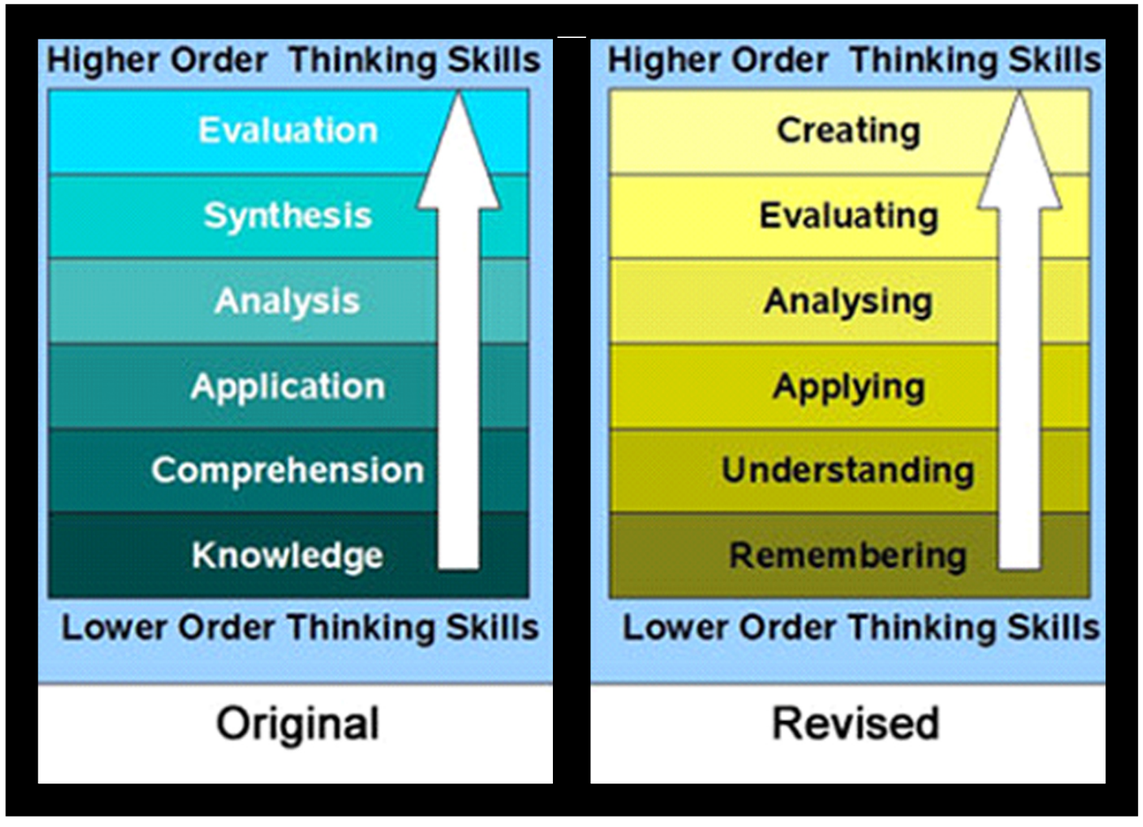

Fig. 2 - Original BDT (left), Revised BDT (right) (Source: Churches, 2008:1-2; Tarling & Ng'ambi, 2016:560)

Learning experience design

The learning design was drawn from the BDT, which enabled learners to first engage with Lower Order Thinking Skills (LOTs) in order to achieve Higher Order Thinking Skills (HOTs) through active engagements while addressing challenges related to the SDGs. In essence, if participants do not remember and understand the SDGs and other sustainable design philosophies, they will not be able to effectively transfer knowledge to HOTs and achieve the desired learning outcomes. Following an experiential learning approach, learners dedicated ample time, engaging with sustainable worldviews. Participants researched about sustainability practices to inform their next actions for designing solutions. These activities were then followed through to applying, analyzing, evaluating and creating sustainable solutions as proof–of–concept for the selected SDG project (Figures 1-4).

Fig. 3 - Emerging framework for integrating SDGs in a course (Source: Adapted from Kolb, 1984 as cited in Jose et al., 2017:272; Churches, 2008:1-2; Davies & Wilson, 2013:6)

Design + Change: SDG project plans

In these Design + Change activities, participants worked on eleven SDG cases, which revolved around design themes such as design for health, education and environment. Some of these cases are described in Table 1, which shows some of the SDG proposals by participants. Design processes were explored which was based on philosophies such as Afrikology – an African ethos of togetherness (Ubuntu) to foster collaboration among participants (Futerman, 2015:25; M'Rithaa & Jamie, 2017:2; Osha, 2018:25). Guided reflections were used to obtain feedback from participants, which helped to improve upon subsequent design activities (Schön, 1987:249-250; Atkinson & Irving, 2013:7-8). The learning activities were characterized by active presentations at the end of Term II (Figures 2&3). The criteria for selecting the top projects were based on guidelines such as originality, technology, replicate-ability, affordability and sustainability. The top design teams received special awards whereas the others received certificates for their participation. Learners were offered the opportunity to participate in an incubation hub in the selected HEI and other affiliated maker spaces for further development and implementation of their proposed solutions.

The discoveries from the learning activities showed that participants were able to achieve the stipulated HOTs as specified in BDT. An emerging framework of the design process have been proposed which could serve as a guide to integrate SDGs as part of design curriculum in Afrikan universities[...]

Fig. 4 - Design + Change activities with participants

SDGS	Design + Change project description
3	Blood Donation: this was designed with a focus on blood donation campaign aimed at promoting health and wellness to the general public.
13 & 15	Illegal Logging – 'I log out': the project aims to curb illegal logging of forest reserves and sensitize people to be conscious of the act and it's impact on the environment.
13, 14 & 15	Illegal Mining – 'Galamsey': participants focused on designing solutions to encourage small-scale illegal miners to desist from the practice and consider other sustainable ways of mining and living.
12 & 13	Recycling of Plastic Waste: team members proposed solutions to encourage people to trade plastic waste materials for recycling in exchange of points for other services on campus.
13 & 15	Tree Planting: the tree-planting project is designed to promote afforestation for people to be environmentally conscious.

Table 1 - Proposed solutions

In conclusion, sustainability is a substratum in design and should to be integrated at all educational levels in Afrika. Efforts could be directed towards promoting Science, Technology, Engineering, Arts, Mathematics, "Design" and (for) "sustainability" (from STEM to STEAM and now STEAMDs) projects starting from basic schools to HEIs. Additionally, emphasis should be placed on Design, Innovation and Sustainability as part of teaching and learning in Afrika. Providing learners with the requisite knowledge on sustainability at the early stages in their education would transform their mindsets and influence behavioral change within multicultural setting in Afrika.

Results, conclusion and future work

The Design + Change activities yielded several positive results. The learning activities were exciting as it was designed to be experiential for learners. These strategies, increased learner participation and promoted deep learning on sustainability related practices. Additionally, it was observed that participants have gained a better understanding of the SDGs, which informed their proposed solutions. The discoveries from the learning activities showed that participants were able to achieve the stipulated HOTs as specified in BDT. An emerging framework of the design process have been proposed which could serve as a guide to integrate SDGs as part of design curriculum in Afrikan universities (Figure 2&3). In conclusion, sustainability is a substratum in design and should to be integrated at all educational levels in Afrika. Efforts could be directed towards promoting Science, Technology, Engineering, Arts, Mathematics, “Design” and (for) “sustainability” (from STEM to STEAM and now STEAMDs) projects starting from basic schools to HEIs. Additionally, emphasis should be placed on Design, Innovation and Sustainability as part of teaching and learning in Afrika. Providing learners with the requisite knowledge on sustainability at the early stages in their education would transform their mindsets and influence behavioral change within multicultural setting in Afrika. Further research is suggested to experiment the emerging framework in other design related contexts towards promoting sustainability among learners in Afrikan societies.

References

- Atkinson, S. P. and Irving, J. (2013) Reflective Practice: A non-negotiable requirement for an effective educator. London. doi: DOI: 10.13140/2.1.1329.1524. [Accessed, March 2019]
- Churches, A. (2008) ‘Bloom’s Taxonomy Blooms Digitally’. TechLearning.com, pp. 1-6. Available at: http://www.techlearning.com/article/8670. [Accessed, March 2019]
- Davies, U. and Wilson, K. (2013) Design methods for developing services. UK. Available at: http://www.mbsportal.bl.uk/taster/subjareas/techinnov/tsb/153100Keepingconnecteddesign11.pdf. [Accessed, June 2019]
- Schön, D. A. (1987) ‘Teaching Artistry through reflection-in-action’, in Educating the reflective practitioner: Educating the reflective practitioner for teaching and learning in the professions. San Francisco: Jossey-Bass, pp. 22-40. [Accessed, February 2019]
- Futerman, R. G. (2015) Design for collaboration in South Africa: An activity theory perspective on participatory design. Cape Peninsula University of Technology.
- Jose, S. et al. (2017) ‘Experiential learning theory: The importance of outdoor classrooms in environmental education’, International Journal of Science Education. Taylor & Francis, 7(3), pp. 269-284. doi: 10.1080/21548455.2016.1272144

M’Rithaa, M. K. and Jamie, A. (2017) ‘Advancing the Afrikan lions’ narrative: The quest for a sustainable future for all...’, in 24th Annual FIDIC-GAMA Conference African Partnerships for Sustainable Growth. FIDEC-GAMA 2017, pp. 1-13.

- Osha, S. (2018) Dani Nabudere’s Afrikology: A quest for African Holism. Dakar: Council for the Development of Social Science Research in Africa. Available at: www.codesria.org. [Accessed, March 2019]
- Schön, D. A. (1987) ‘Teaching Artistry through reflection-in-action’, in Educating the reflective practitioner: Educating the reflective practitioner for teaching and learning in the professions. San Francisco: Jossey-Bass, pp. 22-40.
- Tarling, I. and Ng’ambi, D. (2016) ‘Teachers pedagogical change framework: A diagnostic tool for changing teachers’ uses of emerging technologies’, British Journal of Educational Technology, 47(3), pp. 554-572. doi: 10.1111/bjet.12454
- United Nations [UN] Report (2018) The Sustainable Development Goals [SDGs]. New York. Available at: https://unstats.un.org/sdgs/files/report/2018/TheSustainableDevelopmentGoalsReport2018-EN.pdf. [Accessed, February 2019]
- Vezzoli, C. et al. (2018) ‘Design for Sustainability: An introduction’, in Designing Sustainable Energy for All. Sustainable Product-Service System Design Applied to Distributed Renewable Energy, pp.1-230. doi: 10.1007/978-3-319-70223-0

Title:
Feminist pedagogy & design for social cause: Examining the designer's agency

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Introduction

This paper stems from a course I conducted along with Tanishka Kachru for students of Exhibition Design at National Institute of Design (NID), Ahmedabad in fall 2018. Set against a backdrop where design education and designers in India remain largely apolitical; and a world of increasing complexity and conflict, the course urged learners to critically examine the United Nations Sustainable Development Goals (UN SDG 11: Sustainable Cities and Communities) to develop reflective and reflexive design solutions for India. The ten week long studio course was designed to recognize, identify, and develop position, agency and voice as an exhibition designer in the society; to perform and participate in a globally ongoing project; to formulate sensitivity towards the built and the unbuilt environment in form of an action research project, and to learn to explore, experiment and question the status quo to be more responsible contributors to the corpus of design professionals.

In this paper, I reflect upon this course to not only draw out how the feminist pedagogical structure enabled design students to develop engaging solutions for complex, wicked problems identified by them, but also look at the changing role of designer in the society, and how young designers in India are viewing the community and their practice; and argue that revisiting the epistemological positions in design pedagogy can lead to meaningful designers (and citizenship) with intersectional, layered and strategic design solutions.

Course Pedagogy

Background
Design education at NID is mainly structured in the following format: foundation course, where the students learn the basic skill learnings, followed by basic design projects which increase in technical and conceptual complexity as the years go on. A four-year program, the learners at the end of the prefinal year have a short internship in the industry. The education terminates with a final graduation project where they are expected to have an acceptable level of professional competence.

The terminal course conducted at NID across disciplines, is called 'Systems' Design. Drawing from the notion of wicked problems, and the systemic level solutions required to counter the same, it is expected that the students can cope with both the scale and relevance of the problem. With considerable flexibility in conducting the course, Tanishka and I set to appropriate it for our department and the specific challenges that we face. Exhibition Design, while based in communication design umbrella, also integrates much of industrial and new media design within its curriculum, presenting a plethora of opportunities for students to work in. However, it also leaves them confused and oftentimes disoriented with their own agency and positionalities in the society. This is the genesis of one of the course's aims: to identify the agency of designers in the current world.

Pedagogic development
Drawing from our (Tanishka and I) backgrounds, and that of the students, we felt that SDG Goal 11 (Sustainable Cities and Communities) would work best. We also saw critical theory responding well to our learners needs, and naturally gravitated towards using the same for the course. This influenced not only the literature recommended for the course, but also the classroom environment and politics of instruction.

Following some of the classical approaches to feminist pedagogy, the classes were led by the learners, and the authoritative power of instructors was both recognized and forfeited. Democratic processes were practiced, with all stakeholders involved in the decision making. Instructors were extremely sensitive to their own positionalities and had clear, transparent communication with the learners. Some of the readings recommended for the course were: Diamond (2013); Harvey (2003); Kopnina (2016); Marcuse (2009); Penner (2016); Purcell (2002); Thrift, (1997). The course aim and objectives were also explicitly explained to the learners at the onset of the course.

Course structure
The course was structured around a prompt (Dear & Flusty, 1998); giving learners maximum time to think and lead the learnings from the course, with specific inputs pre-decided at the onset and others being facilitated as and when required. For example, Jonak Das gave input on Systems Thinking, Tanishka on Critical Theory and Speculative Fiction, and I gave inputs on Understanding Cities, Ethnography, and Human Geography. Based on specific inquires by the students, input by Rebecca Reubens (Sustainability), Harsh Mittal (Assemblage of Smart Cities), Gagan Sethi (Human Rights), and Abeer Gupta (Cultural, Heritage Studies and Communities) was provided. Specific input was also provided by a series of exercises, writing and physical, with an understanding that writing is a discursive activity. Learners were asked to respond to the following questions at specific period within the course:

1. What is Design? Who is a designer?

2. What are the rights and duties of a designer?

3. What is Exhibition Design? What is the scope and limitation of the Exhibition Designer?

4. What did you learn from this course?

Some of the physical exercises, which the learners participated in, were Privilege Walk facilitated by Navdeep Mathur, consciousness raising through workshop format peer review, and ownership led project mentoring processes. Feminist Pedagogy both influenced and informed these exercises. Please refer to figure 1 which provides a conceptual diagram of the course structure.

This is the genesis of one of the course's aims: to identify the agency of designers in the current world.

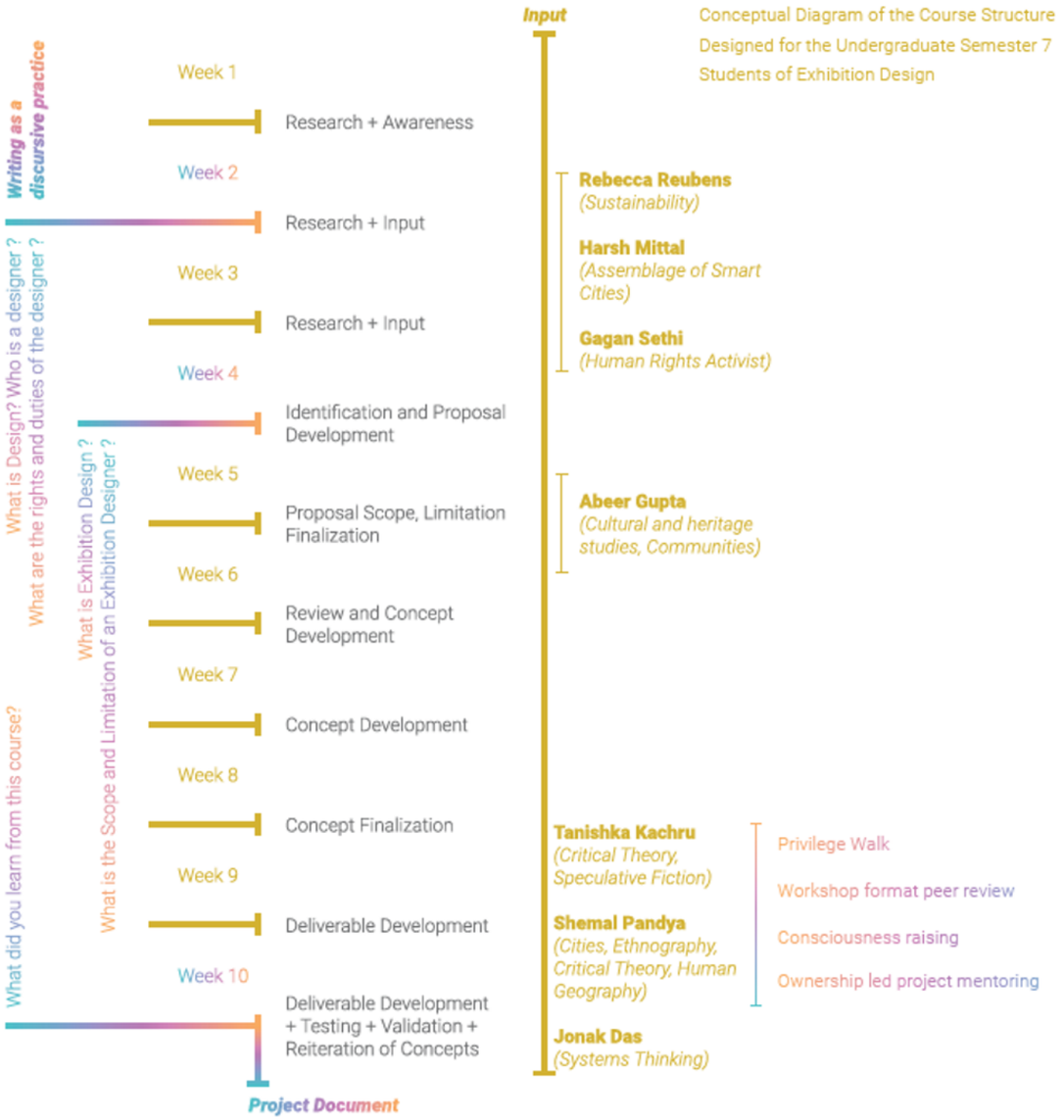

Fig. 1 - Conceptual Diagram for Course Structure

Course output

With context of projects spread across India, some of the identified areas to work in were (numbers in brackets refer to specific targets and indicators for SDG 11): heritage and culture management with respect to urban spaces during Thrissur Pooram in Kerela (11.4.1), community development through music and art in slums of Ahmedabad (11.1), bridging the urban rural divide through physical education and recreation (football) in Gujarat (11.A), resilience of cities and communities post natural disaster in Kerela post floods (11.5), impact of tourism and internal migration in local governance and policies in Goa, street art for sustainability awareness in Ahmedabad, Art for mental health awareness in Ahmedabad , domestic waste generation and management in Kanpur (11.6), sex education in schools of tier two cities like Meerut (11.7.2), intangible cultural conservation through food cultures (11.4), and public participation in Smart City Mission of Patna (11.3, focus on 11.3.2). For brevity, a few were selected to showcase interventions in multiple geographies.

Public participation in Patna
Drawing from David Harvey's 'Right to the City' and 'ladder of participation' model, Yatharth looked at, "an exploration of how a city envisions and plans it future...can we enhance the participation of the stakeholders?" By looking at existing models of participation, and experimenting with new media and technological inputs incorporated through smart city mission of India (which looks at SDG implementation in India), he did extensive user testing both in isolated and in situ scenarios to propose feedback loops of governance.

He chooses to respond to the specific target of 11.3.2, by reimagining the proportion and role of civil societies in democratic urban planning and management by not only challenging the existing structure of civil society in his project, but also the role of technology in speculative futures.

Titli: Sex education in schools (tier two cities)
Shubhangi looks at Target 11.7.2 of the SDG 11, which looks at provision of universal access to safe, inclusive and accessible spaces in particular for women and children, focusing on persons of victim of physical or sexual harassment. She critically examines her agency to design for advocacy, and education in specific geographies which have a non-western understanding of urbanity, and urban cultures.

Titli is a CSA (Child Sexual Abuse) Awareness workshop which was developed by Shubhangi where she was looking at tier two cities like Meerut and trying to "break the taboo of sex and to curb the ill of child sexual abuse by raising awareness and devising tactics to repress it." The vision which she worked towards was "to create safe environments for children and to curtain child sexual abuse."

Building community resilience to disasters
Belonging to Kerala, Gouthami was there in the floods when the course was initiated. She immediately responded to target 11.5, which looks at substantial decrease of human and material resources due to water related disasters, with a focus on protecting the poor and people in vulnerable situations. After extensive field visits and workshop trainings for disaster response, she examines and operates with community and cultural resilience to develop indigenous, local response to disaster, and disaster management in Kerala.

Conclusion

While this is preliminary, and will require more substantial data to draw conclusions from, the premise of an argument that I make is that feminist pedagogy in design education provides an opportunity of disturbance in the status quo, and an insertion of the collective in the social fabric to respond and react to the wicked problems. It forces the individuals to look closely at themselves not only to look at others, and therein they shift in their individual pattern of working to a more collaborative, non-conventional, and transformative design practices which are not restricted by the disciplines or categorization, and they seek to critically examine the idea of labor, industry and society, instead of merely performing as cogs in the same.

I argue that the SDGs require rupture of the current practices, and advocate that critical thought, and feminist pedagogy in design education, can achieve successful, local integration of the goals. Most of the students have taken this project forward for their graduation project, with many of them securing Ford Foundation Funding for the same. My recent conversation with them went thus, “while it [the project] might not make a visually stunning, or an aesthetic portfolio for jobs, we now know what we can do, and must do.”

References

- Dear, M., & Flusty, S. (1998). Postmodern urbanism. Annals of the Association of American Geographers, 88(1), 50–72.
- Diamond, J. (2013). Collapse: How Societies Choose to Fail or Survive. Penguin UK.
- Harvey, D. (2003). The right to the city. International Journal of Urban and Regional Research, 27(4), 939–941. https://doi.org/10.1111/j.0309-1317.2003.00492.x
- Kopnina, H. (2016). The victims of unsustainability: A challenge to sustainable development goals. International Journal of Sustainable Development & World Ecology, 23(2), 113–121.
- Marcuse, P. (2009). From critical urban theory to the right to the city. City, 13(2–3), 185–197. https://doi.org/10.1080/13604810902982177
- Penner, B. J. (2016). From Ergonomics to Empathy: Herman Miller and MetaForm. In The Routledge Companion to Design Studies. Routledge.
- Purcell, M. (2002). Excavating Lefebvre: The right to the city and its urban politics of the inhabitant. GeoJournal, 58(2), 99–108. https://doi.org/10.1023/B:GEJO.0000010829.62237.8f
- Thrift, N. (1997). Cities without modernity, cities with magic. Scottish Geographical Magazine, 113(3), 138–149. https://doi.org/10.1080/00369229718737007

Title:
Grounding SDGs in creative eco-systems: An organic model to integrate design narratives in everyday systemic actions

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In terms of sustainability and conscious behaviours, design and, in the light of a broader sphere of influence, the cultural and creative industries (CCIs) have a particular responsibility in the realization of the UN Sustainable Development Goals (SDGs) not only because they actively contribute to the development and fruition of products, services, processes and systems but because they engage the general public, acknowledging and leveraging on cultural diversity.

Not surprisingly – at least for those who operate to promote and enhance the CCIs – culture has been embedded within the framework of the SDGs not only as an end in itself but also as a direct and indirect contributor to the implementation of all of the goals, a first for an international agenda.

The mutually beneficial relation between culture and the three pillars of sustainable development – social, economic and environmental – becomes a crucial pivot. Culture and creativity acting as cross-cutting drivers and enablers for sustainable development and the three dimensions of sustainability supporting the continuance of cultural heritage and creativity.

Similarly, as it lays at the root of a fundamental shift in how we think and act across all ages, contexts and settings, education is a key element within the 2030 Agenda. In addition to representing a goal in itself, it is woven through all the global goals, supplementing knowledge, skills, values and behaviours by prompting new systemic-oriented approaches.

If we consider established in this scenario education's crucial role in unlocking sustainable development and that creativity offers exceptional tools to bring about sustainable change, design education should be nothing short of ready to foster a better world.

Transitioning from the conceptual viewpoint to a more performance-based perspective on the SDGs framework at how things stand today, is it really so? Is design education successfully exploiting its knowledge and skills for impact rather than story-telling?

With this backdrop, the IED Istituto Europeo di Design, drawing from its past and recent experiences as a design school, has initiated a research project to critically investigate the role of the CCIs towards the achievement of the SDGs and explore the current and future effectiveness of design disciplines in promoting and implementing change in a systemic and cross-sectorial perspective.

The research project develops through a three-pronged approach embracing: the SDGs as strategic levers and control systems, the CCIs as multi-polar eco-systems and design education as holistic multi-layered learning communities.

The interest around the world on issues of sustainability and sustainable development is demonstrated by the number of publications, more than 108 000 peer reviewed papers in 2015, and focused networks and global events; amongst which those facilitated by the UN and a growing number at grass-root level, in addition to institution and business-led initiatives. It is noteworthy, particularly for the purpose of the project covered by this paper, to mention that design-driven endeavours, such as Design for Change, Global Goals Jam, What Design Can Do, have been growing, creating global impact in raising public consciousness and in implementing solutions.

The rising popularity of sustainable development, evident from recent marketability of the issue across sectors and media, has unquestionably made it a trending topic, but has equivalent progress been made in tackling the complexity and in generating value towards the delivery of the SDGs? The ongoing IED analysis is focusing on how the SDGs are being translated in creative eco-systems from a context-specific perspective on the basis of the relevant priorities identified by competent international entities and in the light of the ever fluid geographical, cultural, sectorial and language boundaries.

Fig. 1 – Context-specific prioritizing of the SDGs

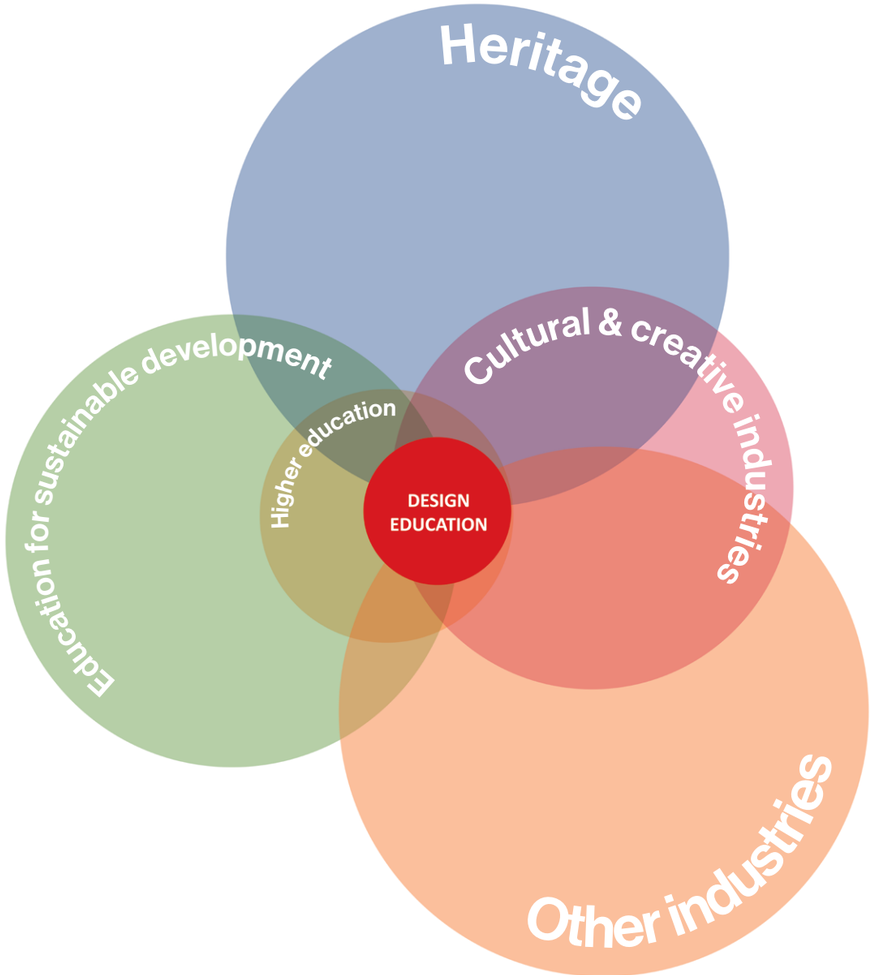

Fig. 2 - Design education at the cross-roads of CCIs, cultural heritage, education for sustainable development and higher education systems.

The preliminary research exercise has identified what could stand for ‘family lexicon’ of disciplinary confines, each more or less traced in terms of significance to a shared global vocabulary, and of touch-points as well as divergences in prioritizing SDGs and assessing delivery. A pertinent association of framework variables for design education is represented by the comparison between the SDGs acknowledged as particularly relevant to the Higher Education (HE) community, taking the example of the Times Higher Education (THE) world rankings, and to the industrial design community, as identified by World Design Organization (WDO) members , in relation to the learning objectives of the UNESCO Education for Sustainable Development Goals (ESD).

Widening the angle of observation to be comprehensive of all design domains and of the CCIs as multi-layered eco-systems the shifting overlaps increase, further adding to the complexity of the applicable frameworks and networks of relationships.

In approaching the SDGs, design education is at the crossroads of CCIs systems and relevant domains, cultural heritage, education for sustainable development and higher education, prompting the need for cross-referencing by way of multi-disciplinary and multi-value chain approaches.

As each disciplinary domain and world region, though symbiotic, is developing its own momentum within the 2030 Agenda, the IED has framed the initial research phase principally within the European context, notwithstanding a global perspective. Considering that sustainable development cannot be understood independently of cultural contexts, local relevance of the SDGs framework and of design content and methods represent a valuable asset towards the assessment and achievement of sustainable development and towards prioritizing interventions.

With design progressively operating across the economy as an innovation catalyst, fostering the appropriation of its methods by other sectors, incorporating sustainable development in the methodological debate while the CCIs and design itself, by virtue of the social and economic value they generate, apparently represent the panacea for all complex issues and one of the key enablers for the 2030 Agenda, may seem a paradox. Isn’t it embedded?

Increasingly, yet with diverse, and sometimes divergent, meanings and means of implementation (MoIs) due to the aforementioned “family lexicon”. Sustainable development and culture are complex multi-faceted concepts and as such require cross-sectorial and trans-disciplinary approaches and at times transformative modes of implementation to nurture mutual understanding.

Considering the ongoing working findings and considerations a valid perspective, pending further analysis, multiple challenges for design education still stand.

Allowing for a holistic life-cycle approach to education whereby learning transcends the boundaries of formal training to extend to more flexible community-based settings and informal everyday environments, design schools need to be addressed as multi-polar learning environments. This requires the grounding of the SDGs beyond the curricula to embrace a whole-institution approach: training, research, operations and stewardship. Entailing, in turn, a concrete understanding of the multiple factors that influence the SDGs and of the impact and accountability of the communities that design schools are a part of.

It is estimated that by 2025, less than 6 years from now, there will be 160 million designers and creative decision makers around the world, representing 5% of the global workforce. Impressive, especially considering that in 2013 the CCIs employed 1% of the world’s active population, but will they be able to address the urgent challenges posed by contemporary societies and drive systemic change for the better good? Is design education playing to full use its part in supporting the acquisition of the key competences and the achievement of the learning objectives of sustainable development?

Engaging the expertise of its networks, the IED is exploring through specific research activities, as introduced in this paper, the radical shifts and transformations that are in progress within the education thinking and through educational practice, the effectiveness of design disciplines in current settings and the MoIs for the SDGs. The research activities are complemented by actions carried out in collaborative initiatives and by key focuses within the academic planning.

Supplemented by the framework variables gathered by the disciplinary confines already partially shared, the reflections enabled the identification of elements that exemplify the premises of an organic working model to build research capacity on the issues of interconnecting the SDGs and design education. With the overarching principle that comparability and transfer of MoIs originating from complementary systems, herein referring primarily to HE, CCIs, ESD, is key in building lasting change - the elements allow for a multi-disciplinary and multi-value chain perspective of the purposes and goals of design education. Creating, in turn, the conditions for a context-sensitive body of scenarios and priorities and setting the stage for long-term accountable vision planning.

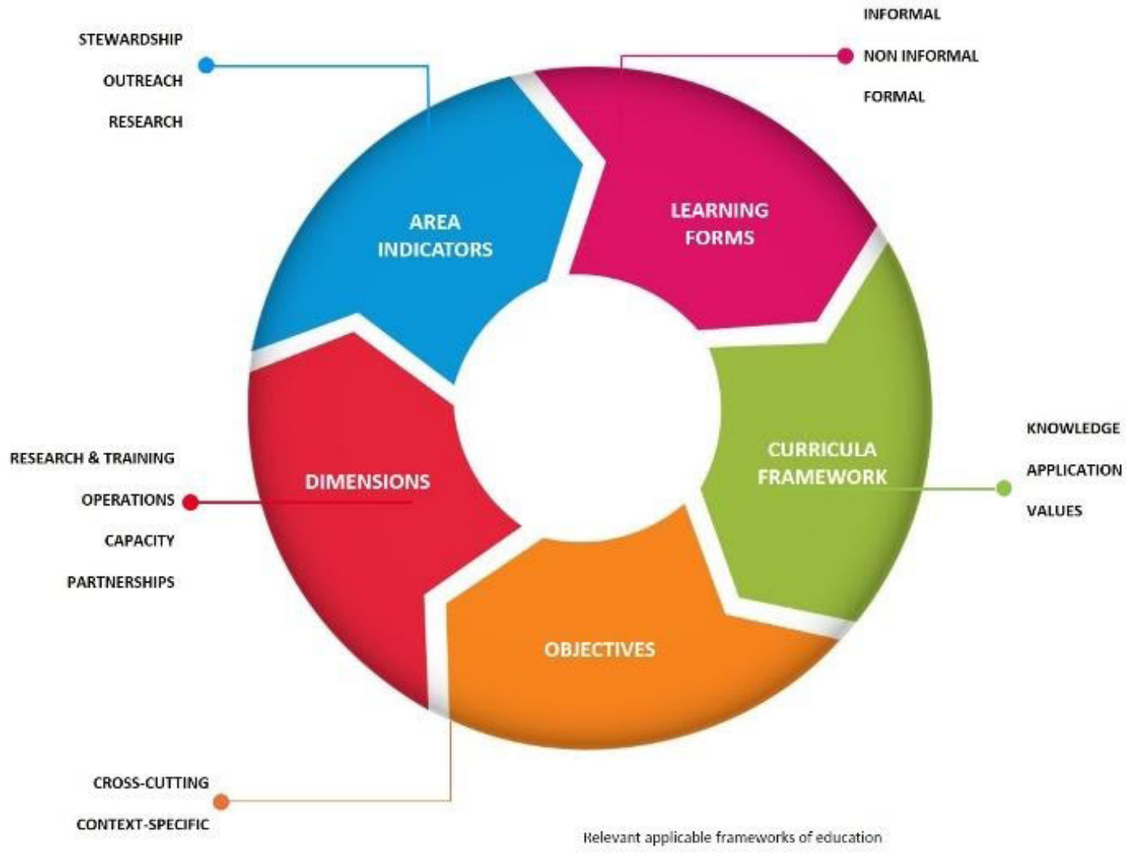

Fig 3 – Relevant applicable frameworks of education

Sustainable development and culture are complex multi-faceted concepts and as such require cross-sectorial and trans-disciplinary approaches and at times transformative modes of implementation to nurture mutual understanding.

In conclusion, the contribution of design and CCIs in generating social and economic value, enhancing cultural diversity and engaging the general public are evident making the responsibility they hold in terms of sustainability and conscious behaviours towards sustainable development significant.

Design education, with its unique position in creative eco-systems, by embracing a whole-institution perspective and a holistic life-cycle outlook can meaningfully ground the SDGs within its communities. Overcoming self-referral and encompassing multi-disciplinary and multi-value chain approaches is a key step in the definition of applicable frameworks and networks of relationships for the implementation of everyday systemic actions– interconnecting local relevance to global perspectives.

The internal reflection has started, the broadening and enrichment of the investigation through cross-cultural partnerships will soon follow.

References

- Hosagrahar, J. (April-June 2017). Culture: at the heart of the SDGs. The UNESCO Courier. Retrieved from: https://en.unesco.org/courier/2017-april-june/culture-heart-sdgs
- Liedtke, C. (March 2018). Design for sustainability. SDGs: delivering change. A UNA-UK publication providing analysis and recommendations on achieving the sustainable goals.
- Retrieved from https://www.sustainablegoals.org.uk/design-for-sustainability/
- Osman, A., Ladhani, S.,Findlater, E. and McKay, V. (2017). Curriculum Framework for the Sustainable Development Goals. Commonwealth Secretariat.
- Retrieved from https://www.thecommonwealth-educationhub.net/wp-content/uploads/2017/01/Curriculum_Framework_for_SDGs_July_2017.pdf
- Sherwin, C. (4 April, 2018). The changing role of the designer in the circular economy.
- Retrieved from the Forum for Future blog: https://www.forumforthefuture.org/blog/changing-role-designer-circular-economy
- Sterling, S. (2016). A Commentary on Education and Sustainable Development. Abstract. Journal of Education for Sustainable Development. Centre for Environment Education, Ahmedabad, Gujarat (Los Angeles, London, New Delhi, Singapore, Washington DC and Melbourne). Sage Publications. Vol 10(2): 208–213
- Dessein, J., Soini, K., Fairclough, G. and Horlings, L. (eds) 2015. Culture in, for and as Sustainable Development. Conclusions from the COST Action IS1007 Investigating Cultural Sustainability. University of Jyväskylä, Finland.
- Retrieved from https://www.academia.edu/12482133/Culture_in_for_and_as_Sustainable_Development_Conclusions_from_the_COST_Action_IS1007_Investigating_Cultural_Sustainability
- UNESCO United Nations Educational, Scientific and Cultural Organization, Education Sector. (2017) Education for Sustainable Development Goals: Learning Objectives. Paris: UNESCO. Retrieved from the UNESCO Digital Library https://unesdoc.unesco.org/ark:/48223/pf0000247444
- Vv.Aa. EY (December 2015) Cultural times: The first global map of cultural and creative industries. Retrieved from the UNESCO Digital Library https://unesdoc.unesco.org/ark:/48223/pf0000235710

Title:
Stepping back to look ahead. Questioning the impact of design education in sustainable driven programmes

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The centrality of design as language and mind-set in the contemporary cultural debate has been transforming in the last 50 years, moving from a technical and product development focus towards a large scale systemic focus, changing and visibly widening the global impact on planet issues, thanks to a higher exposure to a wider number of domains and industries, with this showing a broad range of extensions and applications.

Meanwhile, the socio–cultural perspective on sustainability as a value, has transformed its relation with the paradigm of complexity. The idea of sustainability has expanded from an economical and environmental key differentiator, towards a cultural dimension and today clearly involving also social and ethical impacts. With the subsequent rise of the level of complexity to deal with, sustainability has reached systemic importance.

Design has been widely recognized today as one of the fruitful way to tackle scenarios featuring a high level of complexity, drifting the focal points of projects, where the implications on the global community have a higher priority than the defined applications, and where the analysis of variables' interaction becomes central for the problem setting process: as a result, design driven problem setting is recognized as a key point in any problem solving process aiming at sustainable solutions.

It is interesting to outlook the changes and reflect on the evolution of the interactions among sustainability, design methods and complexity, through the experience of an Italian private higher education design institution, over the last 30 years of research, curricula definition and industry relations.

Since the start in the late 60s as a Milan (Italy) based design school, IED – Istituto Europeo di Design - stood outside the established academic arena, position as an interpreter of cultural and professional changes, thanks to its synchronicity and proximity to real world needs, either as interceptor of industries suggestions and communities' demands: inputs from professionals or users, including those related to sustainable issues, were intercepted and translated into academic programmes with a direct impact on contents and methods.

IED's research experience had (and still has) company embedded/engaged mixed model: embedded companies involved in applied research and on problem setting and ground based research projects, while engaged companies in testing and validating processes with students within curricula. IED implemented sustainability related topics both in academic curricula and research activities, building up an internal cultural framework and fostering an evolutionary process, that from the mono-disciplinary learning model evolved through non-disciplinary models, passing through multi-disciplinary, cross-disciplinary and interdisciplinary approaches, leading to the current discussion on trans-disciplinarity.

Since the beginning of IED research on sustainability in the 80s, the Natural Structures Research Centre has been focusing on biomimicry and natural behaviours, where a design methodology based on principles of eco-sustainability has been formalized and then tested in several curricular programmes. The model led in fact in the late 90s to postgraduates programmes in Bionics Design and Glocal Design; a bit later also a department for development of strategic design for public bodies took off, testing design thinking methodologies to sustainable design challenges, based on real needs on a different scale of complexity.

As significant milestones of the evolutionary process in the extents followed the opening in 2001 of the Department for Sustainability Studies at IED Madrid (Spain), the opening of the post graduate programme in 'Design and Innovation' and the starting in 2011 of the Master programme in Design for Social Business, based on systemic design challenges for economic and social growth in developing countries, also as a result of the International conference organized by IED and Grameen Creative lab, chaired by Muhammad Yunus, Nobel Peace Prize recipient.

Since then, sustainability has been considered central and in a symbiotic relationship with design frameworks. It has become a crucial non-optional educational objective and today is integrated in curricular programmes, as a cross-cutting topic at the under graduate level and then gradually expanding as a cross and interdisciplinary area at the post graduate level as well as in the continuous professional education trainings, acknowledging the rise of the level of complexity reached by sustainable design issues in the internal academic discourse, having passed from a technical product-centric approach to a human/people centred approach with global implication on the context.

These are examples of how sustainability related topics can be introduced in the curricula to foster the perception of the paradigm shift within the community (staff, students, professors, researchers) progressing through different approaches: from sustainability as a vertical – technical-disciplinary approach, along then as an ecological-environmental design challenge and brief, finally to sustainability as a systemic observation filter, based on a multi and interdisciplinary approach: a crucial mind-set that designers must acquire in order to tackle projects and challenges in the age of complexity.

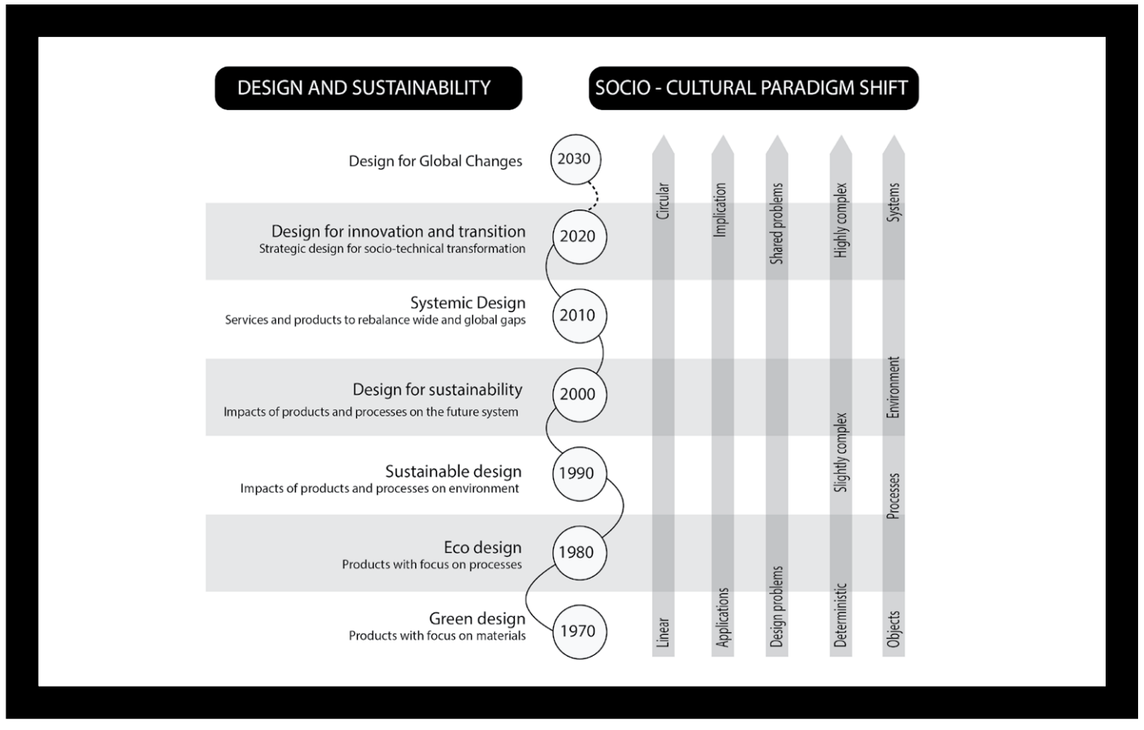

Fig. 1 - Socio-cultural Paradigm Shift

“Since the beginning of IED research on sustainability in the 80s, the Natural Structures Research Centre has been focusing on biomimicry and natural behaviours, where a design methodology based on principles of eco-sustainability has been formalized and then tested in several curricular programmes.”

At the present time, SDGs set by the UN in 2015 represent a further opportunity for IED to bring on and develop an internal discourse on a new system of thinking based on design paradigm, tested with students and able to propose more adequate solutions to everyday larger scale problems.

As examples of design challenges, ‘Under Pressure’ is a student-led project organized in three years and starting with a co-creation problem setting process, involving citizens and young generation, aiming to enrich the debate and the awareness of promoting the ethic rule of design education and the human relation with nature; the Global Goals Jam is a UNDP initiative along with Digital Society School in Amsterdam, seeking to design realistic, actionable interventions for SDGs: IED participation in the last two years with some of the enrolled students of the network, shows how the evolution of the relation between design and sustainability in the education environment must be considered as highly impactful. The final objective is anyhow to stimulate IED global community (Italy, Spain, Brazil, China beyond worldwide alumni clusters) to face up to solutions towards SDGs.

At the same time the SDGs challenges are triggering a shift in the perception of global issues, involving sustainability as the main focus in the creation of a more complex vision on future development. As the result of such a shift, the change of perspective around design methods continued, boasting the reflection around the key passage from complicated to complex project environments, from a wide range yet linear and disciplinary (multi, cross and interdisciplinary) approach toward a trans-disciplinary slightly non-disciplinary approach, open to systemic design thinking.

Such an awareness has stimulated IED to question the role of design and designers (and thus curricula), when dealing with complex problems, triggering a shift from a design centred disciplinary approach to trans-disciplinary design translated approach: design becomes one among other disciplines, a facilitating tool that uses techniques and a body of knowledge in a cross-fertilized mode. Such a role requires an attitude open to interpretation rather than solutions; introducing at the same time a threat, when design disciplines might overwhelm other bodies of knowledge misleading to unilateral perspectives and solutions.

The internal discussion on the most appropriate learning model, when dealing with SDGs complexity, led the institution to the proposition of a programme able to test a trans-disciplinary methodology considered as a milestone for a change of the educational perspective: a programme in Trans-disciplinary Design.

The Master in Trans-disciplinary Design aims to use the design mindset as a filter for the interpretation of other different cultural mindsets in order to tackle global issues, as codified by the SDGs challenges. Global issues are seen and interpreted through the light of a multi-dimensional paradigm based on: technology, people and economy. This interpretation paradigm represents a multi-layer observatory set to students to start with the research and analysis of complex issues.

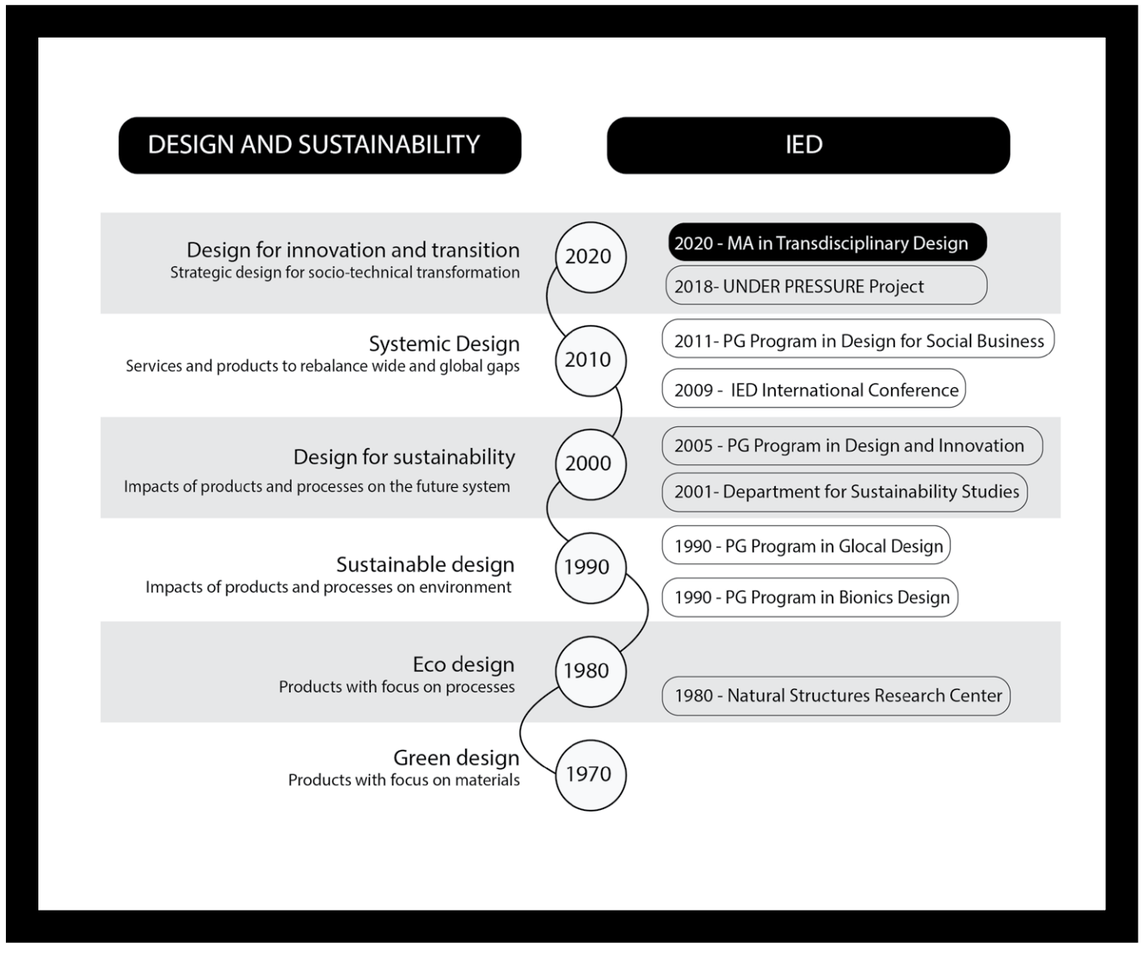

Fig. 2 - IED way towards sustainability

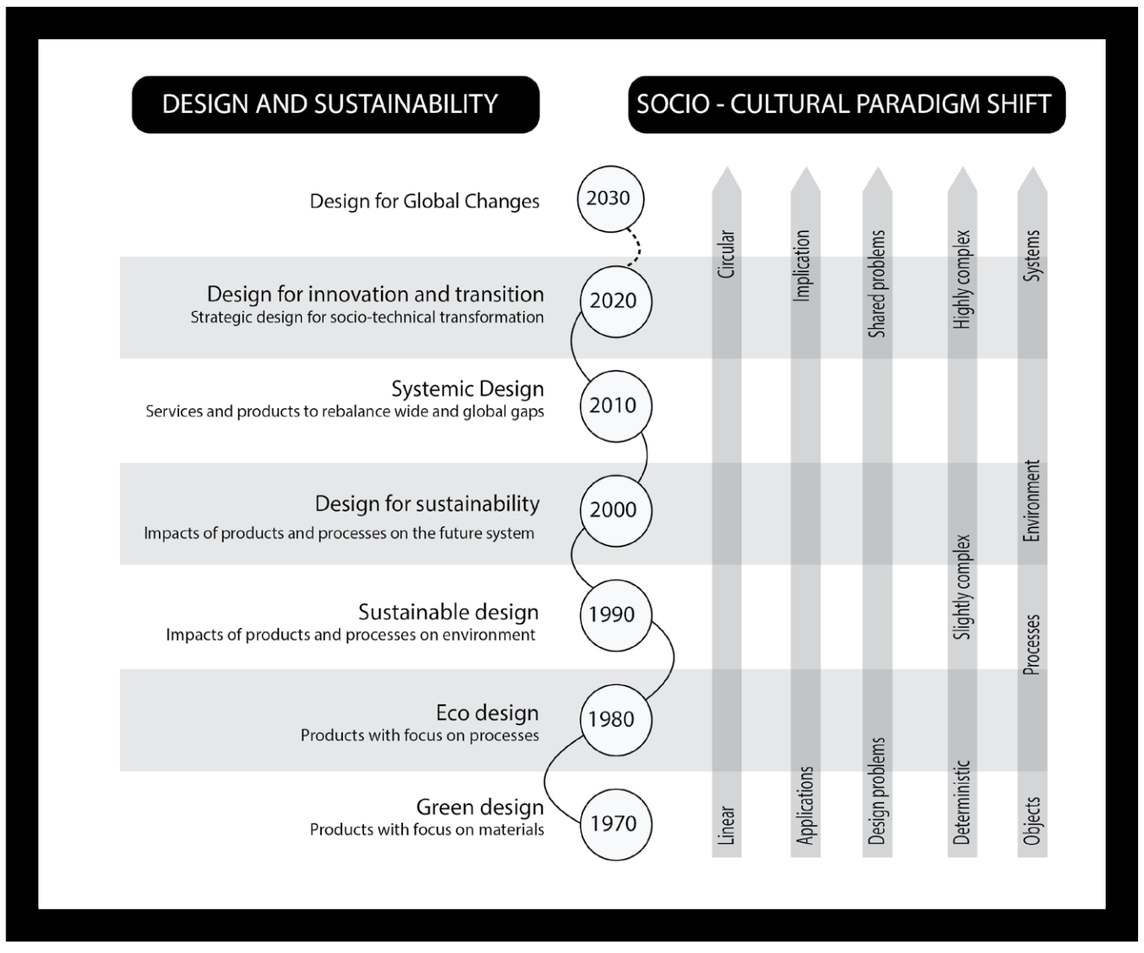

Fig. 3 - Conceptual framework for transdisciplinary design methodology

With their different backgrounds and from different domains, students are gathered in a non-disciplinary pastoral environment, pushed to reflect on problem settings, experimenting in a participatory, connective and collaborative practice studio-like environment, involving actors, who are also external to the disciplines (incorporation of non-systematized knowledge): institutions, universities, laboratories, governments, social groups and individuals. This methodology allows to search for solutions from a wider perspective, capable of integrating diverse bodies of knowledge in a series of results, that may ultimately not be the best solution possible, but an initial solution's improvement.

It seems to be useful as a conclusion, to reflect and map an agenda of implications, possible effects and areas of investigations on design pedagogic models, curricula evolution and organization of institutions.

In the light of the "disciplinary extension" of design toward other domains, we recognize that its role is partially moving outside the boundaries of its disciplinary comfort zone.

On one hand, we have seen why in the discussion on global issues (SDGs) design and designers can successfully play the role of facilitators rather than solvers. Thus, design language becomes an arbiter among different domains of knowledge, able to decode the SDGs into the language of products, services, processes and business models, in order to trigger real cultural systemic change.

On the other hand, designers must clearly accept a partial loss of ownership on solutions, stepping back to a role of process enabler: the first implication is a re-definition of the professional semantic of designers.

If sustainability is accepted to be the key differentiator for global issues successful problem setting, design education should consider a general curricula review, where core 'traditional' topics and disciplines can still be considered necessary and fundamental yet not sufficient. The academic curricula review process cannot be limited to the introduction of new topics: the paradigm shift requires a change in subjects, methods and academic organization.

Visibly, also the Institutions' organizational models are required to shift from a vertical disciplinary vision, based on domain/profession based model, to a cross cutting issue/impact based approach, which programmes and delivery units should refer to.

To value, share and progress on this change, it is useful to reflect on a set of paradigms to frame academic portfolios of institutions, mapping the grey areas that sound weak for disciplines and strong for global problem settings.

References

- Ceschin F., Gaziulusoy, I., 2016, Evolution of design for sustainability: From product design to design for system innovations and transitions, Design Studies, http://dx.doi.org/10.1016/j.destud.2016.09.002
- Van der Bijl-Brouwer M., 2018, Transdisciplinary Innovation and Design.
- Van der Bijl-Brouwer M., Malcolm B., 2018; Design expertise in public and social innovation; Design Research Society, Catalyst.
- Allen W. , 2016, Complicated or complex – knowing the difference is important https://learningforsustainability.net/post/complicated-complex/
- Bliemel M., Van der Bijl-Brouwer M., 2018, Editorial: Transdisciplinary Innovation Chris McPhee, Editor-in-Chief, Technology Innovation Management Review (Volume 8, Issue 8).
- Moreno L. A., Rogel Villalba E., 2018 Transdisciplinary Design: Tamed complexity through new collaboration - Strategic Design Research Journal, 11(1).
- Zafeirakopoulos M., Van der Bijl-Brouwer M., 2018, Exploring the Transdisciplinary Learning Experiences of Innovation Professionals Technology, Innovation Management Review (Volume 8, Issue 8).
- Nicolescu B., 1996, La Transdisciplinariedad – Manifiesto, Ediciones Du Rocher.
- Luengo N. A., Martínez Álvarez F., 2018, La educación transdisciplinaria; Leonardo Gabriel Rodríguez Zoya. - 1a ed. - Ciudad Autónoma de Buenos Aires: Comunidad Editora Latinoamericana, 2018.
- Popa F., Guillermin M., Dedeurwaerdere T., 2014, A pragmatist approach to transdisciplinarity in sustainability research: From complex systems theory to reflexive science, Published by Elsevier Ltd.
- Battistoni C., Giraldo Nohra C., Barbero S., 2019; A Systemic Design Method to Approach Future Complex Scenarios and Research Towards Sustainability: A Holistic Diagnosis Tool, MDPI Sostenibilità.
- Augsten A., Geuy B., Hollowgrass R., Jylkäs T., Klippi M., 2018; Humanizing organizations - The pathway to growth; ServDes2018 - Service Design Proof of Concept Politecnico di Milano.

Title:
Towards an ontological expansion of design: Thematic threads to advance the next design education paradigm

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Introduction: Defining design

From the renaissance word, 'desegno', meaning the essential idea of a work of art and the expression of that idea through drawing, to Heskett's (2002) articulation as noun (object), verb (process) or an adjective (quality), the word 'design' has historically witnessed a range of heuristics. Meandering through Simon's (1996) seminal articulation 'courses of action aimed at changing existing situations into preferred ones', which Huppatz (2015) notes, 'was part of his broader project of unifying the social sciences with problem-solving as the glue', the design, as a subject, has witnessed a discourse of ontological shifts in its modern history.

The expansion is also visible in the shift from the twentieth-century functionalist dictums to the disciplinary pursuit as the 'science of design' and as an independent discipline (Cross, 2001). The dimensions of meaning; semantics (Krippendorff, 1989, 2006; Balaram, 1989) and cultural logics and practices (Joshi, 1985; Vyas, 1991; Athavankar, 2002, 2010), further decoded and expanded design around the turn of the century. Through their definitions, these positions have also sketched the boundaries of design which subconsciously contributed in defining design education (DE). The paper argues that we need to look beyond the historical ontologies of design to advance the next design education paradigm.

The context of design and SDGs

The new millennium widened the forms and perceptions of design as 'Objects, Communications, Spaces, Events, Services, Systems, Environments, Organisations, Futures' and associated it with 'the idea of transformation' (Ranjan, 2015). This expansion of forms and the idea of transformation is pertinent to the urgency displayed in addressing the Sustainable Development Goals (United Nations, 2015). Be it Responsible Production and Consumption (SDG 12), Sustainable Cities and Communities (SDG 11), or Good Health and Wellbeing (SDG 3), the design has a role, agency and ability to critically and constructively address each of the 17 SDGs poignantly.

The recent developments in addressing the SDGs, and significantly the associated wicked problems, has seen emerging positions and expansions on reimagining scenarios through a systemic lens. The scholarly efforts of the growing network of Systemic Design (SDA) with a focus on systems theory and human-centred design to tackle the social and wicked problems are one such example. However, as its foundations are rooted in the post-war developments in design science at Hfg Ulm and the design methods movement (SDA, 2019), the interpretations/practices of the Global South need to be particularly articulated.

Another emerging thread within the broader transition discourse (Escobar, 2011) on design, systems and sustainability is the transition design (Irwin, 2015) through the idea of transitions in the social, economic and natural systems. It subscribes to living systems theory as an approach to understanding wicked problems (Irwin, Kossoff & Tonkinwise, 2015) to bring in sustainable transitions. Though its construction at the design studios conveys its foundations in design education, its applicability in the larger world needs a conscious investigation.

The argument: an ontological expansion of design

There are several empathetic efforts and collectives in the design education, which have attempted to address the wicked problems relating to SDGs. The paper here looks beyond the cases from the 'Global North' towards the propositions and possibilities from the 'Global South'.

The author argues that the 'design', and especially its ontology, needs to be expanded to operate in the larger world to accommodate plural worldviews. In the next paradigm of DE, fostering the contextual solutions is critical to the developing world to address the SDGs empathetically, sustainably, and equitably.

Thematic threads

Developing on the ideas of contemporary design thinkers, like Escobar (2017), Manzini (2015) and Thackara (2015), the author suggests an ontological expansion of design education. This expansion includes the forms, perceptions, intentions and materiality as the following threads.

Decolonizing design

There have been various calls for decolonization in various academic disciplines of social science, including Mignolo (2011), Escobar (2017). In design's theory, practice and research, the Decolonizing Design group's call (2016), to adopt decolonization to reorient the design endeavours has emerged as a critical stance against the contemporary western practices of design research and studies. According to DD, the foundational purpose of decolonising the design knowledge is to challenge the "eurocentric ways of seeing, knowing, and acting in the world". The scholars argue the institution of design has ignored the substantial other, including the alternative and marginalised discourses of design, especially the non-western spheres (Decolonizing Design, 2016). They also underscore the inability of contemporary design practices and visions in not identifying the criticality in the larger socio-political systems.

Unfortunately, at large, design education has mainly been Eurocentric. The other worldviews have often been categorised within traditional or indigenous culture brackets, and practices are named around synonyms of art and craft.

With the case studies of two iconic schools of design, Bauhaus and Hfg Ulm, the twentieth-century design schools emulated their formal legacy but missed their critical position of locating the purpose of design within contemporary politics. In the post-war context, the design schools missed the opportunities of continuous recontextualization of their idols. That could have acknowledged the need of decolonial versions of design education. The globalisation burst further flattened the design world and suppressed any such possibility. However, the present-day networked world has brought the reflections on decolonization together for greater possibilities.

The decolonization can achieve deeper unearthing of indigenous knowledge systems relating to people, society and the environment. It also supports the discourse against the hegemonic centres of knowledge and control. The next paradigm of DE can be its prime driver and also its immediate beneficiary.

Democratizing design

The discourse of DE has mostly been institutional through its academies, schools and professional networks. The democratic practices of design are neither acknowledged nor categorized within the brackets of design. The design, as an institution, has mostly been exclusionary to underline its novelty and alienated with the 'real world'.

In the vast landscape of 'designerly' activities which include the practices of craft, democratic problem-solutions, frugal design solution, people's assembled expressions, market 'copies' of design, cultural rituals of communication, everyday decorations, thrive and compete along with the modern institutional interpretations of design. From the pluriverse of the real world, here the developing context like South Asia, one of the alternate design and problem-solving practice is jugaad. The jugaad yields quickly fixed creative solutions in constrained socio-economic conditions, utilises fewer resources (Tewari, 2016). Lacking in the purist aesthetics, safety and sustainability aspects, jugaad, which is often illegal, has not been able to challenge Design. However, its applicable democratic value calls for its careful adoption. Butoliya's Critical Jugaad (2018) is one such position which seems like an excellent potential to pursue in the developing context as post-normal design.

Though several design schools in the developing world have been pursuing it, revisiting Papanek's iconic book Design for the Real World (1984) formally and recontextualizing it in design education appears a viable option. Balaram's (2011) 'invisible design' offers a pragmatic social design vision for designers working in complex scenarios in developing economies. A similar idea lies in the socialization of Design by Manzini (2015) who sketches the interactions between diffuse design (by people) and expert design (by trained designers). His call of collaboration is worthy of exploration for DE in the next paradigm.

Re-using design (through re-visioning design)

With the omnipresent call for sustainability in any future's speculation, the inevitable explorations have primarily been calling to close the linear processes of production and consumption systems through a loop. However, the continuous search for 'newness' in design by its practitioners, especially in its materiality, and planned obsolescence by the manufacturers, pose wicked challenges for closing the loop. Decoding the market obsolescence strategies and negation of 'newness' factor can lead to sustainable design. The possibility of re-using a design, or a designed product, can brighten its bets.

The upcycling can disrupt the existing markets. The case of OLX, a re-selling portal, is its live case study where people embrace pre-used products. The second-hand car markets in the developing world is another example, where people adopt refurbished vehicles. Though their environmental costs need an investigation, they offer an excellent systemic example. Tewari (2017) briefly explored the three propositions of re-using the design as raw, repair and refurbish. With the example of furniture (re)design and re-used, the author ethnographically sketched the networks of re-design.

The explorations on 're-use' can start early at the cradles of ideologies, i.e., the design schools. The propositions of appropriating the used pieces of design, facilitating its mediation, and strategies to increase its consumption can lead to a sustainable path, perhaps. As a starting point, the pedagogies will have to reorient themselves by acknowledging the real human-made mess and strategize to embrace its re-use and upcycling. Later, some of the positions explored by Thackara (2015) like 'changing' and 'commoning' can also be co-explored concerning several SDGs.

Epilogue: The next design education paradigm?

The paper elaborates some thematic threads, which design education structures and networks can pursue to advance the next paradigm in its pedagogy. This paradigm (or paradigms) will surely be more relatable to the context and localities, and empathetic to the users and the mother earth. Elaborating the threads as critical practice will also allow DE to offer integrated solutions (UNDP, 2019) towards the Sustainable Development Goals.

Along with an opportunistic eye at the developments in science and technology, DE has the opportunity to actively embrace emerging discourses like Social Design, Design Anthropology, Design History, and Design Studies, and bring in criticality. The embracing and nurturing of these disciplines will allow DE to locate itself meaningfully and interactively. Further, through researching these under-explored positions, and exploring its inherent politics, it can work towards creating new forms of knowledge in design: theory, research and practice.

References

- Athavankar, U. A. (2002). Design in Search of Roots: An Indian Experience. Design Issues, 18(3), 43–57. https://doi.org/10.1162/074793602320223280
- Athavankar, U. A. (2010). Mapping the globalized mind. (December 1994)
- Balaram, S. (1989). Product Symbolism of Gandhi and Its Connection with Indian Mythology. Source: Design Issues, 5(2), 68–85. Retrieved from http://www.jstor.org/stable/1511515
- Balaram, S. (2011) Thinking Design. New Delhi: Sage.
- Butoliya (2018) Critical Jugaad: A post-normal Design Framework for Designerly Marginal Practices. Doctoral Dissertation. Pittsburgh: Carnegie Mellon University.
- Cross, N. (2001). Designerly ways of knowing: design discipline versus design science. Design Issues, 17(3), 49–55. Retrieved from http://oro.open.ac.uk/3281/
- Escobar, A. (2011). Sustainability: Design for the pluriverse. Development, 54(2), 137–140.doi:10.1057/dev.2011.28
- Escobar, A. (2017) Designs for the Pluriverse: Radical Interdependence, Autonomy and the Making of Worlds; Durham and London: Duke University Press.
- Irwin, T. (2015) Transition Design: A Proposal for a New Area of Design Practice, Study, and Research, Design and Culture, 7:2, 229-246, DOI:10.1080/17547075.2015.1051829
- Irwin, T. , Kossoff G. & Tonkinwise, C. (2015) Transition Design Provocation, Design Philosophy Papers, 13:1, 3-11.
- Heskett, J., (2002) Design: A Very Short Introduction. Oxford: Oxford University Press.
- Huppatz, D. J. (2015) Revisiting Herbert Simon's "Science of Design". Design Issues: 31.2, The MIT Press.
- Joshi, R. K. (1985). "Shubham Bhavatu". IDC News, 6. Mumbai: IDC.
- Krippendorff, K. (1989). Product semantics: A triangulation and four design theories. In S. Väkevä (Ed.), Product semantic '89. Helsinki: Finland: University of Industrial Arts. Retrieved from http://repository.upenn.edu/ascpapers/254Manuscript
- Krippendorff, Klaus (2006) The Semantic Turn: A new foundation for design. Boca Raton, FL: CRC Taylor and Francis.
- Manzini, E. (2015) Design, When Everybody Designs: An Introduction to Design for Social Innovation. MIT Press. Amazon Kindle Edition.
- Mignolo, W. (2011). The darker side of western modernity: Global futures, decolonial options. Duke University Press.
- Papanek, V. (1984) Design for the Real World: Human Ecology and Social Change, London: Thames and Hudson.
- Ranjan, M. P. (2015). Design Thinking ! 1–11.
- Simon, H. A. (1996) The Sciences of the Artificial. Cambridge, MA: MIT Press.
- Systemic Design Association (2019) Systemic Design Association. Web: http://systemic-design.net/sdrn/ (Accessed 12 September 2019).
- United Nations (2015) Transforming our world: The 2030 agenda for Sustainable Development. Available at https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E
- United Nations Development Program (2019) Sustainable Development Goals, Available at https://www.undp.org/content/undp/en/home/sustainable-development-goals.html
- Tewari (2016) Jugaad. The Bloomsbury Encyclopaedia of Design. DOI: 10.5040/9781472596161-BED-ONLINE-011
- Tewari, S. (2017) Raw Repair Refurbish. Design History Society's Annual Conference, University of Oslo, Oslo.
- Thackara, J. (2015) How to Thrive in the Next Economy: Designing Tomorrow's World Today. Thames and Hudson.
- Vyas, H. K. (1991). The Designer and the Socio-Technology of Small Production. 4(3)

Theme 2

Future of Design Education in Emerging Economies

The emergence of university level industrial design programmes outside of Europe and North America can be traced back to the early 1960s in India and Brazil. Since then, modern design education systems are widespread in all parts of the world. More recently, after two decades of intensified globalization, design has been accepted as part of the competitive capabilities of emerging economies. However, issues such as a lack of resources of all kinds, and the rapid expansion of design education programmes, acutely challenge the standards of international design education and the capability of design to meet the relevant local social and economic conditions.

Design research and education institutions in emerging countries are now at a critical junction to understand their own unique characteristics, as they identify new problems, opportunities and responsibilities, definitely in order to define themselves, but also in terms of their ability to redefine the global design education and research agenda.

Title:
A future scoped, trans-disciplinary design education for the emergent digital India: A constructive character-building paradigm

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Abstract

India is an innovation-driven emerging economy. Government initiatives such as Digital India, Make in India, Atal innovation centres, Atal Tinkering labs fuel innovation at all levels. As companies mature to a workforce augmented with design competencies, design is becoming a preferred choice in undergraduate studies. As in established disciplines, aspiring design professionals experience a tug-of-war between lucrative corporate jobs and founding their own start-ups; even as the need for design in areas of social impact is increasing.

The design profession has transformed from designing stand-alone products to designing products that are a part of a complex system, and more recently there has been an emphasis on human actions within an experience. Additionally, there has been an advocacy for designers getting a 'seat at the table.' The need for a trans-disciplinary approach when designing solutions is becoming increasingly obvious. The design aspirant is a generation Z, largely from the upwardly mobile class of emergent India. In the last decade, design educators and professionals have been deliberating on a curriculum that is at the cusp of technology, science, business and art. Arguments on the relevant skills and character attributes of a designer have been made as well.

The paper proposes an enduring, holistic curriculum for design education based on this transformed role of design and the designer, goes on to measure the efficacy of the same. The sustainable domain-based curriculum at the undergraduate level is aligned to the expectations of the emergent innovation-driven digital India. The plan of this model has an extended foundation programme to include multi-skilling, character building and encompass transdisciplinary knowledge components to enable pursuits in solution driven, experience centric 'products' (tangible or intangible).

The paper documents a quantitative study of the curriculum pertinent to the socio-economic and cultural dynamic of the Indian student, conducted over a two-year period with a sample size of about 50 Indian design students. The study uses the matrix of learning outcomes and criteria mapped to the graduate attributes. It further examines the relationship between the character attributes of curiosity, collaboration, agility and humility and the high-level programme goals such as contextual application, cognitive reflections, enabling of business goals, transdisciplinary design approach and humanized experiences.

In conclusion, affirms that a design curriculum with tenacity to build effective character attributes (in generation Z) accelerates the fulfillment of multidisciplinary skills, sensibilities and knowledge goals.

Keywords: design education, multidisciplinary design, future of design, integrative design, character building

Introduction

India is today in an elevated position amongst the innovation cultured countries. From jugaad to innovation, the journey has been commendable. India is also biting a noticeable chunk of the experience economy pie. The government machinery too is driving this innovation driven, experience-led economy through initiatives such as Digital India, Make in India, Atal innovation centres, Atal Tinkering labs. The increasing need of Design competencies in the workforce is changing the perspective of Design from aesthetics to strategy, from designing single products to complex, intermingled eco-systems. Product engagements in an ecosystem that are driven by human actions, requires a multi-disciplinary approach to achieve creative collaboration. This changing paradigm, opportune designer to being a part of the CXO.

Design is now a preferred choice in undergraduate studies. The design student today belongs to a generation Z, largely from the economically forward class of emergent India. If creativity can be learned and sketching can be taught, then the essential character attributes of this new design student should be probed.

The objective of this paper was two-fold:

1. To propose a multi- disciplinary design programme relevant to current context

2. To examine the relationship between student character attributes and programme learning goals

Methodology

The paper encompasses two sections, which are discussed below:

Part I uses a literature review methodology, which is corroborated with the understanding of current industry trend and requirements. The latter is an analysis of documentation of interviews conducted. The sample included industry experts, academicians and design students.

Part 2 employs an observational and quantitative study of approximately 50 Indian students located in Mumbai with respect to assessment criteria such as skill, knowledge, thinking and application and the documentations of individual student mentoring sessions.

Findings

The findings of this paper are separated in two different sections:

The findings of the literature review were corroborated with the current industry trend and requirements. The analysis of the same led to the want of a multi-disciplinary approach to a stream agnostic, generalist outcome programme. In addition, the findings led to a requirement of an encompassing experiential dominant of humanizing of technology. The student fraternity considered is the Generation Z, (the demographic cohort after Millennials) largely from the emerging 'New Indian' economic class.

Conclusion
The translation of the above findings has led to the construct of a future scoped undergraduate design programme.

Objectives of the programme
The student will advantage knowledge and practice

1. To design products in an ecosystem which are interactive, immersive and experiential

2. To secure a 'seat at the table'

3. To include in their skillsets the expertise to focus on Human action led design.

Buchanan (2001), refers to George Nelson's position on the changes anticipated in the field of industrial design. The author further elaborates that for the designer to be relevant in the changing fabric of society and culture, the stream based knowledge should connect, relate, integrate and assimilate a broader, periphery view of the specialization.

The proposed matrix of this multi-disciplinary undergraduate programme is based on seven fundamentals broadly classified as 'design centric' and 'design influencers'. The design centric comprises the core design modules, whilst the design influencers include modules in psychology, sociology, technology and management. The amalgamation of these will equip the students with design sensibilities and problem solving skills to build experiential solutions. Figure 1 shows the distribution of the B. Des programme in humanizing technology.

Table 1 represents the details of fundamentals of B. Des program in humanizing technology whilst connecting the building blocks of fundamentals, modules and outcomes.

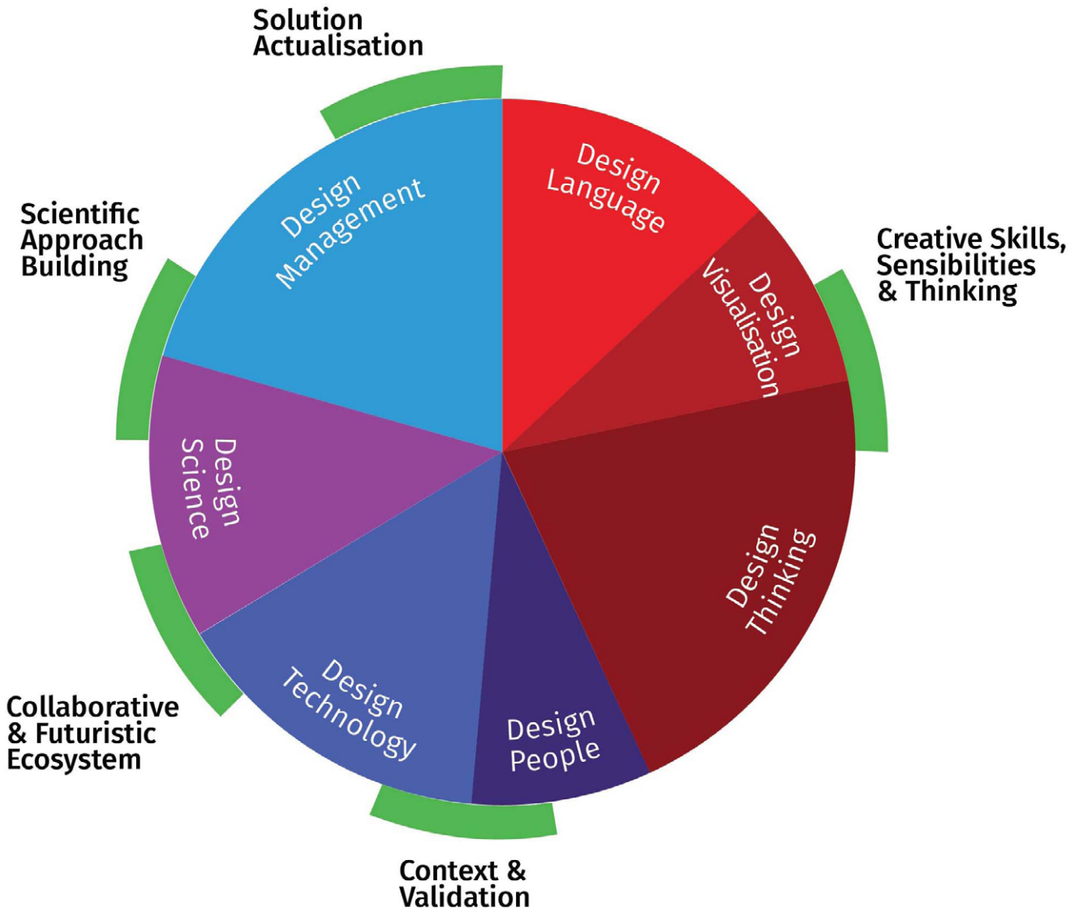

Fig. 1 - Matrix of the B. Des programme in humanizing technology

Sr. No.	Classification	Fundamental	Outcome
1	Design-centric	• Design language • Design visualisation • Design thinking	Multi-skills, multi-disciplinary sensibilities and collaborative creative thinking
2	Design Influencers	• Design & people • Design science • Design & technology • Design management	Designing for contextual intent, scientific approach to collaborative designing of feasible, validated, futuristic solutions

Table 1. Outcomes and the details of fundamentals B. Des programme in humanizing technology

Year-wise mapping of student goals in the B. Des programme

The programme facilitates on-going learning even after the completion of the programme. The four-year programme consists of a two-year foundation, a year of fulfilling academic projects to apply and practice learning to solute with emergent technology, whilst interrogating one's individual lean.

The final year is focused on professionalization by internship and industry suggested projects. The year wise goals and the pathways are listed in the figure below.

The graduate attribute affirms a generalist skillset with the tenacity to build domain specialization as per individual interest in the final year.

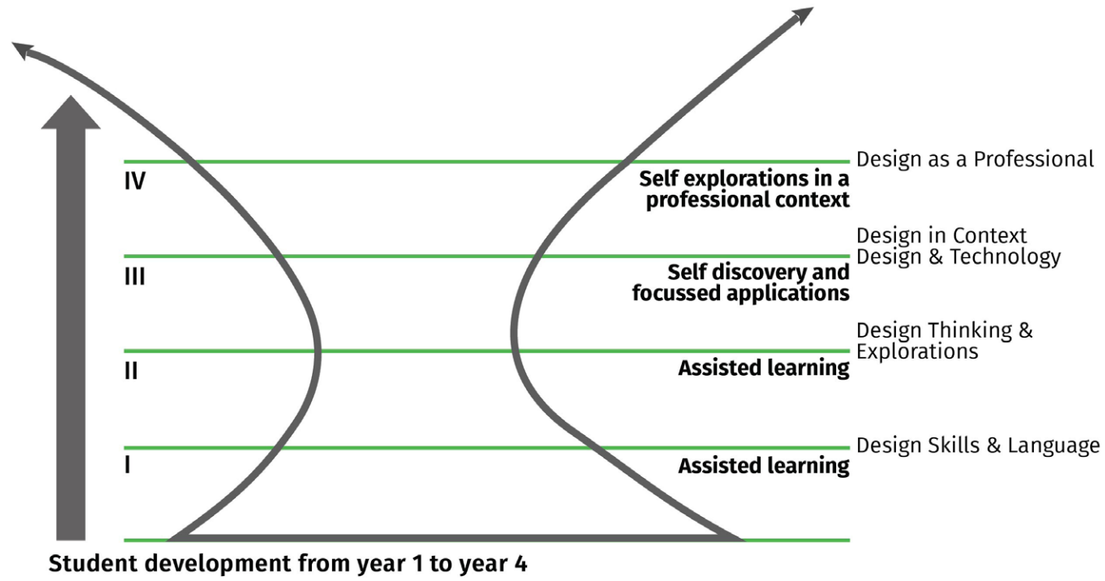

Fig. 2 - Year wise mapping of the student goals and pathways in B. Des program in humanizing technology

Findings (Part II): Relationship of the character attribute of a student to the achievement level of learning outcomes

The study to probe the hypothesis that the outcomes of the design programme are achieved when character attributes are relevant, nurtured and aligned. Whilst it is a commonplace knowledge amongst educators that character and learning share a close relationship. The study determines pertinent character attributes (in generation Z), which facilitate the fulfillment of the goals of a design programme that set to achieve multidisciplinary skills, sensibilities and knowledge. The study tracked the overall pattern in the assessment of a student's learning outcome through the multi-skilled and multi-disciplinary approach of the under-graduate four-year degree programme.

It further examined the relationship between the character attributes of curiosity, collaboration, agility and perseverance with high-level programme goals such as contextual application, cognitive reflections, enabling of business goals, transdisciplinary design approach to humanized experiences.

The research conducted by The Harris Poll in 2018, a global market research firm based in New York, conducted a study based on responses from a 30-minute nationally representative online survey of 2587 respondents, states that the generation Z believe that they have 55% more opportunities to succeed than their parents and 56% are optimistic about their future. Whilst 35% are more amenable to take risks and a 65% believe that they would like to be at the top of their careers. Generation Z are technology native and have expectations of it being a seamless part of their lives. They demonstrate dominant online behaviours wherein YouTube tops the list with 82% usage closely followed by Instagram and Snapchat. With respect to education 67% see the value of education through college as vital for future success. Due to their online preferences, YouTube is taking precedence in being an important learning tool. On the contrary, 14% more than Millennials, generation Z, prefer teacher led instruction, though 2% less feel that teacher is vital to their learning and development. They are more likely to figure out their hurdles, as only 29% would seek help from the teachers. Their focused attention span is 8 minutes, whilst they can multi-task easily (Global Research Insights, 2018)

There is a new addition to the economic class diversity in India called 'New Indians'. They adopt a more 'international lifestyle' with respect to taste and preferences in lieu of core Indian traditional values, yet retain that the children are the parent's responsibility, financially and otherwise where education is concerned. Most higher education students are distant from the on-road reality and rural India. To add to this, the Indian education system is not enquiry based, hence a student is not inclined to question and synthesis information (Miller, 2013). The concept of competition is herd based and not individual motivation driven.

The above factors pertaining to Indian context with the addition of generation Z characteristics challenges liberal art and design education.

Referring to the big five factors Model put forth by the American psychologist Lewis Goldberg (1992) a prominent researcher in the field of personality psychology. This work is based on Raymond Cattell's 16 fundamental factors of personality. The model comprises of five primary factors namely:

1. Extroversion
2. Agreeableness
3. Conscientiousness
4. Emotional stability
5. Intellect

Originating from the above factors, the hypothesis of this study proposes the following character attributes that are essential to facilitate the learning outcomes of the above-mentioned multidisciplinary curriculum.

1. Curiosity
2. Agility
3. Perseverance
4. Collaboration

Typically, three personas were observed in the student cohort, each have unique groupings of the above listed character attributes.

Persona I has curiosity and agility as the dominant characteristics, the trend is an indication of a student learning outcome that is consistently rising within a range of 1-2%.

Persona II has curiosity, collaboration and has developed agility over the first year of the multi-disciplinary programme has shown a spike 8-10% in the trend post first semester.

Persona III whose character attribute includes curiosity, collaboration at a higher level but at lower rung is agility and/or collaboration, have demonstrated a trend line that is stagnant across the assessment criteria, within a range of 70-80% across a semester. There is also an indication of a downward movement.

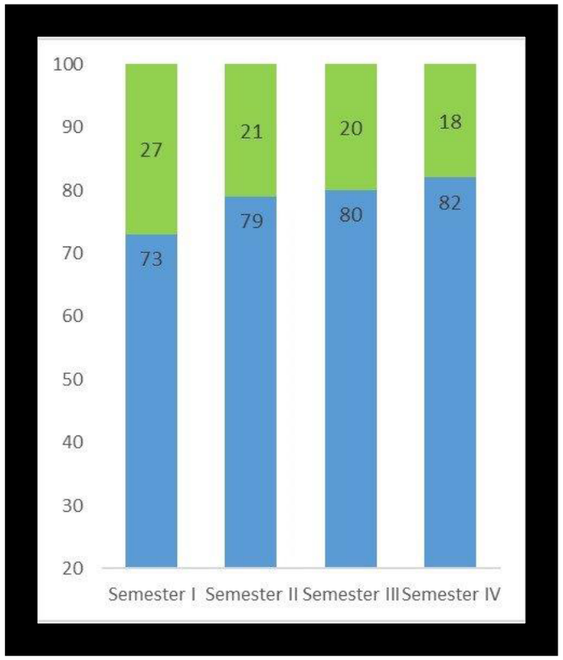

Fig. 3 - Assessment graph over four semesters of Persona I

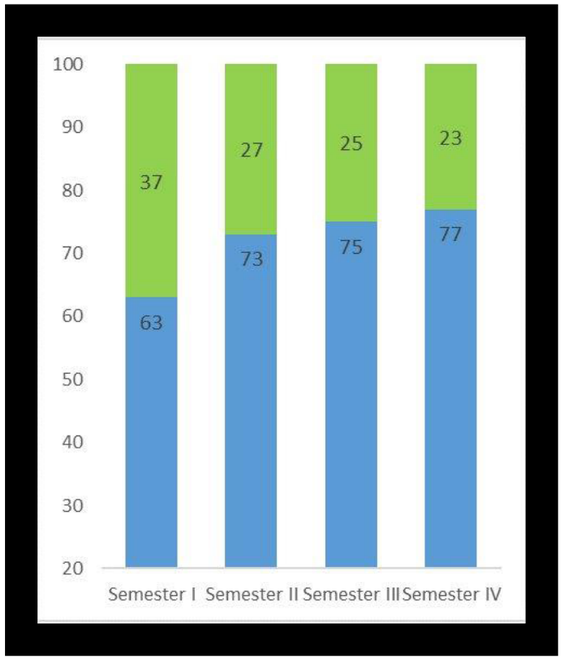

Fig. 4 - Assessment graph over four semesters of Persona II

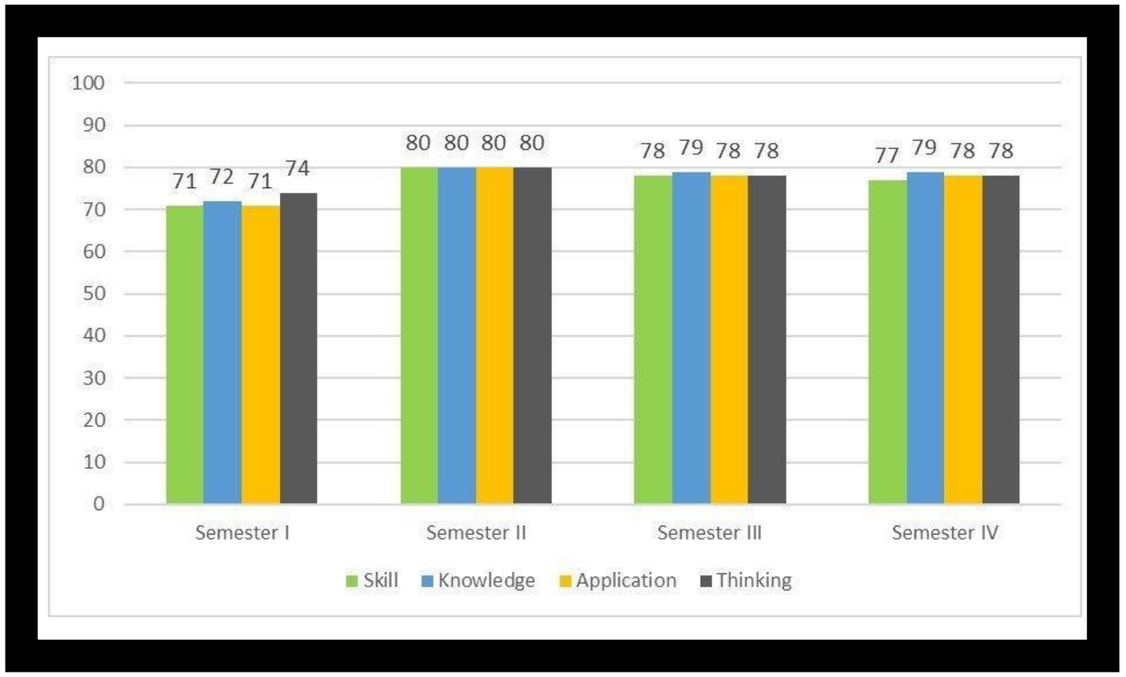

Fig. 5 - Criteria based assessment graph over four semesters of Persona III

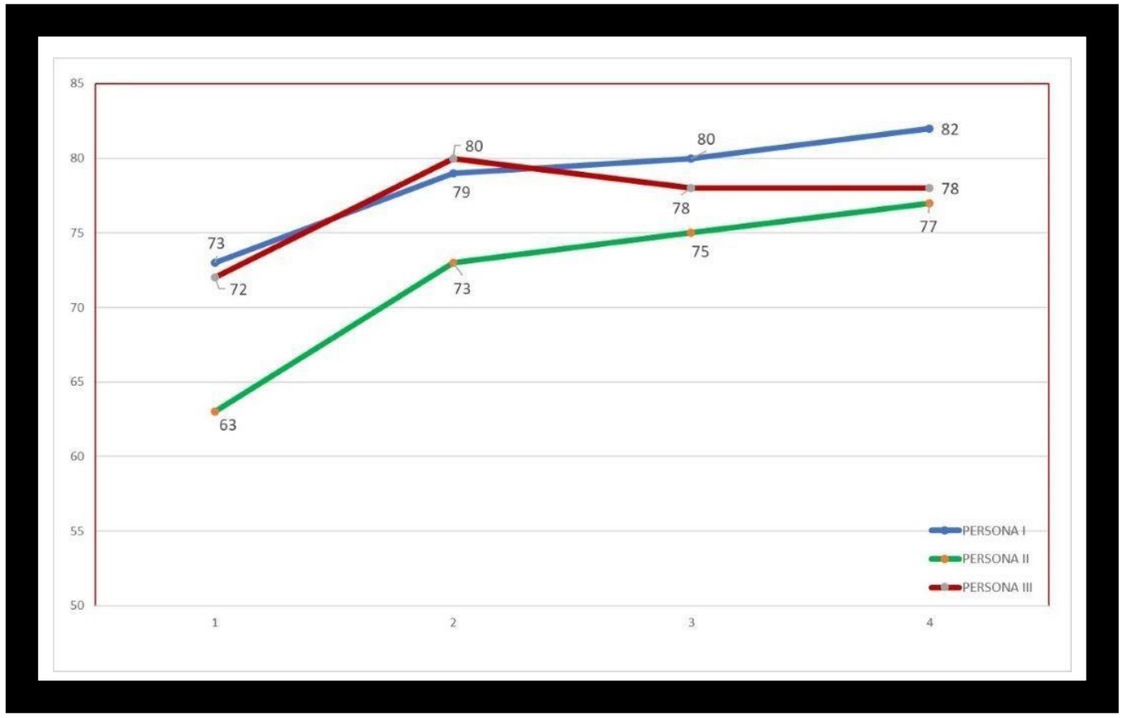

Fig. 6 - Comparative assessment of Persona I, II & III over four semesters

Conclusion

The ongoing study at this stage concludes the following:

The comparative trend line of the three personas (Figure 6) imply that the degree of the learning outcome achieved by a design student of a multi-disciplinary programme is directly proportionate to the level of curiosity and agility attributes of their character. It further indicates that perseverance should be the most essential and underlining character attribute of a student pursuing such a programme.

The future scope of this study could observe and document the impact on the individual criteria of the assessment of Persona I, II & III. On basis of which interventions to trigger, nurture and sustain agility and curiosity, the essential attributes of a favourable student character for a multi-disciplinary design education can be designed and implemented.

References

- Buchanan, R. (2001). The Problem of Character in Design Education: Liberal Arts and Professional Specialization. International Journal of Technology and Design Education, 11(1),13–26.
- AIGA Educators. “2016 Design Education Programming Recap,” AIGA Design Educators Community, 10 January 2017. Retrieved from https://educators.aiga.org/2016-design-educationconferences-recap (Accessed January, 19, 2017).
- Singh, S., Lotz, N., & Sanders, E.B.N. (2018). Envisioning Futures of Design Education: An Exploratory Workshop with Design Educators. Dialectic, 2 (1), 15-42.
- Orman, D. & Klemmer, S. (2014). State of Design: How Design Education Must Change. Core, 77, 14 March 2014. Online. Available at: http://www.linkedin.com/pulse/20140325102438-12181762
- Miller, N (2015) Neil Miller; Indias By Class: Economic Diversity of India; Learning India, Making sense of the subcontinent.
- Novikova IA., Big Five (The Five-Factor Model and The Five-Factor Theory) The encyclopaedia of cross-cultural psychology, 2013 Wiley Online Library.

Title:
Design education in India: The role of international collaborations for a globally aspiring mindset

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Abstract

The Design market in India is estimated to be at INR 188 billion by the year 2020. It has been found that India has only two designers for every one million of the population while Finland has 120 and Japan has 90 for the same population. India produces around 1000 design professionals against a requirement of 10 000 each year. The design services available in the country may benefit tremendously with an increase in the number of design institutions and designers. Further, a change can be brought about in the design education in India by introducing newer methodologies.

With rising aspirations, an increase in the demand for multifaceted designers and design institutions, international collaborations between educational institutions could be one possible way to broaden horizons and bring about this change. The Product Development Project (PDP), hosted by the Design Factory at Aalto University (Finland) and involving institutions globally is one such collaboration. This paper attempts to study the various ways in which the PDP course aids personal and professional growth through its collaboration between Aalto University and the Indian School of Design and Innovation (ISDI) in Mumbai.

The qualitative findings indicate the significance of building such a diverse community along with the establishment of international networking opportunities. Several attributes are essential to develop a global mindset, like working with cross-cultural and interdisciplinary teams, being involved in a live industry project, industry and factory visits, student exchange trips, etc. were studied as part of the research. The key contributions of this paper are: a) to understand the fundamental elements that were incorporated in the collaborative project b) to propose how the learnings may be adopted for reformulating curriculum in a design school.

Keywords: International Collaborations, Student Diversity, Future of Design

Introduction

The increase of Indian influence on the world now emphasizes the magnitude of developing design education in our country. Today, to be globally relevant, designers need to work on issues that have broad scopes and with multifaceted teams. 21st century design needs a more pragmatic and strategic resolution to issues, far beyond form and function.

Design in today's day and age is scaling tremendously and design education is capable of addressing majority of the world's complex businesses. Design education comprising of various disciplines like visual, communication, textile, graphic, product, interior, automobile design, etc. needs to encourage students to understand humans and their needs, economic conditions, social strata, environmental and sustainability concerns, consumer demands and technological requirements. For developing countries like India, instead of spending a fortune to study abroad, a collaboration programme in design schools would be the ideal choice to get similar exposure at a lower cost.

When it comes to employment, the design profession is majorly self-governed. The skillset has more significance over the degree. Design students need cultivated experience and heightened awareness to work in any industry world-wide. As a developing country, each region in India varies from the next and the only way to understand the differences is by working with culturally diverse teams and sensitizing ourselves to the ample knowledge accessible to us. The growing popularity of design as a field can be gauged from the fact that there are over 70 design schools in India.

This paper describes the outcomes and learnings from the Project Development Project (PDP) course, undertaken at the Aalto Design Factory, Aalto University, Helsinki (Finland) as an aid to the design education systems in developing countries like India, through collaborations with international universities. The learnings from this course are an attempt to establish the need for a shift in the curriculum for the future of design education in India.

International collaborations

The PDP programme has over 100 students participating from more than 20 'design factories' across the globe. The Design Factory Global Network is a network of innovation hubs in universities and research institutions across five continents. Aalto Design Factory, NYC Design Factory, Sao Paolo Design Factory, Kyoto Design Factory, Design Factory Melbourne, Porto Design Factory, CERN Geneva, Warsaw Design Factory, etc. are few of the organizations that come together to form 12 teams with approximately 10 students each. Each team is an inter-disciplinary team with students from science, technology, social sciences, engineering, design and business backgrounds.

One of the co-authors was a participant in this course. It was a team of four students who were pursuing the post graduate diploma in design and innovation at the Indian School of Design and Education (ISDI), Mumbai. It included one mechanical engineer, one electronics and telecommunications engineer, one graphic designer and one business graduate, all put together with experience of around 8 years. The local team from Finland comprised of students mainly from Aalto University, Helsinki. Of these, three students were pursuing their Master's degree in Mechatronic Engineering, one was pursuing a Master's in industrial design and the project manager was pursuing an MBA after 8 years of industry experience.

Fig. 1 - Team Freelevator with the final prototype at the Product Gala, Aalto University, May 2019

The problem statements were given by both domestic and foreign industrial companies, who were searching for innovative cooperation with the next generation of product developers. Kone, the global leader in the elevator and escalator industry was the sponsor for this project. The team had been given a design brief to redesign an elevator transport mechanism using mecanum wheels, such that multiple elevator cars could move in one shaft structure simultaneously, in both, the vertical and horizontal direction.

Structure of the Product Development Project

The Product Development Project (PDP) course is primarily aimed at Master students studying technology, business and design. The course is also open for other students from various master's studies, e.g. cognitive science, anthropology, and biology, etc. as well. Students have a lot of freedom and influence in terms of their learnings and processes.

The course follows a problem-based learning (PBL) methodology where real-world challenges are given and sponsored by industry partners, who are searching for innovative cooperation with the next generation of youth. There are few assignments and deliverables that all teams are expected to do and deliver until the end of the course. These assignments are planned to assist the teamwork, monitor the process and communicate it to the community.

A project typically includes phases like understanding the challenge, planning, research, concepts generation, prototyping and testing. The project concludes with a Product Design Gala where the teams present their final functional prototypes of a tangible product or service solution to visitors, engage with them, explain the project, answer their questions, talk about the teams' accomplishments and processes throughout the nine month period.

The structure of the course had components like a project plan, weekly Skype calls with the team, monthly check point meetings with the faculty and sponsors, feedback forums, safety, economy and presentation trainings and workshops, prototyping sessions, and a report, video, poster and brochure for the final gala.

The team leveraged a multi-channel, multimedia communication strategy to optimize the exchange of information in the most advantageous manner. The primary meetings were conducted face-to-face, and, in the case of international team communication was done through weekly Skype meetings. Each week, the team produced a short video to showcase the progress for that week, with clips compiled from both the Finland and India-based portions of the team. Each week these videos were sent to Kone to keep them updated on the progress.

Key learnings

Some of the key takeaways from this course was the opportunity to work with an interdisciplinary and cross-cultural team, and coordinate efficient product development with the changing schedules of multiple team members across time zones. Interacting with numerous people, within the teams and otherwise, helped improve personal and professional skills like communication, people and project management, leadership and networking. It was also a kind of student exchange trip since the Indian participants travelled to Finland twice, with the trip being partially sponsored by Kone. The teams who were in Europe itself went to their partner teams' countries as well. Creating a product within a limited time span, enabled and improved productivity, created opportunities for investments and enhanced the entrepreneurial skills of the students.

The infrastructure available in Finland aided the concept of fail faster, iterate better and succeed sooner, during prototyping and testing phases. The multifarious faculty were always accessible and accommodating. Participating in a live industry project with a brand like Kone, helped understand the concrete, mechanical challenges involved with elevator construction, particularly in a different context. The team understood the overall development of vertical transportation and people flow within buildings better. The participants visited the Kone factories in Finland along with the factory of Beckhoff Automation, the project partners for the electronics and control systems.

Fig. 2 - International teams attending workshops, October 2018

Fig. 3 - Team Freelevator and Team Trenox, India, Finland and Portugal, Product Gala, May 2019

Fig. 4 - At Kone, Hyvinkaa (Finland), October 2018

Conclusion

Marcel Proust, the French novelist, observed that, “the real voyage of discovery consists not in seeing new lands but in seeing with new eyes”. He realised that by interacting with others we learn about their cultures and are able to explore new ideas and prospects. Options that would not have occurred to us before stand out as obvious as we begin to understand how other people experience the world. Therefore it is vital for students to have a deeper global awareness and understanding of other cultures.

Greater opportunities for international collaborations lie in the area of developing and delivering niche programmes in the emerging domains of design. Introducing more master’s programmes and Ph.D. programmes can further increase opportunities for international collaboration. The PDP programme marks the success of one such international partnership and sets an excellent benchmark for more collaborations.

One third of the students graduating from design schools become entrepreneurs, 56 per cent go on to work in the industry and 10 per cent enter academia. Industry sectors like transportation, business and financial services, entertainment, retail, consumer goods, luxury segment, telecommunication, manufacturing and publishing are now leading industry sectors that employ design students. An interdisciplinary approach is of prime importance for these industries while recruiting. Therefore, design institutes need to collaborate and cooperate with other domains of study, such as engineering, technology, science, management, medicine, etc.

Designers today are expected to think beyond mere products and be more strategic in their work. The boundaries within known design disciplines are blurring and there are several other disciplines that are practicing design. Design has become pervasive and hence the nature of design education also needs a change. A new way, marked by an attitude of openness, cooperation and exploration is needed to change the way design education is perceived. To prepare people for the future, we need to design an education system that is forward-looking.

The skills achieved through such collaborative learnings, can help a design professional go a long way in transforming today’s complex, dynamic and interconnected world. They help us become more empathetic, make us more adaptable to an ambiguous future. Hence, it is essential that the design education system also adapt itself to a collaborative and integrated approach. These skills help us accurately identify the problem at hand and discern sustainable solutions that help enhance the community economically, socially, culturally and ecologically. Aptitudes such as creativity, collaboration, communication, empathy, and adaptability are not just good to have; they could become the required capabilities of a 21st century global economy facing complex challenges.

References

- BALARAM, SINGANAPALLI (2005) Design Pedagogy in India: A Perspective, Design Issues.
- British Council (2016) The Future of Design Education in India - NID, India Design Council.
- EMERT, HOLLY A. & PEARSON, DIANE L. (2007) Expanding the Vision of International Education: Collaboration, Assessment, and Intercultural Development, New Directions For Community Colleges.
- FINDELI, ALAIN (2001) Rethinking Design Education for the 21st Century: Theoretical, Methodological, and Ethical Discussion, Design Issues.
- JUSTICE, LORRAINE (2019) The Future of Design Education, Design Management Review.
- KURIACHAN, JUNEESH K (2014) History & Future of Design Education: Importance of Design Education learning in India, Oriental Journal Of Computer Science & Technology.
- MAJITHIA, RAMNEEK KAUR (2017) What’s Next in Design Education? Transforming role of a designer and its implications in preparing youth for an ambiguous and volatile future, The Design Journal.
- NOEL, LESLEY-ANN (2015) Envisioning a Future Design Education in vulnerable emerging economies, Conference: INSIGHT 2015, Bangalore.
- PARKER, INDRANI DE (2013) Reflecting on the Future of Design Education in 21st Century India: Towards a Paradigm Shift in Design Foundation, ICoRD’13.
- PICARDO, JOSE (2012) Why students need a global awareness and understanding of other cultures, The Guardian.
- RANJAN, M P (2011) Nature of design: The need for nurture in India today, Conference: What Design Can Do, Amsterdam.
- Retrieved from: https://pdp.fi/
- Retrieved from: https://designfactory.aalto.fi/about/
- SHERWOOD, GWEN & LIU, HUAPING (2005) International collaboration for developing graduate education in China, Nursing Outlook.

Title:
Design for development 2.0? Revisiting the Ahmedabad Declaration and discourse of design in India

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Introduction

In the Indian post-independence unfolding of nation-building, design and development found each others company as complementing partners. With Nehru's pro-development stance and the invitation to iconic designers to India, like Le Corbusier and Eames couple, design aspired to be one of the catalysts for development. Charles and Ray Eames' seminal 'India Report' laid the foundation for the National Institute of Design (NID) at Ahmedabad (2013) to pursue design in the Indian context.

A decade later, in 1969, shaped by its local conditions, the Industrial Design Centre at IIT Bombay (IDC) emerged as another hub for industrial design education in India. Both were inspired by iconic schools of design, Bauhaus and HfG Ulm, more of the latter though.

NID and IDC formed the two ideological cradles of design in the seventies where the first formal discourse of industrial design and communication design occurred. It further shaped India's landscape of design in the second half of the twentieth century.

In January 1979, they along with the United Nations Industrial Development Organization (UNIDO) and the International Council of Societies of Industrial Design (Icsid), hosted a landmark International event, Design for Development. The deliberations and discussions confluenced as the 'Ahmedabad Declaration on Industrial Design for Development' (UNIDO and Icsid, 1979), which remains significant to the human needs, design and development. The paper here illustrates the backdrop, as visions, pedagogy and projects, towards the making of Ahmedabad Declaration of 1979. Through a retrospection, it further mulls the relevance of the document in today's context of design and its education.

Backdrop: developments towards the Declaration

Design and man in a developing society: Adarkar at Icsid Kyoto 1973
After a series of meets in the West, and one at the USSR in 1971, Icsid moved towards the East. Along with the Japan Industrial Designers' Association, the Icsid General Assembly and Congress were organised in Kyoto (Japan) in 1973. India found its voice through Prof V. N. Adarkar's three-essay vision, Design and Man in Developing Society (1973), which echoed the developing world's concerns. Adarkar was a graphic designer, the first dean of Sir JJ School of Applied Arts, Mumbai and an advisor to IDC at its foundational years (Rane, 2017).

Adarkar's first essay in the set, 'Environment, Design and Man', illustrated the problems and potentials of the Indian context for Design to flourish in virgin territories. At the same time, he showed concerns about the possible loss of identity, especially India's rurality, which design could bring into the formal system. His second essay, 'Environment, The Decision-Maker & Design Policy' conveyed a great sense of environmentalism and sustainability thinking. He warned the humankind of the technocratic decisions in design being disastrous and ugly and called designers to be more humane. In his third essay, 'A Social Renaissance through Visual Communication' Adarkar realized the potential of print technology as a national priority. He believed that visual communication has a pivotal role in then mostly illiterate nation to resolve social issues.

Jawaja: a social design project in 1975
Jawaja Project was a collaboration between NID and Indian Institute of Management Ahmedabad (IIM-A) in 1975 for action-based learning and exploration of the dynamics of development of disadvantaged groups in rural areas (NID, 2013). The purpose was to achieve 'self-reliance' of the weavers and leather artisans.

The experiment of NID and IIM-A faculty and students visiting Jawaja village not just worked as a capacity-building project, but also it broke away certain social taboos. It was one of the projects which imagined a design for development in empowering the local community to enable them to access the rapidly transforming world.

Products for people: 1978-79 exhibition by IDC
The design world was turning towards the idea of 'need' (of humans and society) voiced by developing nations like India. The first large-scale public exhibition of IDC, 'Products for People', showcasing the first decade of the work including research, design and projects at IDC displays the commitment. The exhibition at Jehangir Art Gallery, Mumbai, showcased various product design solutions addressing the needs of the developing society and its citizens in six significant themes as design for industrial, domestic, rural, public usage, healthcare and children (Rao, 1979).

The projects included the technical solutions to industrial contexts like Sugarcane Crusher and Gas-Cutting Machine, everyday products like ticket dispenser and lunch box to user-specific designs like School Bag and Miner's Safety Gear etc. The first decade of design explorations at IDC focused on the social issues at various levels as one of its kind setup in a technology-centred institute. This exhibition aligned perfectly with the Icsid/UNIDO event in the year 1979, half of which Mumbai hosted at IIT Bombay.

Design for development: Ahmedabad Declaration, 1979

With the above events and pedagogical engagements at NID and IDC, the focus on human needs and developing world was evident. It was a perfect backdrop for an international dialogue on the theme. Through the efforts of academic heads at IDC and NID, Sudhakar Nadkarni and Ashoke Chatterjee, IIT Bombay and NID Ahmedabad co-hosted the two-week-long event in January 1979. The shared vision with international designers and scholars including Gui Bonsiepe, John Reid, Herbert Ohl, Carl Aubock and Aksit Kayalar, emerged as the Ahmedabad Declaration (UNIDO and Icsid, 1979), which reflected the contemporary needs and aspiration of the world.

Ahmedabad Declaration of 1979
UNIDO and Icsid through the International Congress in January 1979 adopted the Ahmedabad Declaration. The vision was, 'to accelerate jointly industrial design activities in developing countries in order to satisfy the urgent needs in this field, and to carry out as extensively as possible the promotional activities necessary to alert developing countries to the advantage of including industrial design in their planning processes...' with a call to collaborate, co-address the contextual problems through design (industrial design). It firmly believed that design can help raise the quality of life within economic planning and that the designer can become an agent of progress (article 7), and acknowledged the agency of UNIDO, Icsid and the broader design community (article 9 & 10).

Reviews of the Declaration
Accounts of Ghose (1989), Balaram (2009), Clarke (2015) have meticulously reviewed the role of Ahmedabad Declaration in turning the focus of the world's design community towards the quality of life, locality and plurality (Tewari, 2018). Clarke highlights it as 'Golden Moment' in the promotion of design (as design for development), in the larger world (here, India) and its extension aligning with Nehru's policies. The pedagogical discourse at IDC and NID, after the 1979 event, continued and constructed the turn towards the sociality of design, and design for development, through its pedagogical models and components.

Reflection: Design and development

The postcolonial history of more extensive fields of design in India stresses the agenda of development in its politics as conception and operation. In the post-independent era (post-1947), design has been a conscious tool of development at various scales, including town-planning, architecture, and design. Through the 1990s, the neo-liberal policies of the centre facilitated a rapid dispersion of globalization in the diverse design cultures of the geography and different systems including agriculture, healthcare and services.

Moreover, the epistemological relationship between design, modernity and development is highlighted in the classical texts of design history, pre-war and post-war, both. So, it becomes inevitable to study the concept of design without considering the tenets of development, especially in the spheres of design education.

Design for development 2.0? Expanding design, understanding development in design education

Notably, Ahmedabad Declaration's article 13 addressed the central theme, design for development, article 14 articulated the role and agency of a designer, and 15 stressed conserving identity and locality. It could also foresee future issues through its article 16, which called to address the speculative problems of globalization and sustainability. The vision could accommodate not just the larger goals design aspired for, but also addressed the concerns of the developing world. The suggestions of contemporary design thinker (here, Adarkar), pedagogical cases of design schools (here, NID and IDC), and the exchanges around the 1979 event contributed constructively to the vision.

As a critique, Chatterjee, who was one of the coordinators of the event, reflected that it 'remained largely a statement of intent, and less one of achievement' (2005). Forty years later, the design world is witnessing the diversified forms of design (like Papanek, 1984; Julier, 2013; Huppatz, 2019) and its narratives (like Fathers and Bonsiepe, 2003; and Calvera, 2005).

With the historicity of design in India (Vyas, 2010 and Balaram, 2005) and the visible influence of western schools (Ranjan, 2007) as a pedagogical culture in the indian design schools, it is critical for the educators in design to comprehend the possible expansion of design.

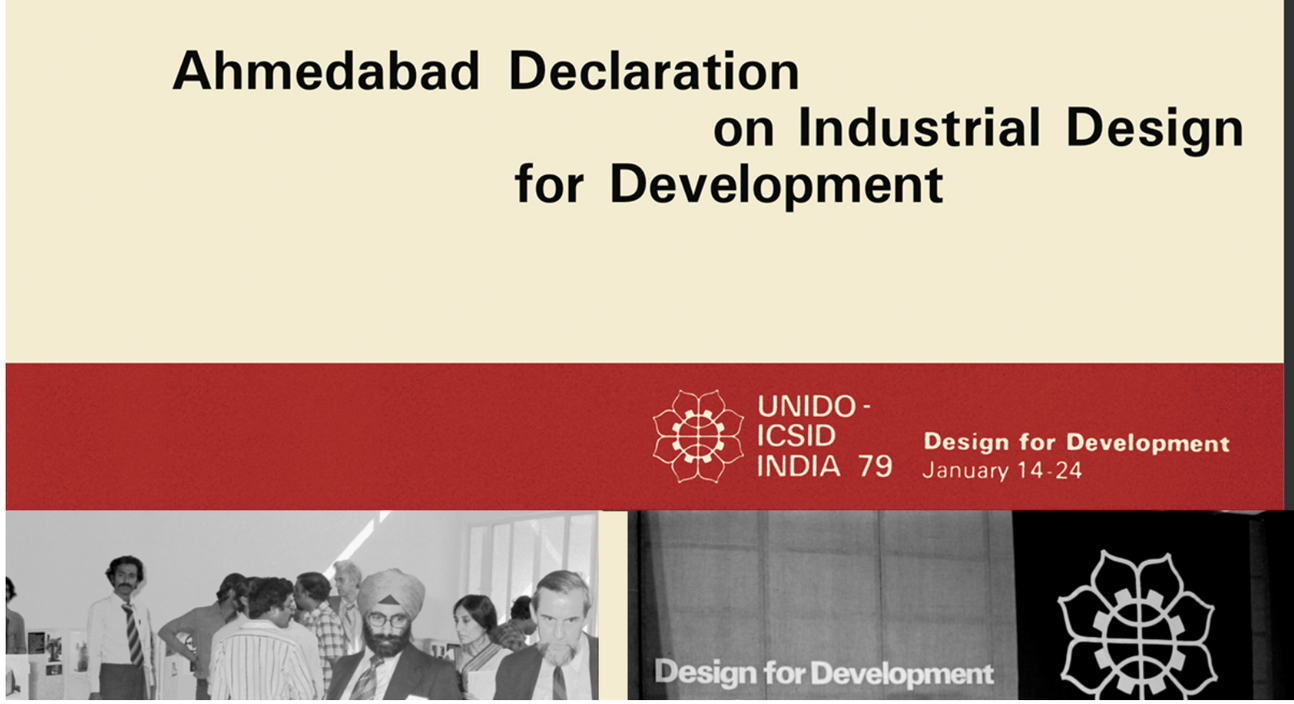
The discourse around design studies, STS and history of technology, suggests a shift of design from 'a thing' to 'thing in a system' and 'a system of things'. The idea of development has also grown through postcolonial, theoretical and experiential, accounts.

The critical narratives, especially from the field of environmental science, have questioned the stress on development as a political agenda of emerging economies.

From 'Design for Development' of 1979, perhaps, an ontological and epistemological expansion of design and understanding development, especially by those in education, is required to include the following critical and political propositions.

- Design as development
- Development as design
- Design of development

It appears that the epistemic gap between design and development has been diminishing. The debate, design brings development, or development brings designs, is now overpowered by a dynamic and networked relationship between the two. So, the expansion and understanding will allow the designers to operate in the complex contexts of design and/in the developing world. The stakeholders in the design education have a timely opportunity to address the shift and enrich through their unique positions.



References

- Adarkar, V. N. (1973). "Design and Man in a Developing Society". Kyoto: 8th ICSID General Assembly and Congress.
- Balaram, S. (2005). Design Pedagogy in India: A Perspective. Design Issues, 21(4), 252–268.
- Balaram, S. (2009). "Design in India: The Importance of the Ahmedabad Declaration". Design Issues, 25(4): 54–79.
- Calvera, A. (2005) 'Local, Regional, National, Global and Feedback: Several Issues to be Faced With Constructing Regional Narratives', 18, 4. pp. 371–383.
- Chatterjee, A. (2005) 'Design in India: The Experience of Transition', Design Issues, 21, 4, pp. 4-10.
- Clarke, A. J. (2015). Design for Development, ICSID and UNIDO: The Anthropological Turn in 1970s Design. Journal of Design History, 29(1), 43–57. https://doi.org/10.1093/jdh/epv029
- Eames C. & Eames, R. (1958, 1997) The India Report. Ahmedabad: NID.
- Fathers J. and Bonsiepe G. (2003) 'Peripheral Vision: An Interview with Gui Bonsiepe Charting a Lifetime of Commitment to Design Empowerment', Design Issues 19, no. 4 (2003), 44–56.
- Ghose, R. (1989). Design, Development, Culture, and Cultural Legacies in Asia. Design Issues , 6(1), 31–48.
- Huppatz, D. J. (2019) Design. London: Bloomsbury.
- Julier, G. (2013) The Culture of Design (Third Edition). London: Sage.
- National Institute of Design (2013). 50 Years of the National Institute of Design: 1961–2011. Ahmedabad: NID.
- Papanek, V. (1984). Design for the Real World: Human Ecology and Social Change. London: T&H.
- Rane, M. (2017). The Design Journey of Prof. Sudhakar Nadkarni. Mumbai: Mandar Rane.
- Ranjan, M. P. (2007). Lessons from Bauhaus, Ulm and NID: Role of Basic Design in PG Education. In Katiyar, V. S. and Mehta, S. (ed.) Design Education: Tradition and Modernity. Ahmedabad: NID. pp 2-9.
- Rao, A. G. (1979). Industrial Design Centre: A decade of design experience. Mumbai: IDC.
- Tewari, S. (2018). Design in Visions: Visions of / on Design from the Events , Declarations and Policies in India. Back to the Future: The Future in the Past. University of Barcelona: ICDHS 10+1. 47–51.
- Vyas, H.K. (2000). Design, The Indian Context: Learning the Historical Rationale of the Indian Design Idiom. Ahmedabad: NID.
- UNIDO and ICSID (1979). Ahmedabad Declaration on Industrial Design for Development. Ahmedabad: UNIDO-ICSID India 1979.

Title:
Future of design education within the changing cultural-economy of India

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Once India became a signatory to the World Trade Organisation, (1994) , it became inevitable that the cultural economy of India will be affected and inflicted by globalization. This integration was not a sudden all-encompassing process, but a change that came slowly, negotiating through the layers and structures of Nehruvian socialism. One of the sectors deeply affected by the socio-economic and political shifts has been the sector of higher education. In the year 1995, World Bank published 'Higher education: Lessons of Experience'. In many ways this report has had a long term impact on how higher education has been conceived, policed and funded. The report termed higher education as, "a private and quasi-private good which allow students-consumer to command a better market for their skill". A first step towards the implementation of this policy agenda has been the introduction of Establishment and Maintenance of Standards in Private Universities Regulations, 2003, UGC. By this time, the World Bank had revised its position and tabled the 'Constructing Knowledge Societies: New Challenges for Tertiary Education (2002)' . In this report higher education was again classified as a public good and there was a strong push to initiate public private partnerships while the privatization of design education began after the 2002-2003 era had begun to expand rapidly. This expansion makes it important for us to focus on its commitments to its stakeholders and how design education today understands its cultural-economical role.

Though globalization has brought in a strong need to de-localize educational methods, at the same time it becomes imperative to remember that different cultural-political-economic contexts need different responses and adaptations to globalization. It's important to acknowledge that though the technological and structural spread of globalization has been all encompassing, its economic, technological and ecological impact on cultural economies has been varied. The largest private design universities in India are very new and in a constant struggle to refine curriculum, define systems and arrive at a sustainable pedagogy. The first world economies had gone through this transition in the 80s through the 90s, and it was almost natural that many of the new design schools would be looking at universities in Europe and America to guide this transition. In India, design itself was a new discipline, institutionalized only in the 1970's. At that point, design was considered important to shaping a modern nation state and crucial for India's search for self-sufficiency in urbanization and industrialization. The scope of National Design Policy (2007) is much more ambitious. Among many goals it states its objective as being, "making India a major hub for exports and outsourcing of designs and creative process for achieving a design-enabled innovative economy."

This policy is a good refection of the confusion in imagining design and design education, and a lack of roadmap in how the objectives and goals are to be attained. The NDP mirrors the aspirational culture of 'new India', but fails to theorise solutions. The word 'innovation' is used all over the document without quantifying it and calls for a tremendous expansion of infrastructure and knowledge base without mapping the resources needed for an expansion. The document does not acknowledge that the discipline is coping with a lack of sufficient theoretical knowledge base, the lack of major inputs on ecological sustainability, erratic exposure to design management and a struggle to keep up with digital-based technology.

One of the key debating points of neo-liberal education has been around learning for learning's sake and learning for employment's sake. As academic fees increase across board, education has become an economic investment (a shift away from its earlier existence as a knowledge and economic investment). Many design educators feel that an employment-focused design education takes away from long term concept building by promising immediate hard and soft skill requirements of the market. In a sense this a continuation of the older clashes between 'technical education' and 'university education'. However, this takes a different meaning in the present scenario because in most scenarios, the structural/ institutional differentiations between universities and technical education institutes have lapsed into a composite whole. The problem has been compounded by us continuing to look at answers from the first world where neo-liberalism is older and infrastructural and cultural realities are completely different. However one very important thing that the National Design Policy does achieve is to align the needs of design education in India with the 'Knowledge for Development,' World Bank 1998 report . In the Indian context the push towards design as capital (away from design as function of manufacturing) is significant and crucial to the future design and its cultural-economic value.

Our excessive focus on the first world to guide our tryst with design education has led to us ignore the parallelly looking at models and experiences from Japan, China, Brazil, Mexico, South Africa and other dominant-emerging economies where privatization and neo-liberalism in higher education, particularly in design, has been closer to our journey and have been going through their own journey balancing between delocalization and localization of design pedagogy . Even today almost all private universities are focussed exclusively on Euro-America and do not engage with China, Japan or Brazil, countries who have made shaping design to be an effective tool for manufacturing as well as an independent capital accumulator. Our entanglement into the technical versus university debate has kept us away from important issues like the need to rethink knowledge flow in a data saturated world and the need to reconfigure the position of craft in the future of design.

The modernist idea of design has been governed by the idea of a 'significant form' and aesthetic unity. The National Institute of Design formed its pedagogical practice based on these principals, and this perpetuates how design is taught and evaluated even today. This approach limits the role the design process into trying to arrive at: a form-function harmony working within the principals of aesthetic unity. This model has a little understanding of design thinking as being separate from design process and is incapable of responding to the heterogeneity of taste cultures in post-colonial societies. What we see as short term demands of the market could be the demand for a more diverse and non-modular understanding of design itself and a simultaneous need to different approaches to form and concept.

Working within large scale privatization of policymaking creates challenges in situating the future of design education within the zeitgeist of the nation . Yet, in a diverse nation like India, the solutions might come from moving away from the notion of a singular zeitgeist and instead to focus on a sustainable relationship between key stakeholders. Design education needs structural interventions through design thinking as there is an urgent need to reimagine business models and long term development goals of key institutes. A failure to do so risks losing the recent growth of design education to an economic bubble and more dangerously to fail in our goal to become a country that exports design and design-based solutions. Almost all institutes look at students as service consumers building their revenue models of increase of intake and fees.

A cursory deconstruction would lay bare the insubstantiality of this model as a business proposition and the tremendous continuous pressure it puts on infrastructure and resource building. Design schools can only become sustainable in terms of business models if they shift from an admission-based to a content-based revenue model. The kind of value incubation centres, patents and content design can achieve has the potential to surpass earning potentials of the admission and fees based model. However, this would require design schools to re-configure their approach and focus on research, analysis and intellectual property rather than on employability creation. We need to understand and respect the market as the supreme appropriator and realize that it will in any case appropriate the training/education of design school graduates to meet its demands and there is more sustainability in centring design as a more conceptual and structural context.

References

- Neo-liberalism and Higher Education in India, Dr. Marami Goswami, Quest Journals Journal of Research in Humanities and Social Science, Volume1 ~ Issue 3 (2013) pp: 32-37.
- Chatterjee, A, Future of Design Education within the changing cultural economy of India, Design in India: The Experience of Transition. Design Issues, 21(4), 2005.
- National Design Policy, 2007.
- World Development Report, Knowledge for Development, World Bank, OUP, 1998.
- Barbosa, Ana Mae. "Art Education in Brazil: Reality Today and Future Expectations." Visual Arts Research 16, no. 2 (1990): 79-88. http://www.jstor.org/stable/20715734
- Jayandhaya Tilak, The Privatisation of Higher Education, Prospectus, Council for Social Development, 1991.

Title:
Objects-based world & learner-centered education: The task of educating object designers of the future in countries with emerging economies

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Introduction

We live in an objects-based world (regardless we call them products, goods, devices or gadgets) and in fact, is partially thanks to them that we have evolved and reached to the point where we are today; either if we talk about the creation of primitive artefacts developed by our ancestors in the stone age, to the modern times in which we can create objects in a few minutes with the help of technology; the objects around us have played and will continue to play an important role in our daily life and in the development of our nations.

Keeping in mind how the countries around the world are in a continuous exchange of innovative products; the profession of the industrial/product designers has become extremely relevant and demanding. We just need to look around to realize that most of the objects that surround us were initially ideated by designers; however, not all these objects represent a real contribution to the society and there is where our role as design educators comes into play.

Taking into consideration the above; it is our responsibility as design educators and professionals to ensure that the designers of the future have the necessary tools to be able to create products that go beyond the fulfillment of commercial objectives and instead, comply with one of the main premises of design: to improve human life and contribute to the construction of a more prosperous world.

On the other hand, we are living in a globalized world, it is important to note that the specific needs and the ways how objects are produced (and therefore the way how object designers must be educated), depends on different socio-economical aspects. Because of that, this research was developed around the following question, keeping in mind the contexts of India and Mexico as both countries are exactly on opposite sides of the world but at the same time are similar in many aspects:

What are the multiple factors that influence the teaching and learning processes of product/industrial designers in Higher Education Institutions (HEI) in analogue countries with emerging economies?

Methodology

A group of 10 Higher Education Institutions from India and Mexico were selected as both countries have many similarities and both have emerging economies. A multi-factorial study about how the teaching-learning processes happens in both countries was conducted to gain a better understanding of what is done and what can improve in our design educational systems.

This research presents an inclination towards action research and a mixed approach since this method is necessary to obtain a study that is more inclusive and also keeping in mind that by using qualitative and quantitative mechanisms at the same time, we can gain a better understanding of the problems of the investigation (Creswell, Klassen, Plano and Smith, 2011).

Participants
This research uses a comparative education approach; where 10 Indian and Mexican HEIs offering industrial & product design programmes were considered, in order to obtain a significant sample which can represent the different realities of the students and the HEIs offering object design programmes in both nations.

Some relevant points are listed below:

- 1.5 Mexican HEIs and 5 Indian HEIs were considered, giving a total of 10 institutions (being 50% public HEIs and 50% private HEIs)
- Most HEIs were located in highly industrialized cities in their corresponding countries. This factor is important given the connection between object design and the industry.
- Although there is a clear difference in the nomenclature of the programmes by the different HEIs in both countries, their programmes content is in many aspects similar since it addresses the design of objects in general.

Instruments
For this mixed research, instruments of both quantitative and qualitative nature were created and implemented. To achieve a better understanding of the instruments applied and the reasons behind their selection, the table below was generated.

Process
After developing the theoretical framework, the fieldwork was conducted in a non-linear way in the different design HEIs; meaning that while obtaining the budget, different permits to visit the different HEIs and fixing appointments with different members of HEIs; relevant information was collected as part of the documentation.

During the field work, the researcher assumed an active role (collecting data and participating in interviews) as well as a passive one (simply observing and without intervening) in order to gain a deep understanding about the operation of each HEI included in this research.

Additionally, it is relevant to highlight that the methodology followed, corresponds to the phases proposed by Vallone (2010), which are related to comparative education research as this work is linked to this discipline.

Fig. 1 - Geographical location of the main HEIs considered for the research.

Findings

There are different factors that influence (either in a positive or negative way) the overall learning and teaching of the future object designers; these factors are naturally related to any other education field; however, they present some particular aspects when related to product and industrial design. Below there is a brief description of some of these factors:

Context
The geographic location, culture, religion, beliefs and the overall socio-economic factors inherent to a place and its population; directs the way people learn and in the case of the designers, even the way how designs are created. This is because object design as a discipline is related to the local society, economy and even industry; these 3 factors will influence what will happen inside the classrooms and that's why countries with developing economies must have a different approach towards the way object design is taught, because their industries and the way they produce is different when compared to more developed nations.

Study group size
The group sizes in the different HEIs can affect the teaching-learning experience for both students and teachers. On one side we have the need of offering access to education for everyone in public HIEs and on the other hand, in the private sector sometimes the interest to generate more revenue by enrolling more students than what the HIEs can manage, decrease the quality of the education provided.

In this aspect, we must define the correct ratio between numbers of students and teachers and more specifically, the ideal group size while teaching-learning theoretical and practical subjects. In the case of this research, it was found that we could create a clear division between two types of subjects-modules and the number of students that can be accommodated in the groups. In the case of the practice-based subjects, it would be advisable to create groups with no more than 15 students, while for theory-based subjects the number can go higher but without exceeding the capacities of the faculty (keeping in mind that learning and the fulfillment of the learning outcomes must be the guidelines while defining the class size).

Faculty profile (The Pracademic: Practitioner + Professional)
Faculty must have not only an academic background but to count with professional experience in the industry as this is a factor many times demanded by most of the students, sometimes they even would like their mentors to be active in the industry while teaching.

We must keep in mind that by having experience in the industry, the faculty can provide realistic inputs to students on what to expect at the time of their graduation. However, the concept of 'Pracademic' comes into the picture as it seems like 'super teachers' are required because both industry and education are really demanding for any individual to manage both at the same time.

Infrastructure facilities
The learning spaces must encourage active learning and eradicate the outdated traditional teaching where everything revolves around the teacher. In the case of object design: classrooms, workshops, model-making and prototyping spaces are equally important and play an essential role on the students' outcome while designing.

On the other hand, in the modern world we must think also about factors that really often are ignored or taken for granted; the connection of the spaces with the environment and the society, the implementation of sustainable practices (not only in theory but also in practice) and the improvement of the spaces in order to provide equal opportunities to all the community members regardless any particular situation they may face: universal design. By working on the previous points, the students and all the individuals involved in the teaching and learning processes can interact and fulfill their learning & personal development objectives in a better way.

This research uses a comparative education approach; where 10 Indian and Mexican HEIs offering industrial & product design programmes were considered, in order to obtain a significant sample which can represent the different realities of the students and the HEIs offering object design programmes in both nations.

Students' gaining professional experience (combining studies and work)
It was found that 26.8% of the students combine studies and part time jobs, particularly in the Mexican context. Out of that students, 81% worked on something related to design. This has an impact on students' learning; from one side, they get a better understanding on how reality-industry works, translating this understanding into their academic design projects. On the other hand, neither design academics or design professional practice are simple, and this becomes a threat for students' academic performance as both the work and studies are quite demanding. A balance must be found in which we can define if combining studies and work is a good idea; as result of this research, it seems like they have an equal amount of advantages and disadvantages; therefore, the best decision can based on each particular context (of the HEIs and each of their students).

Teaching methods
Teaching methods: As modern design educators, we cannot shape design students of the future with teaching methods and techniques from the past. This is so important that even students are aware that some faculty requires training/ updating in terms of design teaching and methods to share knowledge.

While teaching, educators must be fully aware that we are currently educating individuals from a totally new generation: generation Z. We must put efforts in understanding the particular needs and ways of learning of this new type of students and also we must creative to find ways on how to accomplish our mission: to educate students to become socially responsible, creative and successful object designers.

Curriculum
In relation to the previous point, is not only the way teachers shape students (how?) but what the design programme dictates in terms of content (what?). In this aspect, the responsibility goes to the institutions and programme managers as they are the ones who must identify the needs and requirements of a world that is in constant evolution.

The people in charge of creating curriculums and making the final decisions in the design HEIs, must understand how crucial the job they perform is; because the decision they make today, will have an impact on the object designers of tomorrow and therefore in their societies and the development of their nations.

Conclusion

Being analogue countries, the way design subjects are taught in India and Mexico is similar. Also, the design scene in both countries has been growing exponentially in the last years; however, a correct direction on the way we educate our future designers is important because we shall find the best way to design according to our complex socio-economic and geographical context; respecting and preserving our traditions and rich heritages, but without compromising the quality of our products nor by trying to imitate what nations with more developed economies are doing; the objective is to continue the development of our nations taking the education of future designers and good design as one of the ways of accomplishing such complex tasks.

Finally, it is worth mentioning that the results generated with this research, do not intend to serve merely as a statistical study or unquestionable answers to an extremely complex topic; but instead, aim to serve as a starting point for discussion and reflection for designers and educators not only from India and Mexico but potentially to others from countries with similar characteristics; contributing in this way to the generation of a positive change in the education of object designers of the future.

References

- ACreswell, J. W., Klassen, A. C., Plano, V. L. y Smith, K. C. (2011). Best practices for mixed methods research in the health sciences. Bethesda (Maryland): National Institutes of Health, 2013, 541-545. Retrieved from: https://www.researchgate.net/profile/Maria_Sandin-Vazquez/post/Do_I_need_a_specific_qualitative_strategy_in_a_mixed_methods_study2/attachment/59d622f4c49f478072e992b6/AS:272120645390336@1441890025144/download/Best_Practices_for_Mixed_Methods_Research.pdf

- Vallone, B. (2010). La educación comparada y sus desafíos. Reflexión Académica en Diseño y Comunicación. XVII Jornadas de Reflexión Académica en Diseño y Comunicación, 182-185. Retrieved from: https://fido.palermo.edu/servicios_dyc/publicacionesdc/archivos/128_libro.pdf

Appendices

Appendix A

	Objective	Methodology	Techniques and instruments to gather information
Pre-descriptive phase	Estabishment of the theoretical and conceptual basis to address the problem from which the research originated	Literature review	Drafting the problem statement, justification, objectives and theoretical framework
Descriptive phase	Collection and presentation of the data collected keeping in mind not only the aspects inherent in education but also the contextual data	Data collection from a mixed perspective (Qualitative and quantitative)	• Continuous literature review • Interviews • Observation • Serveys • Use of digital media for data collection
Interpretive phase	Conversion of data into information emphasizing data inherent in education, but at the same time taking the contect from a neutral and critical approach	Data collection from a mixed perspective (Qualitative and quantitative)	Analysis, classification, interpretation and documentation of the data collected
Juxtaposition phase	Confrontation of the data previously described and interpreted	Parallel and mixed comparison (Qualitative and quantitative) of all data collection	• Comparison tables • Graphics
Comparative phase	Synthesis and cohesion to unify the findings	Information integration	• Comparison tables • Graphics
Prospective phase	Locate and highlight the possible course that can be taken in the teaching-learning processes of object design	Data collection from a mixed perspective (Qualitative and quantitative)	• Analysis and final reflection (Global review of information and introspection) • Writing and documentation

Sequence of the phases in the comparative education methodology.
Source: Own elaboration based on Vallone descriptions (2010).

Students' perception on different aspects related to their HEIs.
Source: Own elaboration (2019).

Students' self-evaluation about their design skills and knowledge.
Source: Own elaboration (2019).

Theme 3

Human Approach to Digital Media

The industrial revolution has provided us with powerful tools, which forged the next revolution – the digital revolution. Digital technologies have radically transformed the way we live, learn, work and play. The traditional methods of education have been fundamentally altered by the ease of access and versatility of digital media. However, vouching for the progress of technology without understanding the human element acts as a barrier to learning. Design offers a wide range of tools and ways of thinking that can humanize digital media for education. Some of the challenges being faced by developing countries in the field of education range from easy access to knowledge, clarity in fundamental knowledge, reducing the academia-industry skill gap and learning how to solve real-world challenges through design and innovation. Design acts as an important way of thinking about complexity as the nature of these challenges is interdisciplinary.

Title:
Information arrangement in augmented reality walking navigation interface based on capacity theory of attention: To facilitate decision making

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Background information

As walking navigation systems develop rapidly, travelers are accustomed to use the navigation systems to explore novel environment. During the journey, the travelers' attention is distracted in way-finding process, and their observation on environment is also reduced. The previous research shows that users tend to change walking direction while using smart phones. In addition, the users wouldn't notice the emergencies and strange events on the way. (Hyman, Boss, Wise, McKenzie, & Caggiano, 2010) The increasing amount of intersections is related to the increasing amount of pedestrian traffic accidents (Miranda-Moreno, Morency, & El-Geneidy, 2011). It is important to pay attention to the things happening around you during the journey, such as traffic lights, vehicles and other factors beyond control. Moreover, noise and congestion will reduce the memory of the spatial. The noise in the journey is uncontrollable, and the environment distracts the user's attention; thus, the design of walking navigation needs to reduce identification time and to remove the distracting parameters on the interface. Therefore, the users will have more attention to observe the surroundings, and enjoy a safe and rich journey.

Research purposes

The study designs the walking navigation by means of Augmented Reality (AR) features, including changing the existing operating mode, navigation and orientation support, natural engagement, interaction should approach the user's expectation of interaction in the real world as far as possible, compatibility with the user's task and domain and natural expression of action (Sutcliffe & Gault, 2004). The Augmented Reality overcomes the confusion of spatial compatibility. Compared with 2D map and traditional map, the AR system can reduce the time of way finding. In addition, it can also reduce the travel distance and achieve higher system availability in the novel environment (Diao & Shih, 2018).

The behavior that the travelers choose the information they need in way finding is related to selective attention in the decision making process.

The travelers need to pay attention to the smart phones, pedestrian, driver, vehicle, traffic light, road geometrical, and environment, which distract the attention. However, these diverse factors cause the capacity of attention overloaded. Furthermore, attention is part of cognitive resources, and these cognitive resources are not infinite (Chun & Wolfe, 2001). The attention resources will be exhausted rapidly and performance will be weak. Selective attention is focused on monitoring several information channels to perform a single task (Millard-Ball & Schipper, 2011; Tversky & Kahneman, 1973). The research found that the load pressure is more influential than the speed pressure (Goldstein & Dorfman, 1978). It is important that the walking navigation can quickly process information on the smart phones and find the right direction. Therefore, the design must reduce the stress of the attention and reduce the information channels.

Way finding contextual inquiry

Humans rely on way-finding strategy in the way finding process. The strategy includes orientation way finding strategy and route way finding strategy. With the orientation way finding strategy, users have to use self-ability for orientation. Moreover, the users can organize the route trail of the way finding in mind. With the route way finding strategy, the users will use landmarks and buildings as a reference for way finding. Landmarks will be used as markers to link landmarks and landmarks into a route trail. Furthermore, foreign travelers prefer actual observable landmarks such as train stations, name of major road, tourist information and street names. In human way finding methods, direction identification and alignment are the most important factors (Arthur & Passini, 1992; Jiang, Liu, Zhang & Li, 2018). The study combines the way finding strategies with the contextual inquiry of the way finding process so as to obtain the parameters.

The study used the contextual inquiry to observe the user's behavior of operating the walking navigation. The process started from a specific spot, and the participants navigated to nearby restaurants via Google Maps; moreover, the process took 15 minutes, and the four participants were interviewed and recorded via semi-structured interview. The research obtained the parameters, which were vital to the subjects, and the interview questions were as follows:

1. Which information did you check at the intersection, distance, time, direction or others?
2. How did you identify the direction of route?
3. Did you identify the route by marks or by the number of turning points?
4. Did you hear the notification sounds? Which parts impressed you the most?
5. Which were easy to identify on the map? Which were hard to identify?

The result shows that the participants with path strategy are likely to stare at the phone screens, and that the users with overview strategy find the destination with relative position, no matter following the assigned routes. Both of the participants navigate with visual information. With the different strategies, every subject checks the direction of destination on the mobile again at the intersection, and according to the interview and observation, the four users refer to the roads names and attractions, and pay attention to the vehicles and traffic lights.

Table 1. The observations are as follows:

Wayfinding strategy	Use behavior	Viewing information
Route wayfinding strategy	Switching to the head-up function, the orientation of the indicator on Google Maps will follow the orientation of the user's smart phone.	• Location information • Landmark information
Orientation wayfinding strategy	Users don't use the navigation system. They check the map, and turn the destination to the top of the screen. They find the destination with their own ability.	• Location information • Route name information • Landmark information

Fig. 1 - During the contextual inquiry, the participant used the mobile at the intersection.

Walking navigation interface design

The walking navigation interface is designed by the focus group. The information channels are reduced on the smart phone display. Moreover, the prototypes are created by 3D engine Unity platform. In selective attention, the design principles include designing less information channels and providing relatively important information for each channel. Moreover, if the display needs to be scanned, configure them to reduce the scanning range (Sanders & McCormick, 1993), and the use of visual psychology of grouping rules depends on configuration, including the principle of proximity and the principle of connectedness (Chen Yiping, 2011; Haberlandt, 1997; Lin Mei Chun, 2014). The study uses those as the visual criteria for interface design. Furthermore, the interface design includes the results of the last stage, so there are road name information and direction information displaying on the interface. The research applies the selective attention design principle, visual grouping rules and display research to conduct the focus group.

The colour of the screen in the smart phone interface does not use high contrast colours and high saturation colours (Levie & Dickie, 1973). In addition, the reading rate of black words on white background is the best regardless of Mandarin and English (Dobres, Chahine, Reimer, Gould, & Zhao, 2016). And the colour arrangement needs to concern with the relationship between contrast and the complementary colour. If the complementary colour is not suitable, it will easily cause the user's visual fatigue and injury (Snyder, 1988). The use of the text above is most easily identified by He black characters in Mandarin (Chi, Cai, & You, 2003), and the focus group uses the He black characters and the blue of the similar sky as indicators, and the black words on white background as the landmark design which is the most appropriate combination (Lee, Chang, & Wang, 2009).

Fig. 2 - The discussion on interface design of focus group

Prototype design and verification

The AR prototypes are designed by the Unity game engine and Vuforia Augmented reality development tools. Vuforia is a functional AR platform that provides text recognition, cloud recognition, multi-targets, frame markers, video playback and image recognition. The study uploads the image to the cloud, and uses image recognition to simulate the AR walking navigation prototype. Moreover, this prototype was tested at a cross-junction, incorporating subjective assessment and the NASA-TLX (Hart & Staveland, 1988) scale into our research criterion. The research focused on assessing the speed at identifying the direction, reduction of time spent looking at mobile phone screens, use of mobile phone to look at prominent markers in the surrounding, reduction of the visual load during use, and confidence in navigation.

The assessment indicators include that if the users can identify direction easily, if they spend less time looking at mobile phone screens, and if they feel confident in navigation. The mean of design A is the highest. In addition, the mean of design C is the highest in the use of mobile phone to look at prominent markers in the surrounding. The design E has the lowest mean. However, the reduction of time spent looking at mobile phone screens and reduction of the visual load during use are less significant. The inference should enhance the design of viewing the surrounding area and increase the number of samples.

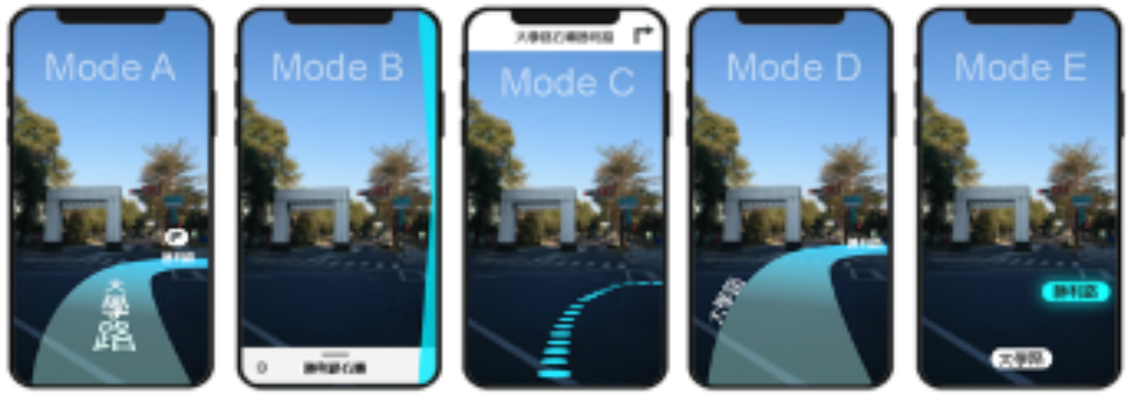

Fig. 3 - Mode A, Mode B, Mode C, Mode D and Mode E (from the left to the right)

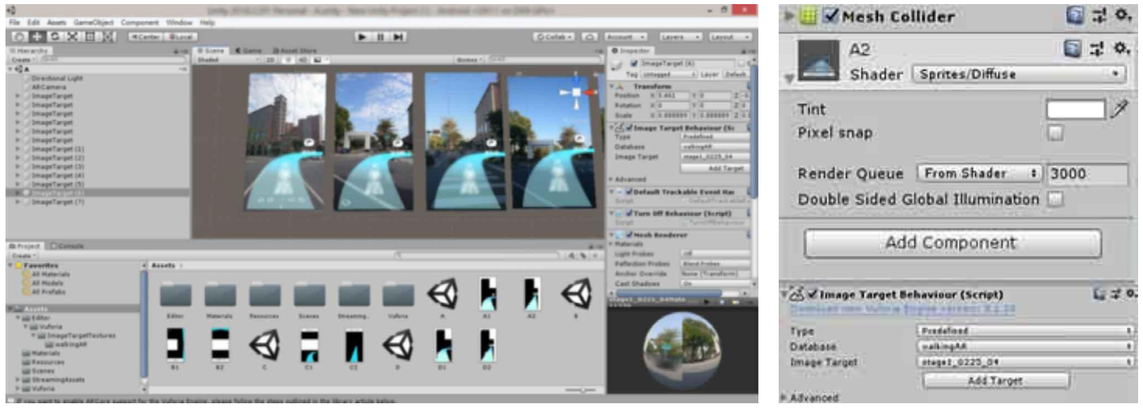

Fig 4 - Unity platform prototyping

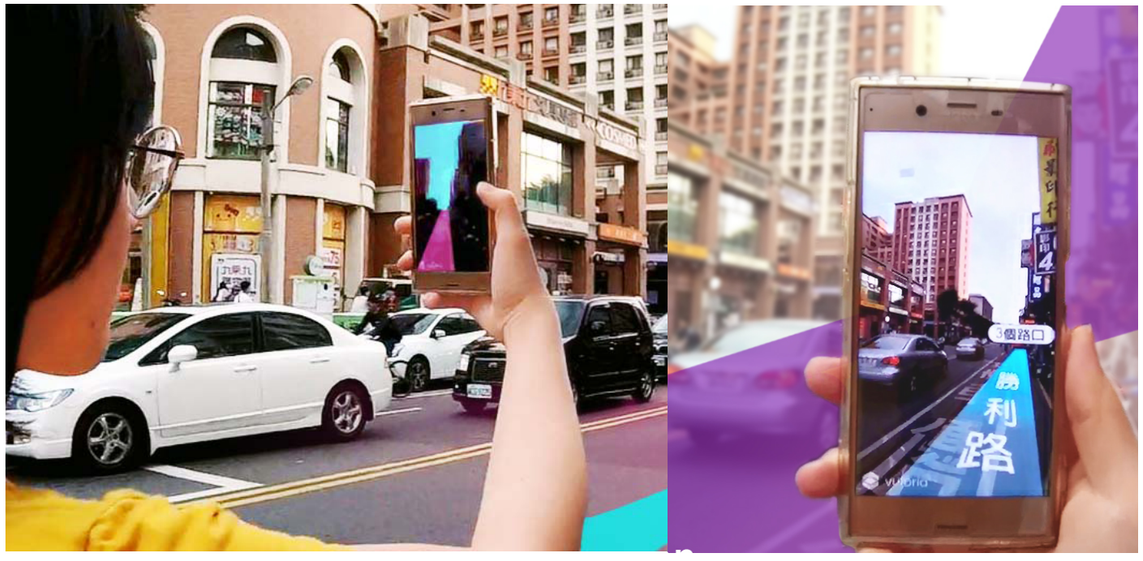

Fig. 5 - The first stage of AR prototype testing

Conclusions and recommendations for future

Based on the walking navigation, the study explores the walking navigation operation mode and obtains the operation behaviour of the users at the intersection. Moreover, with the orientation wayfinding strategy and the route wayfinding strategy, the users identify the route by the road name, direction and attraction. After obtaining the parameters of the wayfinding information, the focus group discuss the AR interface design. The AR interface prototype is created by Unity Platform and Vuforia.

Finally, the design of the visual psychology is conducted, and the design integrates the information so as to boost identification speed, reduce viewing time and increase users' confidence in way-finding. In the future, the design of AR technology can be corrected and executed by Unity. The AR interface is considered to enhance the effect of viewing the surrounding area and reduce excessive index design. For example, visual load can be reduced with different colour and cue reminder design. Thus, the future walking navigation are expected to reduce cognitive load and risk of real intersection.

References

- Arthur, P., &Passini, R. (1992). Wayfinding: people, signs, and architecture.
- Chen Yiping. (2011). [Visual psychology].
- Chi, C.-F., Cai, D., &You, M. (2003). Applying image descriptors to the assessment of legibility in Chinese characters. Ergonomics, 46(8), 825–841.
- Chun, M. M., &Wolfe, J. M. (2001). Chapter nine visual attention.
- Diao, P.-H., &Shih, N.-J. (2018). MARINS: A Mobile Smartphone AR System for Pathfinding in a Dark Environment. Sensors, 18(10), 3442.
- Dobres, J., Chahine, N., Reimer, B., Gould, D., &Zhao, N. (2016). The effects of Chinese typeface design, stroke weight, and contrast polarity on glance based legibility. Displays. https://doi.org/10.1016/j.displa.2015.12.001
- Goldstein, I. L., &Dorfman, P. W. (1978). Speed and load stress as determinants of performance in a time sharing task. Human Factors, 20(5), 603–609.
- Haberlandt, K. (1997). Cognitive psychology. Allyn & Bacon.
- Hart, S. G., &Staveland, L. E. (1988). Development of NASA-TLX (Task Load Index): Results of empirical and theoretical research. In Advances in psychology (Vol. 52, pp. 139–183). Elsevier.
- Hyman, I. E., Boss, S. M., Wise, B. M., McKenzie, K. E., &Caggiano, J. M. (2010). Did you see the unicycling clown? Inattentional blindness while walking and talking on a cell phone. Applied Cognitive Psychology. https://doi.org/10.1002/acp.1638
- Jiang, L., Liu, Z., Zhang, G., &Li, Z. (2018). The Development of A Potential Head-Up Display Interface Graphic Visual Design Framework for Driving Safety by Consuming Less Cognitive Resource of Driver. In Journal of Physics: Conference Series (Vol. 1098, p. 12006). IOP Publishing.
- Lee, C. S., Chang, Y. C., &Wang, M. H. (2009). Ontological recommendation multi-agent for Tainan City travel. Expert Systems with Applications, 36(3 PART 2), 6740–6753. https://doi.org/10.1016/j.eswa.2008.08.016
- Levie, W. H., &Dickie, K. E. (1973). The analysis and application of media. Second Handbook of Research on Teaching, 858–882.
- Lin Mei Chun, L. S. H. (2014). A study on the Covers of "Industry and Information Technology" Magazine, using grouping principle. JOURNAL OF CAGST, 411–431. https://doi.org/10.30153/JCAGST
- Millard-Ball, A., &Schipper, L. (2011). Are we reaching peak travel? trends in passenger transport in eight industrialized countries. Transport Reviews, 31(3), 357–378. https://doi.org/10.1080/01441647.2010.518291
- Miranda-Moreno, L. F., Morency, P., &El-Geneidy, A. M. (2011). The link between built environment, pedestrian activity and pedestrian–vehicle collision occurrence at signalized intersections. Accident Analysis & Prevention, 43(5), 1624–1634.
- Sanders, M. S., &McCormick, E. J. (1993). Human factors in engineering and design.
- Snyder, H. L. (1988). Image quality. In Handbook of human-computer interaction (pp. 437–474). Elsevier.
- Sutcliffe, A., &Gault, B. (2004). Heuristic evaluation of virtual reality applications. Interacting with Computers, 16(4), 831–849.
- Tversky, A., &Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. Cognitive Psychology, 5(2), 207–232. https://doi.org/10.1016/0010-0285(73)90033-9

Title:
Netnography as a strategy of knowledge management in the design process

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Abstract

The following article demonstrates the implementation of a knowledge management strategy within the stage of collection and analysis of information in the design process. The objective was to experiment with netnography to determine its relevance and applicability during this process. Social media is being used as a source of information in every creative field nowadays. This information has high relevance in the collection and analysis processes during designing. Experiment validation was carried out during the development of the degree project "Design of a sports footwear collection inspired by the 'Bogotanidad'" (Cortés, 2019). It consisted of collecting, comparing and analyzing social media information (opinions, images, videos) about Bogotá with specialized software. Results were obtained as design concepts and used as a source of inspiration throughout the collection. In conclusion, a methodology created for the analysis of social network information is obtained, as an approximation to the application of netnography into the design process.

Keywords: netnography, industrial design, knowledge management, design methodology, social media analysis.

Introduction

As a procedure of analyzing and understanding communities and users on the Internet, netnography has been constantly growing, becoming an increasingly everyday element in the practical life of society (García et al., 2009; cited in Caliandro, 2018, p. 552). Therefore, it is impossible to avoid when conducting a community investigation.

Different concepts, methods, and practices have emerged within netnography that seize the versatility of social networks to establish more contemporary research parameters. It represents an opportunity to strengthen netnography as a present research method since, lacking formulas for its execution, experiments consolidate it as a methodology for studying the digital world. (Hine, 2000).

In the Colombian context, there's a lack of experimentation and information about the use of netnography in design fields. It is there where an opportunity for implementation and research in this practice emerges. Globally, into the study of virtual worlds, some projects have been created previously to this experimentation as "Selfiecity" (Manovich, 2014), "Taipei Phototime" (Manovich, 2014) and "DensityDesign" (Politecnico di Milano).

Methodology

A series of stages were established based on the needs of the project:

Creation of 'Virtual Bogotanity'
'Bogotanidad' as a concept is understood as the concepts, forms and other elements about the city of Bogotá synthesized in the document: 'BUILDACITY: Concept application brochure of Bogotanity's syntaxis' (Garzón, 2018).

Different qualitative researches were made to gather information about opinions that people reflected in three social networks (Facebook, Instagram, and Twitter). Two information groups were established to analyze: images and opinions. The image searches were made on Facebook and Instagram, focused on the comparison and verification of the colour palette and textures of the concepts of "Buildacity". For its part, the concepts and opinions searches were made on Twitter.

Facebook's data gathering
Image search is made using different equations of keywords/hashtags. The most proper keywords were selected due to their relevance and the possibility of finding relevant results. The selected ones were: "Bogotá", "#FotosBogotá", "#Bogotá", among others.

Facebook's search filters are used, like the tagged place, date, type of post (location, photos, videos). The results weren't as expected, therefore another search strategy had to be implemented. Thus, were created different posts in groups which could provide the research with images. For example, the group called: Bogota Street Photography (Likes: 68 610). It is created the project photo base and as a result, 2886 images are obtained from Facebook.

Instagram's data gathering
Begins with accounts dedicated to sharing photos of Bogotá such as Bogotá Street Art, Bogotá Street Photography, Bogotaneando, Bogotart, Cívico Bogotá, Fotos Bogotanas, Instagramers Bogotá, Lo mejor de Bogotá, I love Bogotá.

Following the selection of accounts that are more relevant for the project, photo search is carried out using combinations of different keyword/hashtags equations: #Bogotá, #FotosBogotá, #BogotáPhotography, #Bogotagrafias.

Some are discarded because they weren't concerned with the city (products, people, advertising). In this search, 24 217 images are obtained and selected to be processed.

Twitter's data gathering
Twitter has an advanced search tool that was useful to accomplish the search with proper and significant results. For this, search dates are established for tweets, in this case, two months (05/08/18 – 05/10/18). A configuration of hashtags and keyword equations is defined to find tweets that denote the concepts that were being sought, such as #BogotáSuenaA, #TeAmoBogotá, #TeodioBogota, Bogotá Climate, Bogotá Textures, 'the best of Bogotá', 'the worst of Bogotá', among others.

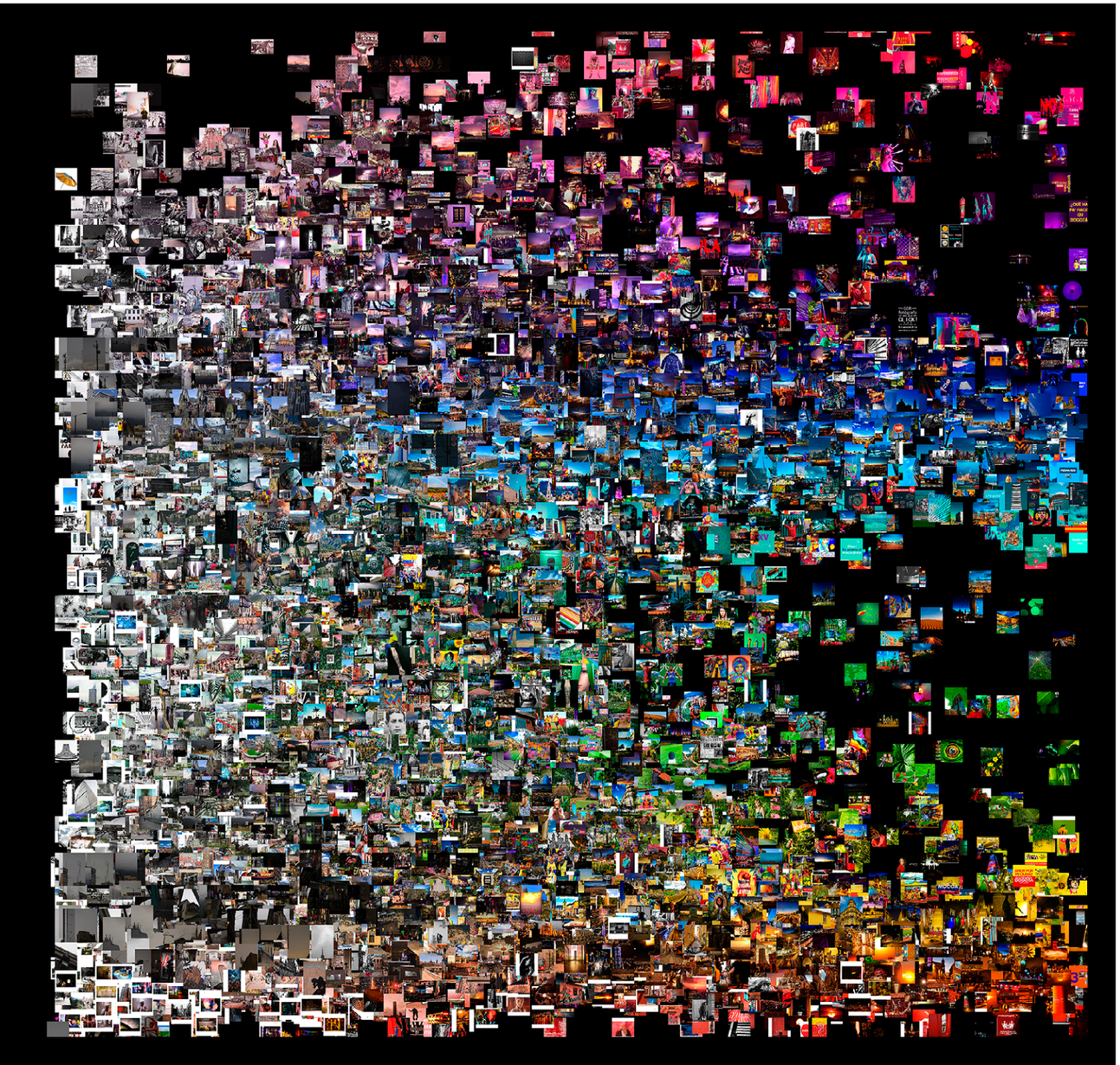
The same process is performed as on Instagram to discard some hashtags due to numerous photographs that weren't concerned with the city (products, people, advertising), or the small number of related tweets. Data collected, in this case, was different because of its type (texts instead of images) and the procedure to analyze it is with qualitative analysis software (NVivo in this instance).

Processing and analysis of data collected: images

To analyze the photo base, the 27 103 collected images are taken and introduced into ImageJ software through ImagePlot plugin (developed by Lev Manovich and his Cultural Analytics Lab). This plugin maps several numbers of images according to different criteria of distribution as median saturation, hue, and brightness. See Figure 1.

Thus, an image with the 27 103 photos organized by median saturation and hue is obtained. This image is made to facilitate the making of the colour palette. The mentioned palette is achieved by doing an abstraction of the final image to get a 16 colour palette.

Fig. 1 - Image obtained from netnographic analysis of more than 27 000 images related to Bogotá, drawn from social media.



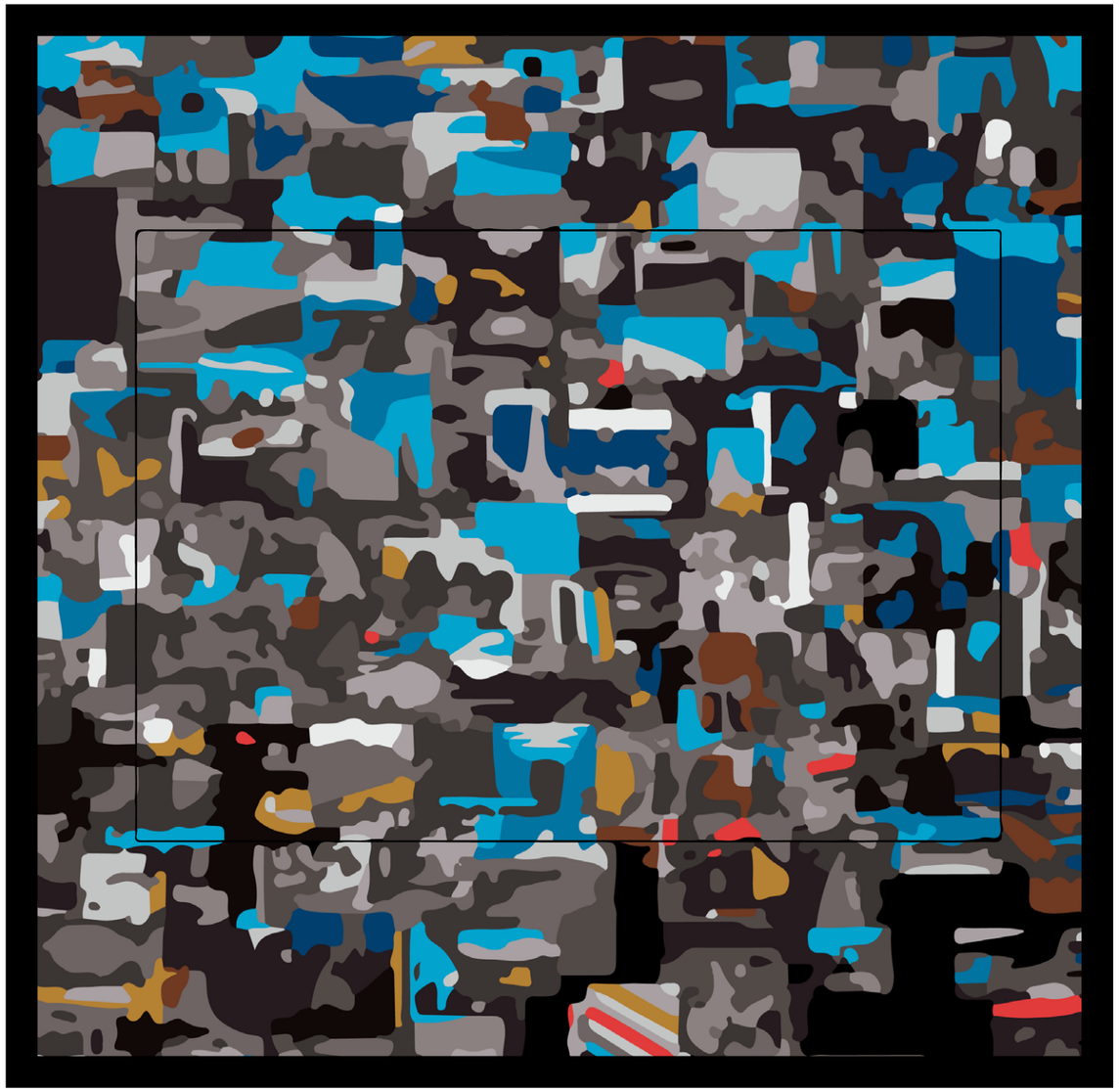


Fig. 2 - Section of the abstraction made to the final image (Fig. 1), to obtain Bogotá's colour palette according to social media.

Processing and analysis of data collected: concepts

In this stage, qualitative analysis software NVivo is used. It determines the frequency of each word within documents uploaded to the software. Hereby, is achieved a hierarchical image with all the different words that were more frequent in the gathered tweets.

Ambiguous, vague, plurals and repetitive words are discarded, and potential words are selected to become concepts. See Figure 3.

Fig. 3 - Final hierarchical image.

Results

Virtual Bogotanidad is shown through different mood boards and infographics that contain all key elements obtained from the experimental methodology developed during this project. All these elements were translated to design concepts according to the 'guide of product analysis and evaluation' (Leal & Charum, 2008).

Subsequently, they were verified and compared with 'Buildacity' to obtain a 'nourished Bogotanidad' from analogic and digital sources. These documents approximate a knowledge management model within the design process.

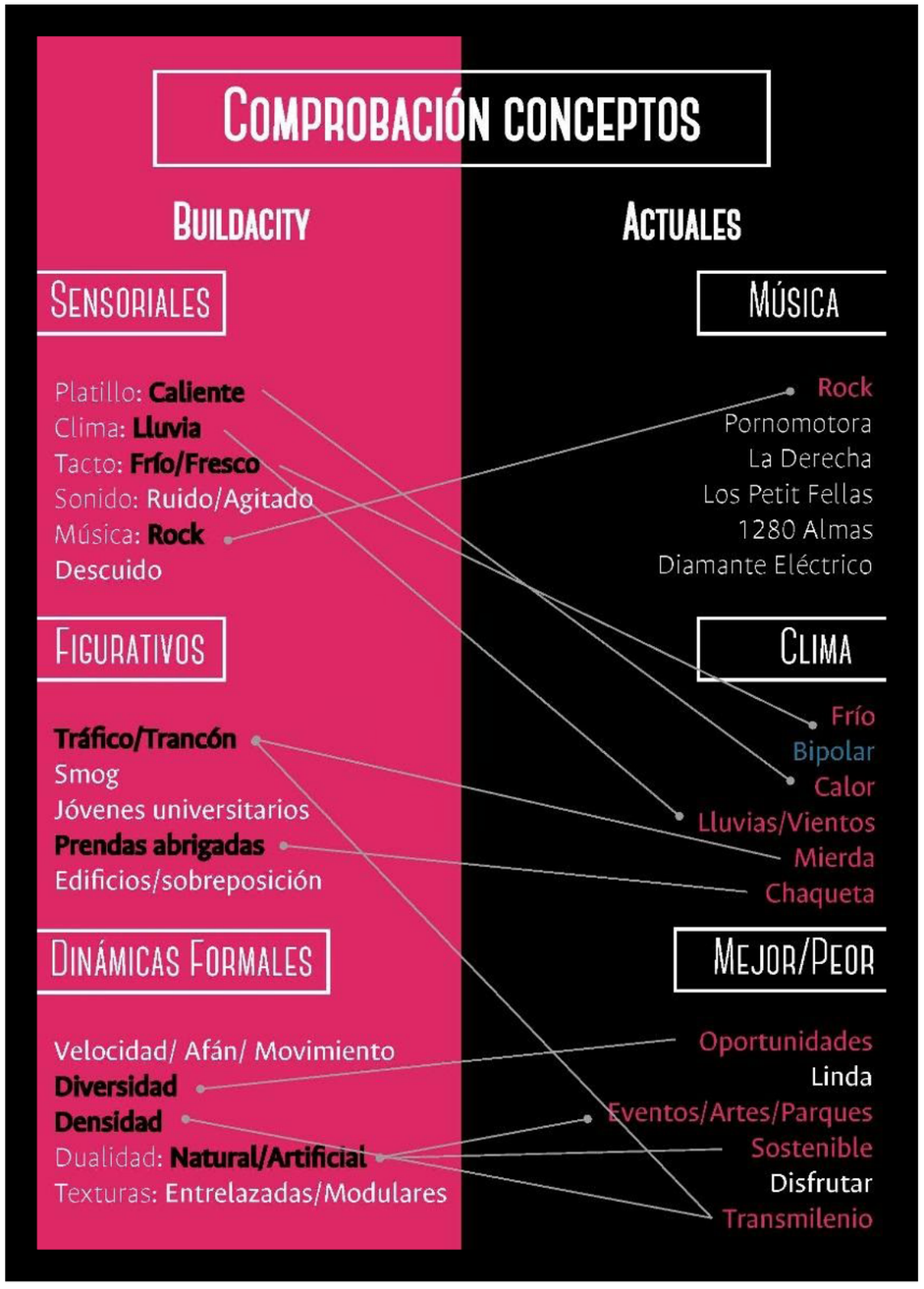


Fig. 4 - Concept comparison infographic.

Fig. 5 - Concept verification mood board.

Discussion

Applicability in the design process happens as a correct translation in design concepts is made with the information obtained. The ability to translate expressions like 'heavy traffic' into 'coincidence' as formal intersection (Leal & Charum, 2008) it is how an industrial designer can find viability and support factor in netnography as a relevant methodology.

Based on the information analysis made with the methods and software used within this experimentation, it can generate interest in trends of information representation and communication, as shown in 'information is beautiful' (McCandless, 2009). This trend in Latin America is still unexplored and without enough investigation and experimentation yet. The art and design processes, being emphatically creative, possess all the qualities of reception and adaptation to new strategies of analysis.

Regarding methodology, several observations arise: 1) a different process to synthesize colours of photos is proposed: ImagePlot plugin exports an Excel sheet with all data of every image that is analyzed at the software execution moment (brightness, saturation, and hue). The use of quartiles is suggested using the data from the resulting sheet. Colour selection could be made based on those results.

Next observation: 2) experimentation with different websites that can provide more valuable information in the design process. Flickr is suggested as an alternative social network and the use of specialized blogs depending on the type of information sought. Following the line of the degree project, specialized forums on city photography are recommended, such as SkyscraperCity, TrekEarth. Also, travel and tourism forums, to extract information regarding people's opinions and concepts about cities; like TripAdvisor.

Besides, new methods for obtaining information on social networks are suggested: 3) experiment with web scraping techniques. An outstanding method for collecting large amounts of information. (Awangga, Pane and Astuti, 2019, p. 276). Consequently, a recommendation is made: several digital marketing tools and extensions exist for searching hashtags in various social networks. Some of these are Leetags, Hashtagify.

One of the main obstacles during the realization of the project was to find a way to detect textures that were repetitively appearing during the analysis of the images: 4) use or adapt texture analysis software to this process. It can be LaboTex, MaZda, LifeX, among others.

This methodology and netnography can be extremely useful methods to get an improved design concept and a better user profile characterization within the design process. It has been a remarkable step in the way of humanizing social media towards design in Latin America.

References

- Awangga, R. M., Pane, S. F., & Astuti, R. D. (2019). Implementation of web scraping on GitHub task monitoring system. Telkomnika, 17, 275-281.
- Caliandro, A. (2018). Digital Methods for Ethnography: Analytical Concepts for Ethnographers Exploring Social Media Environments. Journal of Contemporary Ethnography., 47, 551-578.
- Cortés, C. (2019). Diseño de una colección de calzado deportivo inspirada en la 'Bogotanidad'. (Unpublished bachelor thesis). Universidad Nacional de Colombia, Bogotá.
- Garzón, A. (2018). Buildacity: Brochure de aplicación de conceptos de Sintaxis de la Bogotanidad.. Unpublished manuscript. Universidad Nacional de Colombia, Bogotá.
- Garzón, A. (2018). Caracterización de los elementos que definen la identidad bogotana contemporánea, para su aplicación en el proceso de inspiración y conceptualización del diseño. 1-28. Unpublished manuscript. Universidad Nacional de Colombia, Bogotá.
- Garzón, A. (2018). Diseño de accesorios de lujo, inspirados en la identidad cultural Bogotana contemporánea, para incentivar la apropiación sociocultural y el valor estético como parte de la necesidad de autorrealización del sujeto. (Unpublished bachelor thesis). Universidad Nacional de Colombia, Bogotá.
- Hine, C. (2004). Virtual Ethnography. UOC Editorial.
- Leal, J., & Charum, G. (2008). Guía de análisis y evaluación de producto. Unpublished manuscript. Universidad Autónoma de Colombia. Bogotá.
- Manovich, L. (2019, Jan 30). About: Cultural Analytics Lab. Obtenido de Cultural Analytics Lab: http://lab.culturalanalytics.info/p/about.html
- Manovich, L. (2019, May 16). Projects: Selfiecity. Retrieved from Cultural Analytics Lab Web site: http://manovich.net/index.php/exhibitions/selfiecity
- Manovich, L. (2019, May 16). Projects: Taipei Phototime. Retrieved from Cultural Analytics Lab Web site: http://manovich.net/index.php/exhibitions/taipei-phototime
- McCandless, D. (2009). Information is Beautiful. HarperCollins Publishers.

Title:
Photographs: A visual research method tool in design process

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Introduction

Visual records (paintings, sketches, sculptures) are accepted as pieces of evidence to procure information since ancient times. Photographs, as domineering parts of visual culture, have become a quick mode of communication (Sontag, 2001); (Van Dijck, 2008) which is replacing textual narration (Stephens, 1998); (Mitchell, 2005). In today's world of digital technology (Lacerda, 2008), the invention of cameras and smartphones has brought significant revolution. The modes of information acquisition have expanded from traditional forms (television, newspaper, and magazine) to social media platforms. Currently, millions of images are being uploaded and shared every day through social media (Kaya & Bicen, 2016).

Every photograph aims to communicate something to the viewer (Lester, 2006). Hence, photos have the analytical ability to find and solve design problems (Goldschmidt & Smolkov, 2006). Design is a broad concept, and its classification may differ from one field to another. Design research (DR) involves design thinking which helps in generating new ideas to solve problems (Dugger Jr, 2001); (Razzouk & Shute, 2012). In 1980, at a conference of DR Society, Bruce Archer, a British Professor of DR described it as a 'systematic inquiry' (Bayazit, 2004); (Margolis & Pauwels, 2011) of man-made things and system. Since photographs are strong message conveyers, it can express fundamental human values such as emotions, beliefs, traditions, and knowledge (Barrett, 1986); (Ismail, Isa, & Azahari, 2010) which may contribute to DR methodologies.
Over the past century, photographs were used as data collection methods in social sciences research, commonly as a part of visual sociology, visual ethnography and visual anthropology (Collier & Collier, 1986); (Petersen & Østergaard, 2003); (Schulze, 2007); (Banks & Zeitlyn, 2015). However, there is a lack of study on the effectiveness of the photographs in DR and development. Therefore, this paper explores the potential of pictures as a research instrument in the DR methodology. (Yamada-Rice, Stirling, Procter, & Almansour, 2015).

Methodology

Bayazit (2004) explains that DR is associated with how designers work, think, and address a design problem. The author indicates that DR articulates the outcomes of a design process. It also aims to determine the meaning by systematic exploration and knowledge acquisition connected to design and design activity (Margolis & Pauwels, 2011). This experimental study follows the first two of the three stages (inspiration, ideation, and implementation) of human-centered DR methodology of IDEO (2011) (Figure 1).

The objective of this research was to study and identify the prospective of photographs in the initial DR process. This research also explored how differently individuals analyzed textual and imagery design briefs and came up with design solutions.

Sample
A total of 32 design practitioners participated in this study. 65% of the participants were design students, 25% of the participants were design researchers, and 10% were design professionals with a minimum of 5 years of experience.

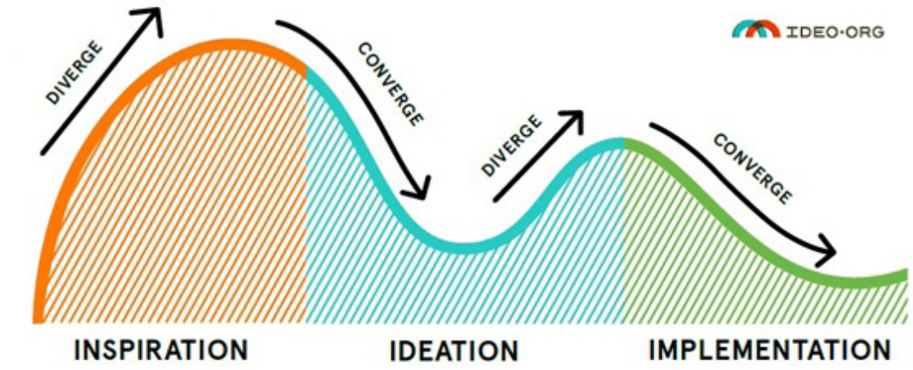

Fig. 1 - The 3 stages of human-centered design: Inspiration, ideation, implementation and how they change (diverge/converge) over time (Brown & Wyatt, 2010)

Data collection
To analyze the potential and effectiveness of photographs in DR method, a design problem was prepared. The task was divided into two segments of one hour each, followed by 15-minute semi-structured interview. The respondents were divided into eight groups of four individuals. Both segments aimed to improve human behaviors at Telangana State Road Transportation (TSRT) bus stations. The design problem statement was provided to implement primary phase DR for both tasks. In task 1, participants were given a textual description as "design intervention to alter behavior of people using TSRT bus stations." Task 2 applied photo-elicitation as a tool of visual research method where related photographs (Figure: 6-7) were displayed as reference along with the textual statement. Photographs were captured during both the tasks and the discussions among the group members were audio recorded. Figure 2-5 illustrate the images captured during the functions. Primary design ideation activity was followed by individual semi-structured interviews. The data collected through interviews were recorded and transcribed.

Data analysis
The observations captured through photographs and audio recordings of the discussion were analyzed with the perspective of comprehension of the design problem. Observational outcomes from both the tasks were thoroughly examined to accomplish the objective of the study. The study also looked into possible domains where photography may help as a visual aid in the design development process (Margolis & Pauwels, 2011).

Fig 2-5: Sample pictures used during photo-elicitation

Findings

Task I (Textual)
In Task I, textual problem statement concerning TSRT bus stations were provided to the groups of participants. They were asked to recognize the problems and to come up with possible solutions to alter human behavior.

Although the respondents were accustomed to bus services many times, it was difficult for them to imagine the whole scenario with the textual description. The participants addressed the problem as a user and analyzed their personal experiences.

"In our group, all members belong to different states of India and everyone shared their bus journeys and issues related to it. We can only imagine the situations that we have experienced. It was difficult at times for other members of the group to share and express the views. At the same time inexperienced person to visualize it".

The respondents mentioned that the focus was more about their personal journeys only as a commuter and influenced by their cultural background.

"I never imagined that there could be issues specifically related to women travelers. At my hometown, women are not treated differently than men."

Overall, the participants found it challenging to recollect all the details from their experience. Respondents had to rely on their past experiences to come up with ideas.

Task II (Photo elicitation)
In Task II, photographs of bus stations for TSRT were projected to the groups of participants. They were then asked to identify the concerns and to list down possible solutions to improve human interactions.

The following are the inferences made by the particiapants regarding the benefits of photography:

(i) The respondents indicated that the images of the bus stations gave them a perspective of a third person in the situation. Images that covered wide area, provided glimpses of various aspects of a bus station. The respondents were evaluating details not only as a traveler but also from multiple people engaged in other activities such as bus drivers.

"When we see the picture we look at it as a third person. Without the photographs, it mostly starts with the user journey. In any place, the scenes are dynamic still the photographs captures everything, this can be refered to later. "

(ii) The respondents expressed that the previous task (without photograph) was majorly influenced by their cultural background but in Task II (with photograph) the particpants were engaged in observing minute details:

"In textual context we were unable to look into the experiences of the user. But with photographs we were able to see each experience such as the discomfort in women's eyes was evident in the photo and that helped us think about what they may be facing."

(iii) They considered the issues related to the area where bus drivers have their meal. During textual task, this thought did not appear in their mind.

"As bus drivers have major role in providing bus services at the bus station, they should have proper place to eat and relax. The previous task no one in our group discussed this issue; however, the images helped us to look into the problem also."

(iv) The participants also suggested that using photographs can provide the design team with resources and reduced barriers in accessing the site by providing a visual aid to the deisgn process.

"In a group activity, if the team members are not present, photographs can help in brainstorming and discussions rather than being on site"

This suggested that photo elicitation method was more engaging, and there were more in-depth discussions among the group members about the problem in various dimensions which was not observed before. Apart from recalling their experiences at the bus station, the respondents referred to the images that helped them in analyzing the situation better.

Fig. 6-7: Photographs of participants captured during the design process

Discussion & conclusion

Problem identification in DR typically requires field trips (Cousin, 2005). However, in a lot of cases, designers get only verbal or textual briefs to understand a situation or design problem. Being physically present in the field is the best possible option to analyze problems, lack of time, and resources call for alternatives. This study explored textual and photo-elicitation methods to understand the next best alternative to understand design problem. It was observed that participants who had a knack of sketching were more influenced by image descriptions. In textual statement, the focus was limited to the bus and the commuter, whereas some other essential aspects such as surroundings, traffic, climate, facilities at bus station which also add to human behavior were missing.

Outcomes suggest that even if a place is visited, the visitors tend to miss the minute details, such as facial expressions. Also, during a field visit, visual sight is dynamic in nature. Hence, it often gets difficult to register details of a particular situation. In this case, photographs give minute details. Also, it provided them freedom to easily reexamine time and again. The task-based on textual description suggested that human interaction and observation are important to make any judgment for further process.

Hence, the primary requirement is to be present at the site physically to acquire real-life experience. While photographs helped the respondents to understand the design problems better, limitations and concerns associated with photo-elicitation method were also observed.

The study found that photographs can also be highly misinterpreted. Along with visuals, getting some touch and feel of the object/place will help get better perception of the scenario. It will also benefit if some recorded verbal communication with the images captured. This study concludes that the photographs alone are not sufficient. Along with the static images, other references (audio-visual) should be used while analyzing a design problem. Photographs can be further used in human-centric domains (product design and system design as a research instrument).

References

- Banks, M., & Zeitlyn, D. (2015). Visual methods in social research. Sage.
- Barrett, T. (1986). A conceptual framework for understanding photographs. Visual Arts Research, 68–77.
- Bayazit, N. (2004). Investigating design: A review of forty years of design research. Design Issues, 20(1), 16–29.
- Collier, J., & Collier, M. (1986). Visual anthropology: Photography as a research method. UNM Press.
- Cousin, G. (2005). Case study research. Journal of Geography in Higher Education, 29(3), 421–427.
- Dugger Jr, W. E. (2001). Standards for technological literacy. Phi Delta Kappan, 82(7), 513–517.
- Dur, B. U. (2014). Data Visualization and Infographics In Visual Communication Design Education at The Age of Information. Journal of Arts and Humanities, 3(5), 39–50. https://doi.org/10.18533/journal.v3i5.460
- Goldschmidt, G., & Smolkov, M. (2006). Variances in the impact of visual stimuli on design problem solving performance. Design Studies, 27(5), 549–569.
- IDEO. (2011). Tools | IDEO.org. Retrieved September 11, 2019, from https://www.ideo.org/tools
- Ismail, A. I. H., Isa, K. M., & Azahari, M. H. H. (2010). An interpretation of photography as an art and communication. 2010 International Conference on Science and Social Research (CSSR 2010), 1350–1352. IEEE.
- Kaya, T., & Bicen, H. (2016). The effects of social media on students' behaviors; Facebook as a case study. Computers in Human Behavior, 59, 374–379.
- Lacerda, A. (2008). The signs and the corporate identity in contemporary society. Proceedings of the 26th Annual ACM International Conference on Design of Communication, 285–286. ACM.
- Lester, P. (2006). Visual Communication: Images with Messages/. Lester. Canada: Wadsworth Cengage Learning.
- Margolis, E., & Pauwels, L. (2011). The Sage handbook of visual research methods. Sage.
- Mitchell, W. J. T. (2005). What do pictures want?: The lives and loves of images. University of Chicago Press.
- Petersen, N. J., & Østergaard, S. (2003). Organisational photography as a research method: what, how and why. Academy of Management Conference Proceedings. Citeseer.
- Razzouk, R., & Shute, V. (2012). What is design thinking and why is it important? Review of Educational Research, 82(3), 330–348.
- Schulze, S. (2007). The usefulness of reflexive photography for qualitative research: a case study in higher education. South African Journal of Higher Education, 21(5), 536–553.
- Sontag, S. (2001). On photography (Vol. 48). Macmillan.
- Stephens, M. (1998). The Rise of the Image, the Fall of the Word. Oxford University Press.
- Van Dijck, J. (2008). Digital photography: communication, identity, memory. Visual Communication, 7(1), 57–76.
- Yamada-Rice, D., Stirling, E., Procter, L., & Almansour, M. (2015). Book Review: The Sage Handbook of Visual Research Methods. Sage Publications Sage UK: London, England.aluation of virtual reality applications. Interacting with Computers, 16(4), 831–849.
- Tversky, A., &Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. Cognitive Psychology, 5(2), 207–232. https://doi.org/10.1016/0010-0285(73)90033-9

Title:
Review of transformative technology and related pedagogy in school: Teaching learning practice to foster creativity

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Introduction

The advent of new technologies such as virtual reality (VR) has brought dramatic changes and provided a super real environment for teaching and training (Bricken and Washington Univ 1990). The simulation-based teaching has opened up a versatile possibility that helps in the visualization of abstract content, serving information with clarity and students can take an active part by involving physically into the environment (Falconer 2013). The usefulness of advanced technology in the field of industry and training sector is highly impactful so, in this changing condition, education sector especially school education sector demands technology-aided (VR based) pedagogy to facilitate classroom teaching-learning (Ying, Jiong et al. 2017).

Although virtual reality technologies are highly beneficial for education in general, the use of this technology tool in the classroom presets many challenges and drawbacks. There are two significant issues; the first is the lack of teachers' knowledge about the use of technological tools. Teachers need the training to use smart devices, content assembling, and time management (Kluge and Riley 2008). Indeed, it requires proper alignment between content knowledge and technology-based pedagogical knowledge. Second, one of the most important issues is creativity or creative functionality of VR. While, VR researchers claim that this VR base learning is creative in its process of visualization, data display, operating system, assistance and nonlinguistic communication (Goodman 2016). Where to, what is and how creativity will be infused in the smart technology-based education system? All these issues require careful thought to determine whether these obstacles can be resolved or whether they could be reconciled in some other possible way.

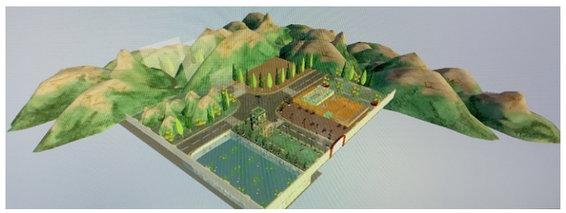
Confrontation of pedagogical issue in virtual reality-based education

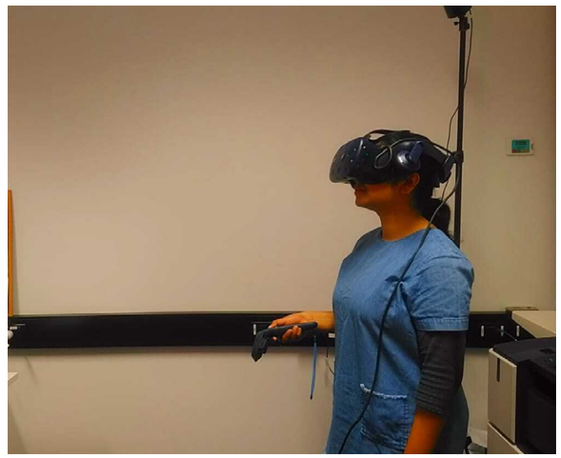
While virtual reality is widely disseminated for teaching and training, some problems are identified while using VR instrument inside the classroom such as usability issues, cognitive issues, uniformed technical issue etc. To address these issues, the VR application must be well informed to the user and the user must handle with care. One of the foremost advantages of VR application is a realistic visualization of subjects and their interaction from different angles and dimensions that reinforce attention, inquisitiveness and retention of learners. It also empowers imaginations of students and gives them the ability to understand, experience their idea and explore their work in greater 3D space. On the contrary, there is a prediction that increases the level of realism may improve learning as well as it may distract the main focus of the subject. In this context, it is necessary to evaluate the subject or lesson wise necessity of VR environment. For example, Prof. Walter Lewin's lecture on physics; he explains the mechanical energy, the energy of pendulum with the live classroom experiment. In his teaching, he begins the demonstration and slowly transforms the lecture hall into a laboratory. Suppose this experiment created in VR environment, would this be the same effect? Therefore, it is required to scrutiny all the subject matter and prescribed pedagogy whether the VR environment is appropriate or not.

With regard to the lack of teacher's knowledge using digital technology into pedagogy, there are some problems, but these problems are not one-sided. These issues derived from the overall system of virtual reality application for school education. The interactivity of virtual simulation is to be designed to have an impact on learning and requires participants to engage in the program (Cant, Cooper et al. 2019). In this context, VR researcher and developer must remember that the use of the VR application is to facilitate the learning, not to complicate the teaching-learning activity. The first issue of use VR application with a large number of students is the availability of a multi-user system and its ease of use. There are several studies on the positive effect of collaboration between learner and virtual environment (Birchfield, Thornburg et al. 2008), (Herrera, Jordan et al. 2006), (Hu, Jiang et al. 2008). However, there is very less concern about how the presence of a teacher influences the learning of the VR environment.

In this case, VR can allow avatar-based multi-user systems but some difficulty arises during the discussion when the participants are anonymous. To define the role of a teacher or a facilitator and their activity with students in a VR environment, guidelines are required for largescale participation in a single environment.

The second issue is no standard technical unification and conformity for educational VR technology. Many types of VR are produced, but they cannot be used widely (Kardong-Edgren, Farra et al. 2019). The technical theory of 3D virtual reality in terms of available instructions, such as equipment configuration, management to run the particular programmes, describes in more detail the set of systems required for teaching at school (Domingo and Bradley 2018). Each VR technique has its quality equipment and other complex factors. Therefore, it is necessary to develop the technical unification and conformity of each type of standard merit (Hu, Jiang et al. 2008). The third problem is user adoption of technological tools is one of the major issues in the digital education system. Lack of experiences with virtual environment raises issues for teachers (Dickey 2005), (Kardong-Edgren, Farra et al. 2019). For example, the skill function of teleportation, navigation and basic communications by using the controller. In addition to the quality of VR equipment, due to low configuration equipment viewer experienced distortion and confusion, as a result, they do not get the actual simulation of the environment (Eschenbrenner, Fui-Hoon Nah et al. 2008). In this case, the teacher or facilitator needs to know what types of lessons they are going to teach and how much realistic simulation are needed.





Images 1 – 3 - User and glimpse of virtual reality environment

Confrontation of creative issues in the functionalities of virtual reality

There are some challenges to the design and development of VR based instructional activities. To design an instructional lesson in VR, the first question is how to conceptualize the components of the VR lesson, then how to outline the procedural steps for building a VR course and how to test the learner's experiences (Dahlquist, Weiss et al. 2010). The major problem concerns data and interactions, input and interactions. An educator who is non-technical ground the process of building VR for an educational application is challenging. In this context, the challenge of the educator is to know how to create content. Should an educator first take into account technological decisions and the resulting constraints? And how these constraints will affects the instructional objectives? To solve these issues, it is required to analyse the needs of the user, the appropriate content to take advantages of VR technologies, the possibility of software modification and time management (Hanson and Shelton 2008).

Oliver Grau (1999) has described virtual reality as a constant phenomenon in history. He said that the meaning of virtual reality is an instructed phenomenon that encourages emotional, ecstatic participation through the use of suggestive visual representations and by creating a fusion of viewer and image (Grau 1999). Which means the manipulated phenomenon works with the cognition of the viewers. Cognitive infusion depends on VR designer and developer how they create the VR environment and interaction. In this case, 3D understanding of real space is difficult. To form an accurate mental model of the virtual worlds, the participant needs an accurate feasible cue, like space exculpation and navigation. This technology constitutes a set of physical and cognitive artefacts that mediate users' experiences of the virtual world. Physical artefacts may call for visual, kinaesthetic and tactile interaction. Maps, diagrams and virtual scenes are an example of cognitive artefacts. 3D understanding is difficult, and users may need hours of practice to form an accurate mental model of virtual worlds and they need every feasible cue. For example, depth cues: space exclusion, kinetic depth effect, force cues and stereopsis. Navigation: user needs to see both, view of the virtual world and map showing his position and where he is looking. It takes a long process to understand map navigation and then progress to scene navigation that both build a precise mental world model, which corresponds to the behaviour of the real world (McLellan 1998).

Conclusion

Despite some practical constraints, but VR-based education has a positive impact on school education platform. In the VR environments, using gross body movements children can test predictions and that can challenge their intuition which is the foundation for deeper conceptual understanding (Lindgren and Moshell 2011). Physical or kinaesthetic memory development is one of the important developmental factors and it is related to cognitive development. Through VR training, a person can accomplish specific physical movements without thinking about how his or her body's parts should move. Along with cognitive capability also be developed with knowledge, application and analysis (Stone, Watts et al. 2011). Engagement, development of knowledge, creativity and cognition relies on the structure of VR instruction and effects of the environment. The inclusion of creativity starts with the idea of creating a VR environment. The basic steps for VR design process are first, to be familiar with VR, to understand and articulate the expectations of educators and students, and to evaluate the design considerations. In addition, the educator must think about lesson-wise judicious requirements of a teaching tool, such as VR based teaching, outdoor field teaching and traditional teaching. Although processes based on VR and traditional teaching are both different, the basic idea of creative teaching is more similar. In this case, the teacher must discover the possibility of exploring the subjects, knowledge-wise student's demand and judging the pedagogical tool in terms of frosting creativity in teaching-learning.

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References

- Birchfield, D., et al. (2008). "Embodiment, Multimodality, and Composition: Convergent Themes across HCI and Education for Mixed-Reality Learning Environments." Advances in Human-Computer Interaction: 1-19.
- Bricken, W. and S. W. T. C. Washington Univ (1990). Learning in Virtual Reality.
- Cant, R., et al. (2019). "What's in a Name? Clarifying the Nomenclature of Virtual Simulation." Clinical Simulation in Nursing 27: 26-30.
- Dahlquist, L. M., et al. (2010). "Effects of Videogame Distraction and a Virtual Reality Type Head-Mounted Display Helmet on Cold Pressor Pain in Young Elementary School-Aged Children." Journal of Pediatric Psychology 35(6): 617-625.
- Dickey, M. D. (2005). "Brave new (interactive) worlds: A review of the design affordances and constraints of two 3D virtual worlds as interactive learning environments." Interactive Learning Environments 13(1-2): 121-137.
- Domingo, J. R. and E. G. Bradley (2018). "Education Student Perceptions of Virtual Reality as a Learning Tool." Journal of Educational Technology Systems 46(3): 329-342.
- Eschenbrenner, B., et al. (2008). "3-D Virtual Worlds in Education: Applications, Benefits, Issues, and Opportunities." Journal of Database Management 19(4): 91-110.
- Falconer, L. I. Z. (2013). "Situated Learning in Virtual Simulations: Researching the Authentic Dimension in Virtual Worlds." Journal of Interactive Learning Research 24(3): 285-300.
- Goodman, L. (2016). Visualisation meets assistive tech: VR, AR, digital materialisation and the tools for imagining and supporting the full potential of human communication. 2016 22nd International Conference on Virtual System & Multimedia (VSMM).
- Grau, O. (1999). "Into the belly of the image: historical aspects of virtual reality." Leonardo 32(5): 365-371.
- Hanson, K. and B. E. Shelton (2008). "Design and Development of Virtual Reality: Analysis of Challenges Faced by Educators." Journal of Educational Technology & Society 11(1): 118-131.
- Herrera, G., et al. (2006). "Abstract concept and imagination teaching through Virtual Reality in people with Autism Spectrum Disorders." Technology & Disability 18(4): 173-180.
- Hu, X., et al. (2008). The Application of 3D Real Time VR in Web-Based Continuing Education Platform. 2008 International Conference on Cyberworlds.
- Kardong-Edgren, S., et al. (2019). "A Call to Unify Definitions of Virtual Reality." Clinical Simulation in Nursing 31: 28-34.
- Kluge, S. and L. Riley (2008). "Teaching in Virtual Worlds: Opportunities and Challenges." Issues in Informing Science & Information Technology 5: 127-135.
- Lindgren, R. and J. M. Moshell (2011). Supporting children's learning with body-based metaphors in a mixed reality environment. Proceedings of the 10th International Conference on Interaction Design and Children. Ann Arbor, Michigan, ACM: 177-180.
- McLellan, H. (1998). "Cognitive Issues in Virtual Reality." Journal of Visual Literacy 18(2): 175-199.
- Stone, R. T., et al. (2011). "Physical and Cognitive Effects of Virtual Reality Integrated Training." Human Factors 53(5): 558-572.
- Ying, L., et al. (2017). VREX: Virtual reality education expansion could help to improve the class experience (VREX platform and community for VR based education). 2017 IEEE Frontiers in Education Conference (FIE).

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