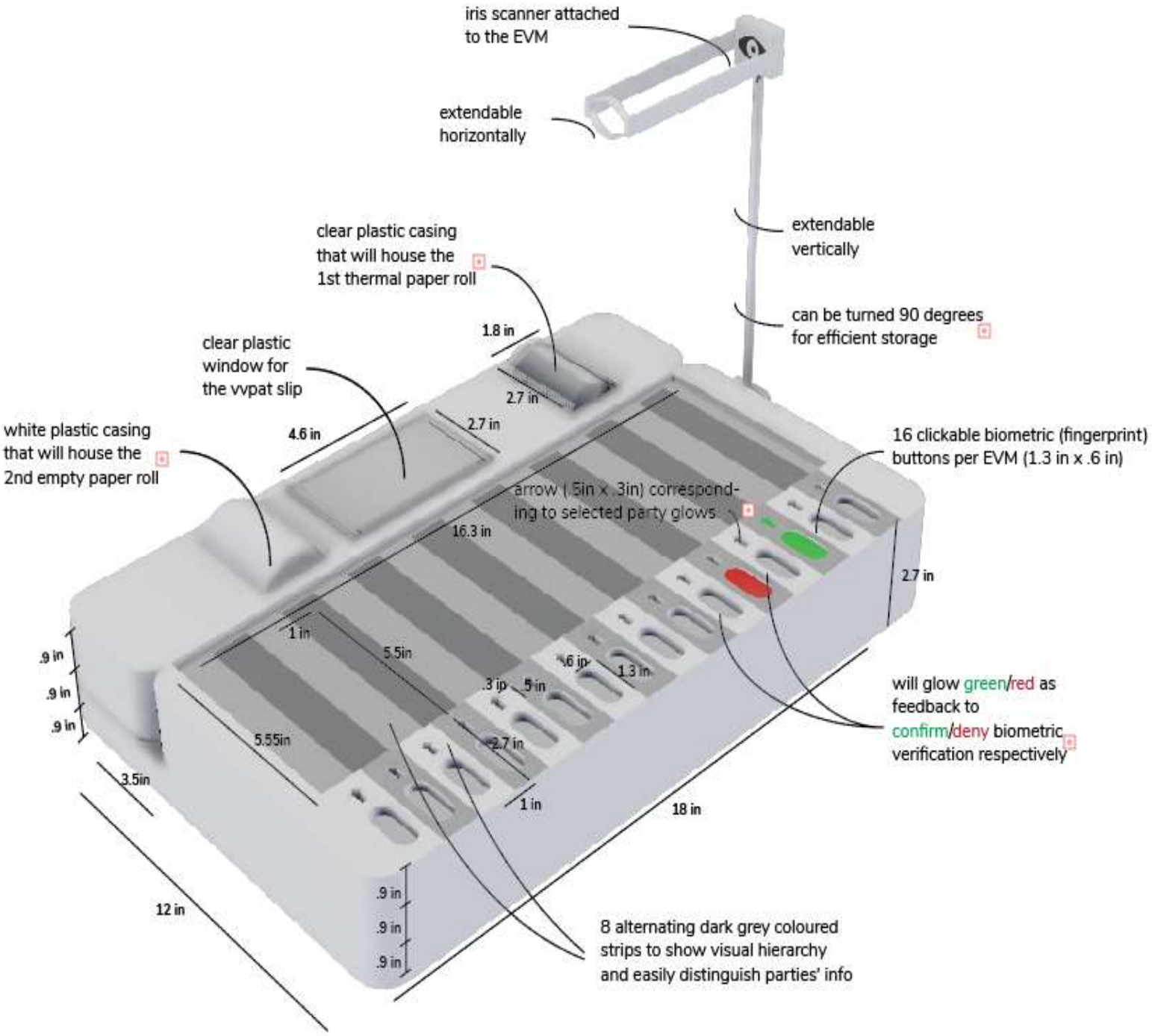
iris scanner attached to the EVM
extendable horizontally
extendable vertically
can be turned 90 degrees for efficient storage
clear plastic casing that will house the 1st thermal paper roll
clear plastic window for the vvpat slip
white plastic casing that will house the 2nd empty paper roll
16 clickable biometric (fingerprint) buttons per EVM (1.3 in x .6 in)
arrow (.5in x .3in) corresponding to selected party glows
will glow green/red as feedback to confirm/deny biometric verification respectively
8 alternating dark grey coloured strips to show visual hierarchy and easily distinguish parties' info
1.8 in
2.7 in
4.6 in
2.7 in
16.3 in
2.7 in
1 in
5.5in
.6 in
1.3 in
.3 in
.5 in
.9 in
.9 in
.9 in
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2.7 in
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18 in
12 in
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Other Regular features

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CO-DESIGNING ECO-COMMUNITY-BASED TOURISM

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Abstract

Background: **In the development of community based tourism (CBT) the importance of community participation cannot be over emphasized. It is considered an essential factor if sustainable tourism development is to succeed. Hence there is a need to interrogate the nature and how to nurture community participation for sustainable CBTEs.** ***The problem:*** **The uptake for community participation has been relatively slow and levels of participation are considered low.** ***Objectives:*** **the objective of the study is to explore the application of co-design methods for effective participation in the planning and development of sustainable CBTEs and to propose a framework for effective community participation in the planning and development of sustainable CBTEs.**

Design: **The study adopted an exploratory design that allowed qualitative methods of data collection while applying a multiple case study method.** ***Setting:*** **the study was based in Homa Bay County in Kenya and specifically looked into RAMA Cultural Centre and Ndhiwa Kodumba Tse Tse group CBTEs.** ***Subjects:*** ***Members of*** **RAMA Cultural Centre and Ndhiwa Kodumba Tse Tse group, key informants from the Ministry of Tourism, county government of Homabay, Kenya Wildlife Services, Nature Kenya and design experts from the School of the Arts and Design, University of Nairobi.** ***Results:*** **The findings show an evidence of both spontaneous and coercive types of participation in the two case studies. Apathy, low levels of awareness, low literacy**

levels, lack of expertise, age and gender were the major constraints to participation.

Conclusion: **The study concludes that though community participation is advocated as an integral part of sustainable CBTE development, policy documents provide a robust legal framework for participation. A major weakness was found to be the lack of clear mechanisms for community participation.**

Keywords: ***Co-design, Community-Based Tourism, Sustainability, Culture.***

Introduction

Kenya has experienced one of the fastest population growths, from 7 million to an estimated 52.2 million with global rankings soaring from 57th in 1955 to 27th in 2019, respectively. In their seminal treatise on ecotourism, Juma & Khademi-Vidra (2019) advance that at present, over 80% of the population depends on agriculture with about 73.4% of this population being in rural areas and a further 40% being employed in agriculture, an economic activity that greatly depends on land and associated resources. As the population grows, natural resources become scarce and increasingly subject to a lot of pressure as communities and their governments strive to achieve local and national socio-economic development goals. Certainly, a fast-changing human and socio-economic environment regularly presents many challenges to the country's sustainable development. In this regard, futuristic development planning and governance are envisaged to guarantee the sustainability of scarce resources and at the same time securing sustainable livelihoods for the present local populace. Indeed, without sustainable livelihoods, the future of scarce resources is also put at risk (Juma & Khademi-Vidra, 2019)

Community-Based Tourism (CBT) has been pushed as one of the strategies for poverty alleviation and it might enhance the sustainability of marginalized regions and communities. However, tourism has also been argued to carry seeds for its own destruction and therefore presents a great dilemma and developmental paradox. The rich natural and cultural resources found in Kenya are the country's strength for attracting tourists. Wildlife in its natural habitat has made Kenya synonymous with the word 'Safari" (Gona, Ondiek, & Muhando, 2017).

Background

The advocacy for community participation has its roots in the concepts of sustainability and sustainable development that began in 1972 during the United Nations Conference on Human Environment. A major outcome of the conference was a call for more participation by local communities in development projects to enable integrated resource management (Stone & Stone, 2011). In 1987, there was further emphasis on community participation, by the World Commission on Environment and Development Brundtland's report. The 1992 Rio Earth Summit introduced Local Agenda 21 (LA21), which was a blueprint for action by host communities participation in local resource management. LA21 was signed by 178 countries, Kenya being one of them. Consequently, the Kenya 2010 constitution anchored this agenda on community participation and provision under Articles 1(2), 10(2) a,b,c, 27, 33, 61, 69(1) and 174(d). While operationalising these, the same constitution cascaded it to the County Government Act while also providing for community participation as outlined in sections 91, 94, 95, 96, 100 and 101.

LA21 action plans have also been cascaded to different sectors, and in the tourism sector, the recommendation is for establishment of CBTEs, that is perceived as a viable approach to sustainable tourism and community development. This is supported by several researchers who affirm that community participation is indeed an integral part of sustainable CBTEs (Murphy, 1983, 1985; Asker, Boronyak, Carrard, & Padd, 2010; Bello, Lovelock, & Carr, 2017; Dangi & Jamal, 2016; Giampiccoli & Saayman, 2018) because community participation increases the effectiveness and efficiency of tourism development plans (Joppe, 1996; Inskeep, 1994; Tosun & Jenkins, 1996) and it leads to the implementation of principles of sustainable tourism development by creating better opportunities for local communities to gain from tourism development through capacity building, empowerment and social justice (Tosun, 1999). Community participation is not just about the benefits accrued from tourism, but also in tourism product identification, planning, implementation, monitoring and evaluation (Simmons, 1994; Zhao & Ritchie, 2007; Songorwa, 19990. However, how to implement effective community participation for sustainable CBTEs remains unclear.

Theory

Application of co-design can be found in the competitive environments of software design, telecommunications industries and high-technology, due to the nature of 'new features' in new products in this fields (Sanders & Stappers, 2014; Kimbell, 2015). In the health sector, co-design is now the preferred approach in determining how best to improve healthcare (Hendriks, Slegers, & Duysburgh, 2015; Wilson, et al., 2015; Gustavsson & Andersson, 2017). It is also widely used in determining effective ways for community resource management (Ssozi-Mugarura, Blake, & Rivett, 2017; Smith, 2008). Though co-

design has gradually developed to become a rigorous and widely used approach across a range of contexts, empirical research shows its limited use in the tourism sector and within CBTE planning and development, it is relatively new and yet to be adopted. This thesis evaluates the extent to which co-design tools and techniques could contribute to effective community participation in the planning of CBTEs and proposes a framework for the planning of sustainable CBTEs at whose core is effective community participation.

The heart of co-design is participation. Its origin is associated with the well-documented works of American and Scandinavian researchers engaged with systems design and automation in the 1980s and 1990s (Greenbaum & Kyng, 1991). However, less frequently acknowledged is that the issue of design and participation had already been broadly discussed in the design communities in the 1960s and 1970s. For instance, at the second conference of the Design Research Society in 1971, the overall theme was '*design and Participation'* (Cross, 1971).

A field survey of six CBTEs by Manyara and Jones (2007) revealed that effective community participation in tourism development and conservation is not yet realized in Kenya. The survey was conducted on CBTEs located in the three main tourism regions of Kenya namely; Northern (Laikipia), Southern (Maasai Mara) and Coastal (Wasini Island, Kwale and Taita Taveta). The study sample included II Ngwesi, Mwaluganje Elephant Sanctuary, Tasia, Koiyaki Lemek, Lumo and Wasini Women group. Their findings revealed that CBTE planning was through external intervention and the role of the community was primarily secondary. This resulted on dependence on external support and incase of withdrawal of such support, most of the CBTEs also collapsed. A similar survey by Meguro & Inoue, (2011) on Kimana

Sanctuary, the first community owned and managed wildlife sanctuary in the South West of Kenya, regrettably confirmed little involvement of the community in planning. From the above examples, one can conclude that the level of community participation, when measured against Arnstein's ladder of participation (1971) is relatively low.

Based on the above discourse, it is not well known how effective community participation can be enhanced in the planning of CBTEs. Though co-design has gradually developed to become a rigorous and widely used approach across a range of contexts, its effectiveness in the planning of sustainable CBTEs is rather unknown. This is in part due to the fact that co-design tools and techniques have not yet been appropriated in the context of CBTE planning and the adaptability of these tools and techniques to different contexts of CBTE planning is yet determined. This study therefore proposes an application of co-design tools and techniques in the planning of CBTEs in Homabay County.

Community participation

In 1981, the UN provided the definition of community participation as *'the creation of opportunities to enable all members of a community and the larger society to actively contribute to and influence the development process and to share equitably in the fruits of development'* (Midgley et al., 1987). On the other hand, Official Development Assistance (ODA) has defined community participation as *'a process whereby stakeholders, those with rights and therefore responsibilities and/or interests play an active role in decision making and in consequent activities which affect them'*. Havel (1996) defined community participation *'as a process through which stakeholders,*

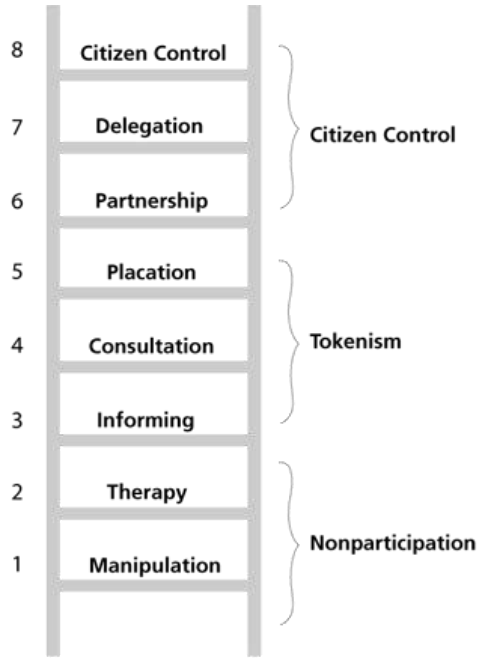
***among them, the local communities, influence and share control over development initiatives, decisions and resources which affect them'*. In this study, community participation is defined as involvement of local communities in projects that help to solve local their problems.**

Typology of participation

Participation is often thought of a continuum rather than as discreet types with defined boundaries of description. Community participation has often been evaluated in two main categories. The first category considers the quality of the participatory process and is often measured by (i) members being representative of the broader community (ii) membership being balanced (iii) participation starting early at the decision-making process (iv) evidence of face to face discussion between the community and agency representatives and lastly (v) determination of whether the agency is committed to the participatory process and responsive to public input (Beierle & Konisky, 2000; Zhao & Ritchie, 2007). The second category is interest oriented. These evaluate the extent to which each of the stakeholders has achieved their goals in the participatory process. The question then becomes what is in this for me and will I achieve the same by participating?

Several authors have analyzed typologies of community participation. Sherry Arnstein, writing in 1969 about citizen involvement in planning processes in the United States, described what she called a 'ladder of citizen participation' (Figure 1), that showed participation ranging from high to low.

Figure 1: Degrees of Citizen Participation



Source: Arnstein (1969)

Participatory approaches

In order to more effectively incorporate the perspectives and priorities of local people in decision-making, policy development and project implementation, the 1970s and early 1980s saw an emergence of a number of 'participatory approaches' to development (Duraiappah, Roddy, & Parry, 2005). The re-orientation towards greater participation by local communities was motivated by a desire to move away from an emphasis on top-down, technocratic and economic interventions towards a greater attention to bottom-up, community led interventions (Kanji & Greenwood, 2001). The 1980s and early 1990s saw the evolution of participatory approaches with introduction of methods such as Rapid Rural Appraisal (RRA), Participatory Action Research (PAR) and Participatory Rural Appraisal (PRA). The aim of each of these methods was to try to seek and understand indigenous knowledge as a way to balance the dominance of western scientific knowledge (Kanji & Greenwood, 2001).

The success of any participatory approach rests in part on the manner in which it is undertaken. For effective participation to be achieved, the following must be considered. (i) the mode of participation, (ii) the participants to be involved and the manner in which they are to be involved and lastly (iii) the cultural structure within which these people operate. Identified are seven key principles on which effective participation is anchored. These are:

a) ***Inclusion*** *– all people or representatives of groups of people that will be affected by the development*
b) ***Equal partnership*** *– appreciating that everybody has a skill, ability and initiative and therefore equal right to participate regardless of their status in the community*
c) ***Transparency*** *– all participants must aspire to create a conducive environment for communication and dialogue building*
d) ***Power sharing*** *– authority and power must be evenly shared amongst all stakeholders to avoid dominance by a party or sets of parties*
e) ***Sharing responsibility*** *– all stakeholders have equal responsibility to decisions*
f) ***Empowerment*** *– Encourage all to be involved to promote mutual learning*
g) ***Cooperation*** *– sharing each others strength and weaknesses*

Typology of participation in CBTE

CBTEs are normally a multi-sector and this means that participation will happen at different levels. Some of these are outlined below and summarized with examples in Table 5:

a) ***Participation is sharing economic benefits** – The community may not have a say in the type of CBTE activity but because it is within their land, then any more it generates is shared in certain proportions to the community.*
b) ***Participation in planning** – Community plays an important role in the generation of information and analysis.*
c) ***Participation in implementation and operations** – Community plays a big role in implementing activities, setting up institutional arrangements and in enterprise operations.*
d) ***Participation in decision-making and management** – Community plays key roles in the choice, design and management of CBTEs including conservation activities and monitoring and evaluation.*

Constraints to participation in CBTE planning

Though community participation is advocated as an integral part of sustainable CBTE planning not just because of the economic benefits accrued from tourism to the community but also for capacity building, empowerment and social justice, the uptake has been relatively slow and levels of participation when related to Arnstein's ladder of participation (1971) is relatively low (Moscardo, 2008). Aref & Redzun, (2008) observed that in developing countries, some factors form obstacles to actual community participation in the CBTE development processes. Tosun (2000) went further to examine these

factors and came up with three main categories of limitations namely; operational limitations, structural limitations and cultural limitations. Limitations at the operational level include the centralisation of public management of tourism development by national governments. All decisions regarding planning, implementation and monitoring of tourism development are made at a national level with minimal or no input from the local community. Consequently, only a few areas where decision makers at the national level have interest on experience tourism development while the other regions are neglected.

Lack of co-ordination amongst stakeholders (government agencies, hoteliers, tour operators, local community and NGOs) involved in tourism development limits community participation. Each stakeholder is driven by the desire to achieve his/her objectives with little regard to the objectives of the others. Kibicho (2008) noted that funding institutions were more concerned with project effectiveness/success than the fundamental and less concrete aspects of community-based tourism like stakeholders collaboration, while the government agency laid emphasis on conservation. He further, observed a level of distrust between the local host community in Kimana Wildlife Sanctuary and the Kenya Wildlife Service (National conservation organisation), and noted that where trust is weak participants do not achieve the desired outputs associated with effective partnership.

Lack of information made available by the other stakeholders to the host community of a tourism site in regard to for instance, insufficient tourism development data and poor distribution of information (Scheyvens, 2002) makes the community more vulnerable to manipulation. Under such circumstances, low public participation in

the tourism development process is apparent, as the community is not sufficiently informed.

Structural limitations at CBTI level include lack of appropriate legal system especially on matters regarding land ownership (Manyara & Jones, 2007), initiatives are registered as CBOs, associations, trusts or limited companies with various landownership tenures and without a definite land use policy.

High cost implication associated with community participation and inadequate financial resources (Tosun, 2000; Scheyvens, 2002; Manyara *et al,* 2007) are other structural limitations hindering community participation in tourism. Communities frequently lack resources and power (Scheyvens, 2002; Akama, Maingi, & Camarco, 2011), therefore unable to establish amenities and infrastructure required for tourism development. This makes it difficult for the community to improve on the quality of the tourism product in their locality and to access the desired markets. The local community is consequently reliant on other stakeholders, and hence vulnerable.

Lastly cultural limitations include limited capacity of poor populations, apathy and low level of awareness in the local community. Kibicho (2008) in his study at Kimana Wildlife Sanctuary noted lack of local community involvement in the Sanctuary"s decision making processes due to lack of a defined leadership structure. He observed that a segment of the community whom he referred to as *the operatives* had low interest in participating in the formulation of aims and objectives of the project, which he attributed to lack of self-confidence due to the community"s low levels of education and lack of capability to effectively participate.

According to Blackstrock (2005) the heterogeneity of communities is a constraint to their participation in tourism development. A community comprises of several different kinds of people, often with uneven positions and different ambitions. Kibicho (2008) identified three segments in the Kimana Wildlife Sanctuary community namely; "*operatives*, *opinion leaders* and *official leaders"* whom he found were expected to influence the community"s support for a tourism project. Such segmentations lead to uneven opportunity for local community participation in tourism activities.

CBT on a theoretical perspective

There is little to find from literature on a universally valid theory of community participation in development programs. What exist are sets of propositions stating the conditions under which people do or do not participate in collective action. Since all development programs in general and most CBTEs in particular entail some collective action on the part of the members, one could argue that factors affecting collective action might also influence people's participation in CBTEs. This study presents the salient features of the theoretical approaches to community participation developed by Olson (1971).

Olson's Theory

(Olson, 1971) challenged the generally held belief that groups of individuals having common interests will usually work together to achieve them. In his argument, he states that "*…unless the number of individuals in a group is quite small, or unless there is coercion or some other special device to make individuals act in their common interest, rational, self-interested individuals will not act to achieve their common or group interests*" (Olson, 1971). It is often not

possible to have people volunteer themselves for projects but are often coerced through incentives so as to participate. According to Olson (1971), the bigger the community, the less noticeable the actions of individuals and the higher the chances of free riders, who though do not contribute in community welfare, still enjoy the benefits accrued. Olson has shown that *"certain small groups can participate towards community good without relying on coercion or any positive inducements apart from the collective good itself. This is because in some small groups each of the members, or at least some of them, will find that his personal contribution is satisfactory".*

Olson however does not specify the number of individuals that would make the small group but he asserts that the group should be small enough so that "the individual actions of any one or more members are noticeable to any other individual in the group". The implication of Olson's theory for managing participation in communities is that when there exists a very large and heterogeneous community, it should be divided into a number of small homogenous subgroups for effective participation. Besides these, Olson also discusses the possible role of a political entrepreneur in promoting collective action. A political entrepreneur is an individual with a combination of such traits as leadership, the trust of the community or fear, the ability to discern the motivations of others and the desire to organize groups for collective action. The political entrepreneur's success is based on his related ability to utilize selective incentives to motivate participation. Another important role of the political entrepreneur is also to provide the much needed assurance to the resource users that the expected benefits from participation would, in fact, accrue to them and that the benefits would be equitably distributed among them.

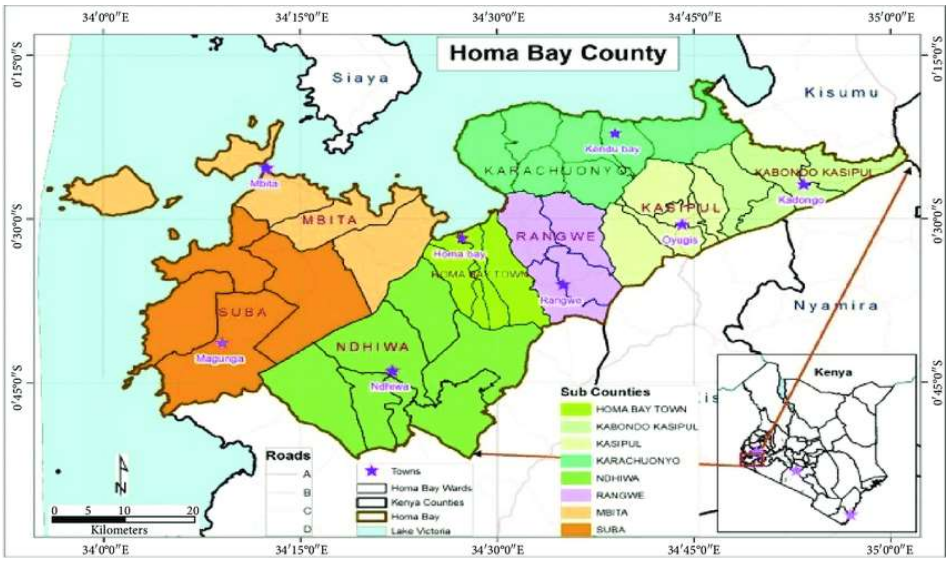
Methods

Exploratory research design was used to achieve the objectives of the study. An exploratory design was selected because this problem had few or in some instances no earlier studies to refer to or rely upon to predict an outcome. Relying on insights by Kombo and Tramp (2006), the focus was on gaining insights and familiarity. Therefore the exploratory approach was flexible and aptly addressed research questions of what, why and how. In our case, exploratory research provided a well-grounded picture of the situation being developed (Creswell, 2014). Since the research intended to analyze the viability of co-design in the planning and development of sustainable CBTEs, exploratory design was considered ideal.

Study Area

The study was conducted in Homabay County), located in the western Kenya. It was chosen because it sits in a prominent position to be a lead destination in the Western Kenya Tourism Circuit due to its rich historical, geographical and cultural heritage (GOK, 2004). Kenya's tourism development has also focussed primarily on 'safari' or game tourism and the coastal beaches; meaning tourism activities are limited to just a few geographic locations (Ndivo, Waudo, & Waswa, 2013). Homabay County was therefore considered instrumental in catalyzing sustainable CBTE development in Kenya.

Figure 2: Location of the constituencies in relation to each other



Source: GOK (2004)

Findings

Homabay County is divided into eight political constituencies namely; Rangwe, Homa Bay Town, Ndhiwa, Suba, Mbita, Karachuonyo, Kasipul and Kabondo/Kasipul 107 constituencies. Of these eight, CBTE activities were evident in only four of the constituencies namely; Ndhiwa, Suba, Mbita and Karachuonyo. The location of these constituencies in relation to the others is shown in *Figure 2* above. From observation, most of the CBTEs were located in close proximity to tourist sites and that is why only the four constituencies exhibited a form of CBTE. The tourist sites found in these constituencies is shown in *Table 1* below:

Table 1: Potential CBTE sites in Homabay County

CATEGORY	ATTRACTION	STATE OF USE
Nature & Wildlife (Game, Landscapes and birds)	**Ruma National Park**	**Moderately utilized**
	Simbi Nyaima Bird Sanctuary	**Minimally utilized**
	Mbusi-Rakuena Bird Sanctuary	**Minimally utilized**

	Mbasa Island Bird Sanctuary	**Minimally utilized**
	Otok Bird Sanctuary	**Minimally utilized**
	Remba Island Bird Sanctuary	**Minimally utilized**
Culture and Heritage	**Abasuba Community Peace Museum**	**Moderately utilized**
	Tom Mboya Mausoleum	**Minimally utilized**
	Gor Mahia Shrine	**Minimally utilized**
	RAMA cultural centre	**Minimally utilized**
Adventure	**Lake Victoria**	**Moderately utilized**
	Lake Simbi Nyaima	**Minimally utilized**
	Homa Hills	**Minimally utilized**
	Ruri and Gembe Hills	**Minimally utilized**
	Bala Hot Springs	**Minimally utilized**
Water sports and Health and wellness	**Boat racing sites**	**Moderately utilized**
	Bala hot springs	**Minimally utilized**
	Lake Victoria	**Moderately utilized**

Source: Authors (2019)

Most of the community members involved in some form of CBTE activity were not in formal groups and had no structures of operation. There were those involved in sale of crafts. The crafts ranged from baskets, mats, hats, carved spoons and even pots. There were also tourism enterprises that engage the local community. Most of these are hotels found in the three main islands of Rusinga, Takawiri and Mfangano.

The findings of (Mowforth & Munt, 1998) while examining community participation in the developing countries of Central America mainly Brazil also reflected on the findings of this study. Though the two case studies involved in this study have no foreign investors yet, the aspect of local elites is evident. In RAMA Cultural Centre, the founder of the centre, is the authority and directs how community participation happens. For instance, the day to day running of the centre is done by the founder and the local community only gets involved when need be like when there are visitors and there is need for entertainment, he then engages the local community. The Ndhiwa Kodumba Tse Tse group is managed by an elite group of officials who determine the group's activities. The type of community participation in these two groups can be summarized in *Table 2* below and *Figure 3* below:

Table 2: Forms of participation

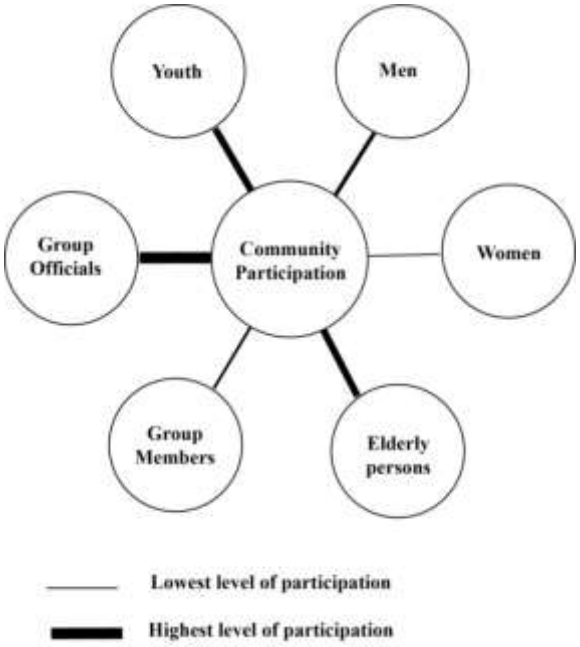
Form of Participation	Characteristic Features
Nominal Participation	Membership in the group
Passive Participation	Being informed of decisions or attending meetings and listening in without making any contributions
Consultative Participation	Being asked an opinion in specific matters without guarantee of influencing decisions
Activity- specific participation	Participating when requested to in tasks or simply volunteering for the same.
Active participation	Taking initiatives by expressing opinions and undertaking tasks whether asked to or not
Interactive (empowering) participation	Having voice and influence in decisions

Lowest participation

Highest participation

Source: Authors (2019)

Figure 3: Levels of participation



Source: Author (2019)

The typology of participation in *Table 2* above indicates that the level of participation ranges from nominal participation to interactive (empowering) participation. The participation of the women was towards nominal participation whereas that of the men was considered consultative participation Both the youth and elderly persons form of participation was activity-specific participation. Cumulatively, the group members presented passive participation. The highest form of participation was by group officials who have a voice and influence decisions in the CBTEs.

Specific determinants of community participation in CBTEs

Based on this study, the following were found to be some of the basic determinants for enhanced or reduced participation in CBTEs (Figure 4).

a)Background

Participation is dependent on personal interest on certain issues. Some people may be interested in one issue and not the other.

b) Point of entry of the community into the CBTE

It was noted that those who got involved in the CBTEs at the early stages of planning were more likely to participate in its activities.

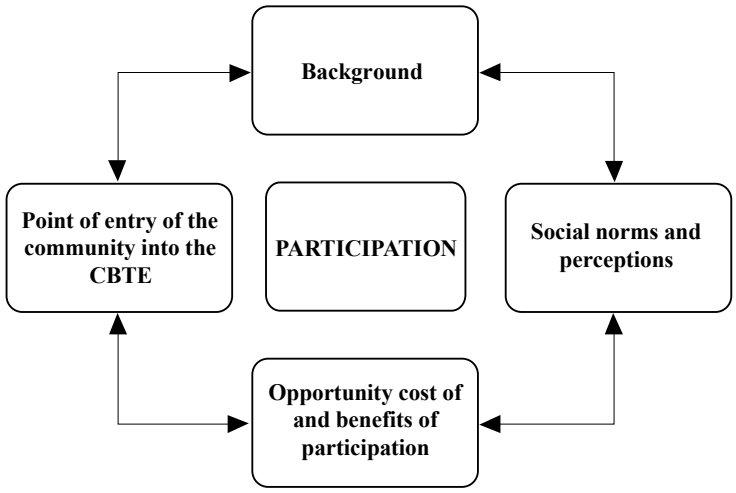
c) Opportunity cost of and benefits of participation

The community generally assess whether by participation, there is value or benefit.

d) Social norms and perceptions

Social norms, which are normally unwritten, may vary from one community to another but they influence the level of participation. These social norms are social constructs that expectations for the different genders and age groups.

Figure 4: Determinants of participation



Source: Author (2019)

Discussion

Homabay county is rich in tourism resources such as geographic features, historical sites and mythical sites. Besides these, the region boasts a rich flora, fauna and birdlife. Regrettably, most of these resources are minimally utilized and there is a need to develop them to their full potential. There is also little evidence of the local community engagement in tourism due to various constraints. All three categories (operational, structural and cultural) constraints to community participation were identified in the two case studies and Homabay County as a whole. At the operational level was lack of coordination amongst various stakeholders. The County and National Governments not having adequately played their roles as facilitators of community involvement in tourism evidenced this. The conservation agency, KWS was also seen not to have created a conducive environment to enable the community fully participate in tourism development. Lack of financial resources (due to minimal external support), lack of skills and expertise on the management of CBTEs were some of the structural constraints hindering participation. Apathy, low levels of awareness and gender social constructs were the cultural constraints found hindering participation in CBTEs. These constraints led to low levels of community participation in tourism planning and development and few if any, established CBTEs.

As discussed by Manyara and Jones (2007), most CBTEs in Kenya are located in close proximity to Natural Resources, National parks and Game Reserves. The use of Co-design tools and techniques proved effective in enhancing community participation in the planning of sustainable CBTEs. Co-design methods of telling, making and enacting were employed to mitigate against the constraints to community participation specifically cultural constraints of apathy, low levels of awareness, low literacy levels and gender disparities.

The study revealed that the main determinants of effective community participation in the planning and development of sustainable CBTEs was in having a shared vision, inclusion, increased levels of awareness and relevant stakeholders performing their roles. A participatory approach to CBTE planning and development should aim o attain the same by employing the appropriate tools and methods.

Conclusion

Homabay County is rich in tourism products, which can be harnessed for the establishment of sustainable CBTEs. As elsewhere, the dynamics of community participation in developing countries has been narrowly looked at in literature especially in developing countries. However, it is established that, constraints to effective participation were as a result of several factors. Among them are social constructs that define gender roles led to constraints to participation. Men took most of the leading roles in leadership and decision making, while the role of women was more supportive. Economic constraints and participation in CBTES being considered a luxury and low levels of awareness as to the operations and benefits of CBTEs and poor dissemination of information on the same from the National and County governments has led to apathy in participation in the CBTEs.

Co-design is promoted as an approach that can lead to effective community participation in the affairs that concerns them, in this study, the planning and development of sustainable CBTEs by putting into consideration factors that contribute to constraints in community participation such as socio-cultural, economic, apathy and low levels of awareness, lack of expertise and administrative constraints.

An appropriate framework for effective community participation in the planning of sustainable CBTEs need to take into cognizance the roles of the two levels of government; National and County, and the departments operating within them, stakeholders such as tour operators, investors, NGOs, Aid agencies and lastly, the local communities.. Each of these should articulate their roles within a predefined shared vision governed by policy with a focus on inclusion. Public participation should be reviewed in such a way as to incorporate a method that is inclusive and engaging as co-design.

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Rethinking the EVM based election process with due respect to the concerns of the voters

Ayushi Suri, Mimansa Tripathi, Arshia Gupta, Prof. Lalit Kumar Das

The core concepts of the Design Project were to be inclusivity and universality in design. So, what better topic to choose than the "Biggest Festival of Democracy- Indian Elections".

Indian elections were also known as the biggest festival of democracy including people from every possible background, starting from the age of 18. The ECI tries to ensure full participation by making provisions in the system and providing assistance wherever required for every person.

This project was aimed at making the whole election system more universal. This topic was chosen after a lot of contemplation and hesitation. The fact that the topic was one dealing with a major chunk of the Indian population made it one to be worried about, that it would be quite a time consuming and would have to be worked upon in-depth, which felt a bit difficult during the Covid-19 pandemic. But after persuasion and assurance from the side of Prof. Lalit Das, that it could be worked upon, the team decided to go ahead with it.

Introduction/Need Statement

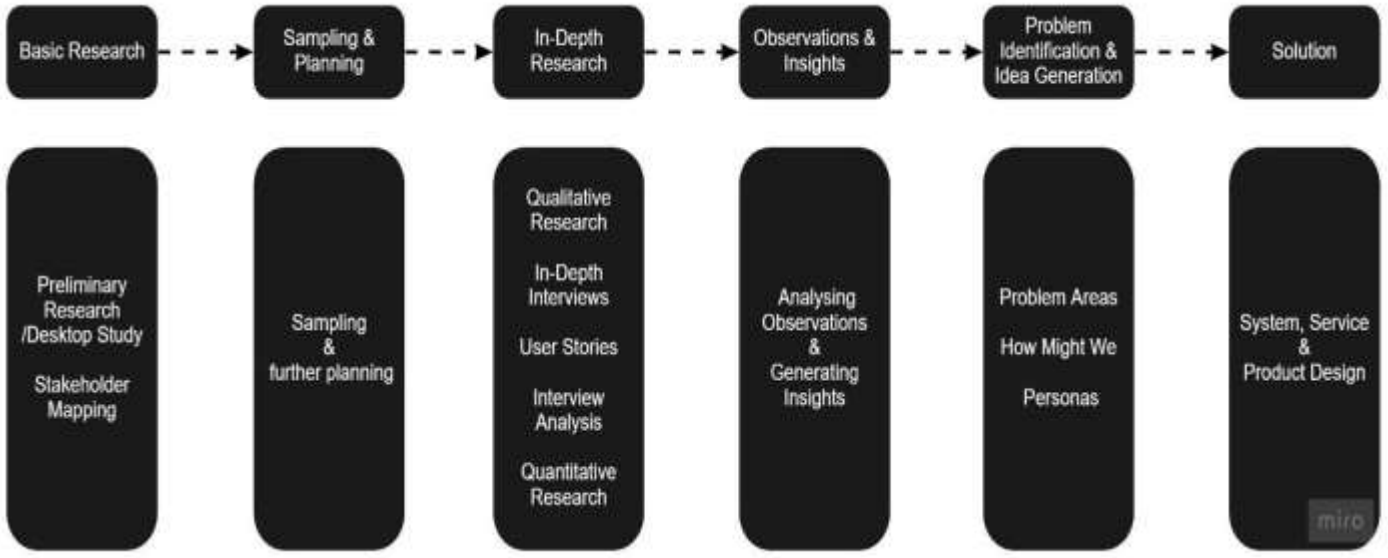
Through the project, the user experience of the Indian Elections from Voter Registration, Verification as well as Vote Tabulation & Tallying was re-designed to make it more inclusive, user-friendly, secure,

error-free & efficient for its major stakeholders—Voters & Election Officials through Service & Product Design.

For a developing and highly populated nation like India that has the largest population of illiterate adults in the world—287 million, which is 37% of the global total, devising a service/solution that is mindful of their abilities was imperative.

The Process

The approach taken was based on the 'Double Diamond Design Process'. According to the needs of this project, the process got tweaked and a new approach of how to proceed got developed.



Preliminary Research

The project research started with some desktop study on the pre-existing methods used for conducting elections in India. These insights were very broadly recorded in a mind map.

Some topics of interest include:

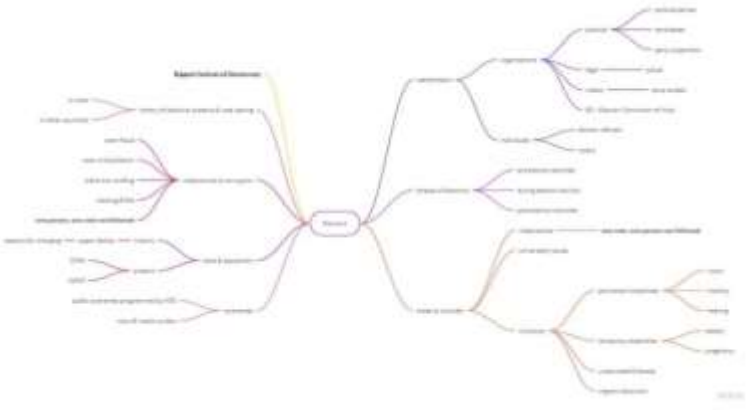
1. ***History of Elections and their conduct in India.***
2. ***Pros Vs Cons of Election conduction in India and other countries.***
3. ***Tools and Equipment used in Elections & their comparison with each other.***
4. ***Various focus areas like that of Inclusivity, Accessibility, and Malpractices in Elections.***
5. ***Read up the ECI's Election Accessibility Guidelines which according to the document have been implemented Pan-India.***

Guidelines for inclusion of wheelchairs, volunteers to help Pwd, allowing assistants for Pwds, making the space disability-friendly by ensuring the presence of ramps and railings of specific dimensions, and inclusion of braille on EVMs and voter slips.

Link: https://ceobihar.nic.in/pwd/Breaking Barriers_WEB.pdf

6. ***Broad understanding of the user flows of both election officials and voters through the 3 electoral phases; Pre, Electoral,***

and Post-Electoral phases.



Caption- Mind Map of the Desktop Study

Stakeholder Mapping

Through the preliminary research, the major stakeholders involved got mapped. This helped in Sampling the Users for further In-depth Research.

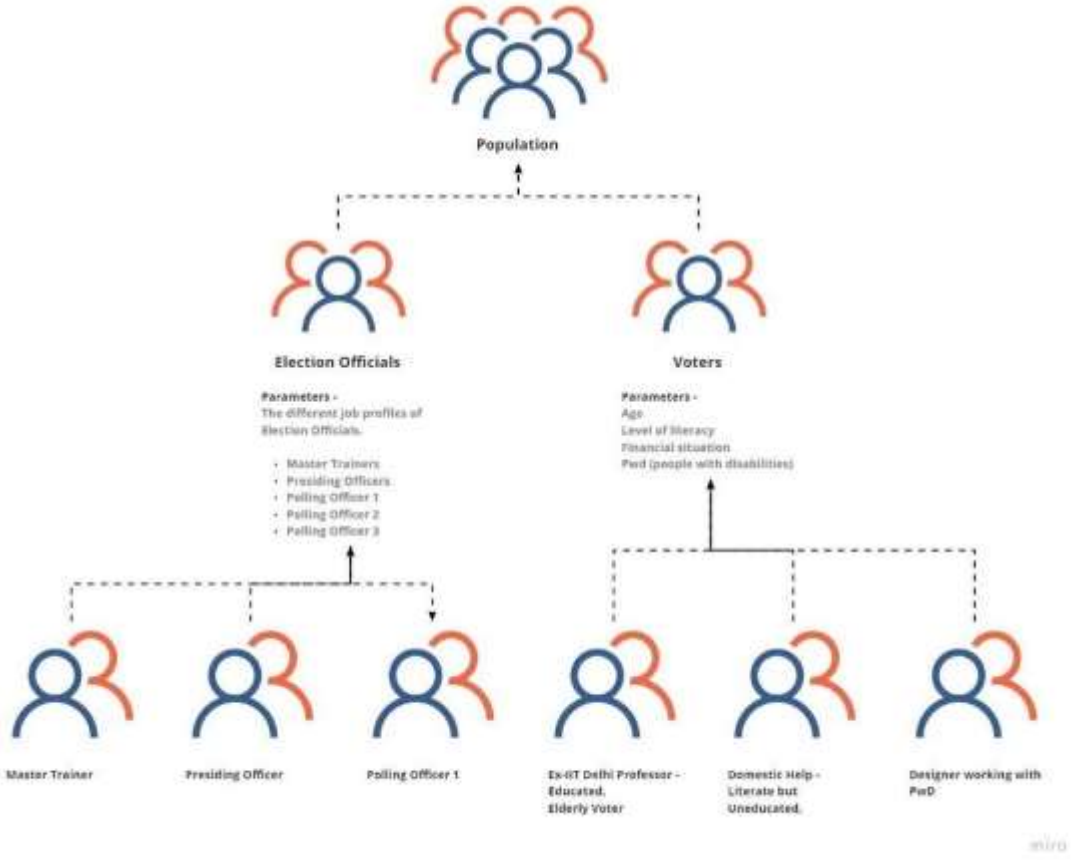
Caption- Stakeholder Mapping

Note: Since there are a lot of direct and indirect stakeholders involved, designing for all of them would be a behemoth feat and very time-consuming. So, the project's focus got narrowed down to only the election officials and voters.

Sampling

A Non-Probability Method of sampling i.e. Quota Sampling was used to split the two groups of desired stakeholders, i.e. Election Officials and Voters into different subsets according to certain parameters.

Individuals from each of these subsets were then chosen to conduct In-Depth Interviews and acquire Qualitative Insights



Caption- Sampling of Users using certain parameters

Note: Sampling was done to get qualitative data on a sample that best represented the majority of the desired stakeholders, i.e. all the different types of Election Officials as well as the 900 million eligible Voters Pan-India.

Qualitative Research

Sampling the users provided an audience to further continue with In-depth Research which included User Interviews, User Stories, Interview Analysis etc.

In-Depth Interviews

In-depth Interviews of 8 users, 5 Election Officials, and 3 Voters were conducted, using open-ended questions to know and understand their own experiences, stories, and behaviours towards the Election System.

Open-Ended Questions were asked majorly to get Qualitative data which along with Quantitative Research were imperative in discovering real user needs and challenges.

Objective: To gather Qualitative data about the stakeholders' experience with Elections and their activities.

Platforms: In-Person, Google Meet

Average Duration: 20- 40 mins

Interview Analysis

All the interviews were analyzed again to get a deeper understanding of what the users feel about Elections and its different phases. The following shows some of the major observations we concluded.

Caption- A sheet showing all the observations collected during the interviews of the Election Officials

Of Election Officials-

1. ***2/3rd (Master Trainers) of them had trouble performing operational training (relaying instructions & rules and guidelines of the Polling Officer's job responsibilities) to the Polling Officials; majorly about how EVM-VVPAT machines connected, how they work together, are sealed, etc.***

2. ***2/3rd of them felt instructional documents & videos put out by ECI on the web & youtube respectively for operational training are not very helpful and can be made better.***

3. ***All of them preferred EVMs over Paper Ballots as they feel it adds a layer of security to the whole vote casting process and reduces chances of electoral malpractice, like booth capturing. It is also more efficient than Paper Ballots according to them. even***

though EVMs add more to their work in terms of conducting mock polls with 50 votes per machine as a measure of checking the functioning of the machines.

4. ***4/5 officials who were teachers &/or professors could not teach their students for several months because of their mandatory election duty.***

5. ***Almost all of them believe cases of voter fraud and malpractice are more common in village and slum areas due to personal experiences or hearing other officials' experiences.***

6. ***Most of the observed cases of electoral fraud in village and slum areas where the less educated voters lived.***

7. ***All of them believe the majority of the polling stations in urban areas in Delhi follow majorly all the Accessibility Guidelines for PwD set by the ECI. The same cannot be said for village and slum areas which have a lot of illiterate/less educated people.***

8. ***2/6 of them personally experienced cases of electoral malpractice.***

   One mis/wrongly-identified voter caused voter fraud; i.e. another man voted on behalf of the original voter.

   The other had to reject entry to an eligible voter into the polling station because his name was not in the electoral

roll. This particular eligible voter, as a result, lost his right to vote.

	occupation	are they eligible voters	are they registered voters	have they voted before	if not, why?	experiences with elections	problem areas
mr. lalit das	Ex-IIT Delhi Professor	yes	voter id card has been made but name has not been in the electoral roll for the past 20 years. So, has not been able to exercise his right to vote.	yes, but not for the past 20 years since a hiccup on the ECI's end	voter id card has been made but name has not been in the electoral roll for the past 20 years. So, has not been able to exercise his right to vote.	Has tried troubleshooting the electoral roll issue himself multiple times but no success. Contacted a master trainer to see if she could get the issue resolved but she couldn't either. Blames the ECI and does not find it and the election system reliable or credible anymore. Lack of transparency on the functioning of the election system. Thinks the electoral roll issue is because of an inside job and that somebody has intentionally not put his name in the electoral roll in exchange for something.	Pre-Election voter registration malpractices and electoral fraud elections not being transparent and inclusive of people
Mrs. Kiranti	Domestic Worker (Migrant)	yes	no	no, never before but really wants to	hasn't gotten her voter id card made because she has no permanent address of proof even though she's been living in the same constituency for about 10 years. So, her voter id card can only be made of her hometown where she has a permanent address proof and out of the constituency she wants to vote in.	Has never voted before because of govt.'s inconsideration in getting her voter id card made and her employers not granting her leaves to go to her hometown to cast votes, even if she vaed to cast her vote that is. Because of this, she has lost trust in the govt. in ensuring people like her are able to vote and now very easily believes the false claims other people and media make.	Pre-Election voter registration elections not being inclusive of people like her
mr. nekrom upadhyay	Designer working with PwD	yes	yes	yes	-	because he's a designer that works for PwDs, he's got a keen eye for observing if something is accessible, inclusive and disability friendly. Through both personal experience and experience of PwD, he says that although accessibility guidelines are provided by the govt. and ECI, they are not being implemented pan-India. says elections are very inconsiderate when it comes to PwD and accesibility.	Electoral phase - space design majorly

Caption- A sheet showing all the observations collected during the interviews of the Voters

Of Voters-

1. ***Most of them either knew somebody who had bad experiences with Elections or had had them themselves.***
2. ***Most of them feel elections are not universal, accessible, and voter-friendly due to either their own experiences or through knowing somebody else's experiences.***
3. ***These experiences have made most of them lose their trust in the ECI and Elections and question their credibility.***

4. ***Most of them feel elections are not universal, accessible, and voter-friendly due to either their own experiences or through knowing somebody else's experiences.***

User Quotes and Stories

Through the In-Depth Interviews, we gathered some interesting things users exclaimed during the interviews as User Stories.

These user stories gave rise to some contradictions as well as shattered some hypotheses that we had developed during the preliminary research we had conducted.

Following are the User Stories accompanied by their corresponding User Quotes:

> ***"We know of an election official who suffered a stroke on the job and died because of all the stress"***
> ***- Mr. Ravindra Singh, Master Trainer***

Said while talking about just how stressful the election duty is for the officials. Said that there is a lot of scope of an error on their part while on election duty which can lead to them even losing their jobs. Said every official is scared and fearful of making mistakes which is why most of them don't conduct their duties efficiently.

"We have missed out on teaching my students for 2 months straight. Itna loss hua unn bachho ka"

(The children have experienced a lot of loss in terms of studies because we missed out on teaching them for 2 months straight as we were the election official)
- Mr. Ravindra Singh, Master Trainer

Said while talking about how the election system is so extensive that it requires a lot of manpower to conduct. This is why even essential workers like healthcare workers and professors/teachers are not safe from election duty.
"Although he had voted before, he couldn't cast his vote correctly"
- Mr. Ravindra Singh, Master Trainer
Said while talking about a personal experience he had with an illiterate, village man who when asked to conduct his vote didn't press the button corresponding to the party on the EVM but tried pressing the party's symbol instead.

This is a contradiction to what was in an article during the preliminary research which said that-

"In EVMs, the voter has to simply press the blue button against the candidate and symbol of his choice, and the vote is recorded.__Rural and illiterate people had no difficulty in recording their votes and they have welcomed the use of EVMs."
- Dr.. S. Y. Quraishi, Former Election Commissioner

(Source:https://www.business-standard.com/article/economy-policy/booth-capturing-is-history-now-thanks-to-evms-109082503018_1.html)

"Prior information about the names of PwD is provided to the Polling Station"

- Mr. Neeraj, Master Trainer

This quote/experience is a complete contradiction to what Mr. Subhash, Presiding Officer said during the interview. ***"Mera toh na hi kabhi voter ID card bana hai, na toh kabhi banega"***

(I have never had a voter ID card made and will also not be able to get one made in the future)

- Mrs. Kiranti, Domestic Worker, Migrant, Living in Delhi as a migrant for >10 years.

Said Mrs. Kiranti, a domestic help in Delhi who is also a migrant. She has been living in the same constituency for 10+ years but has never been able to vote as she lives in a temporary place of residence and doesn't have a valid proof of residence to get her voter ID card made.

If she wishes to get registered as a voter, she'll only be able to cast her vote in her hometown of Bihar where she has proof of a permanent place of residence.

"Mene khud dekha hai, voter ka Electoral Roll me naam hi nahi tha. Toh usko entry thodi de paaye hum"

(I have seen myself that a voter didn't have their name in the electoral roll, so we couldn't let him enter the polling station)

- Mr. Subhash, Presiding Officer

Said while talking about one of his interesting experiences with a voter in his polling station. He was an eligible voter with a proper voter ID card but because his name was not in the electoral roll, the voter was not granted entry into the station hence, losing his right to vote.

Said that incidents like this happen all the time but there is nothing the officials can do about it. They need to perform their duty and follow ECI's guidelines.

"Mere saath khud hua hai. I wrongly identified the voter in the polling station aur phir voter fraud ho gaya. Me kya hi karta? Itni grainy, black & white photo this voter ID me"

(It happened to me as well. I wrongly identified the voter in the polling station leading to a fraud being executed. What could I have done? The photograph on the voter ID was very grainy and was black & white)
- Mr. Manish, Polling Officer 1

Said also while talking about an incident he had with Electoral Malpractice. He misidentified & verified the wrong person which led that person to cast his vote in place of the actual voter.

This mistake came to light when the actual voter came afterwards to cast his vote but couldn't as somebody else had already cast his vote in his name.

The police had to be called to resolve the issue, and the actual voter had to use a paper ballot to cast his vote in the

end. During all of this, he felt extremely fearful and stressed but also resigned.

"I've not been able to vote for the past 20 or so years even though I have a valid Voter Id card made. My name is just not there on the Electoral Roll. Yeh koi inside job hai, somebody has committed this malpractice from the inside of the organization"

(I've not been able to vote for the past 20 or so years even though I have a valid Voter Id card made. My name is just not there on the Electoral Roll. I believe this is an inside job, somebody has committed this malpractice from the inside of the organization)
- Mr. Lalit, Ex-IIT Delhi Prof., Eligible Voter

Said while talking about his bad experiences with Elections. Said he's tried to troubleshoot this problem various times, and also asked a Master Trainer to try to resolve it but to no avail.

Said he's completely lost trust in the Election System and feels that ECI is a corrupt organization because of his bad experience.

"ECI ne nikali hongi accessibility guidelines aur sabh, but what's the use when they're not being implemented pan-India?"

(ECI might have prescribed things like accessibility guidelines, but what's the use when they are not being

implemented pan-India?)
- Mr. Nekram Upadhaya, Designer for PwD at Indian Spinal Injuries Centre, Voter

Said while talking about his experience as well as the experiences of PwD with Elections.

As he is a designer who works for PwDs, he's got a keen eye for observing if something is accessible, inclusive, and disability friendly.

Through both personal experience and experience of PwDs, he says that although accessibility guidelines are provided by the govt. and ECI, they are not being properly implemented pan-India.

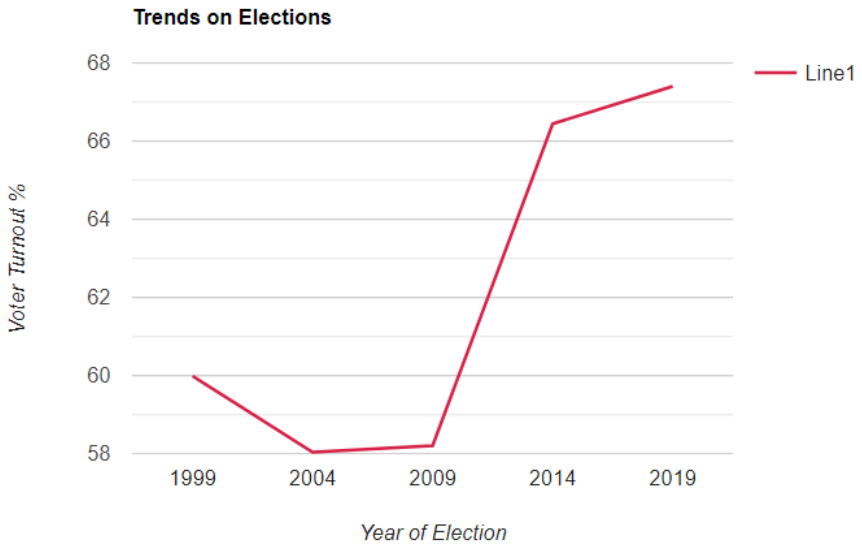
He also mentioned Elections are very inconsiderate when it comes to PwD and accessibility.

Quantitative Research

After the In-Depth Interviews and gathering Qualitative Insights from various stakeholders, Qualitative Research was conducted in terms of some statistics and trends to:

1. ***Try and validate if those observed insights were felt by the majority of the population or not.***
2. ***See if those insights could be converted into actionable user-driven insights.***

Statistics and Trends



Caption: The trend of Voter Turnout % (1999–2019)

Major Observations from this Trend:

1. ***Before 2004, the voter turnout % was on a steep decline.***
2. ***Since 2004, voter turnout has been on an incline. This can be because of the introduction of EVMs that were introduced to replace Paper Ballots for added security and reduction in malpractices like booth capturing.***
3. ***Although 2019 observed an increase in voter turnout %, it was only 0.96% which is minuscule compared to that of 2014 which observed an increase of 8.23%.***
4. ***2019 recorded the highest ever voter turnout % (67.40%), but in 2019 alone there were multiple cases of electoral fraud like voter duplication, mistaken identity, etc. This leads me to believe that a considerable amount of votes***

> ***casting happened through fraudulent means that got included in the voter turnout % for the 2019 Election.***

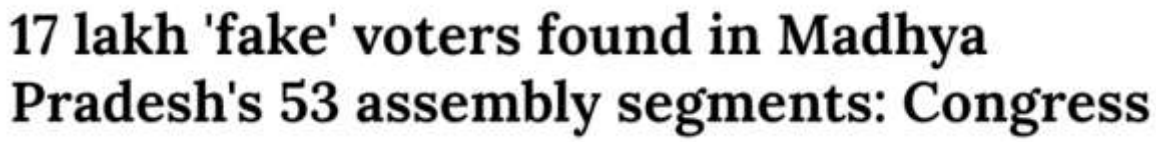
New Delhi : Last week, a 10- member team comprasing officials from the Election Commission of India, led by former deputy commissioner Vinod Zutshi reached Andhra Pradesh to audit the state voter list, following allegations by the YSRCP that about 59 Lakhs entries in the voter list are false.

The allegation is significant as there are about 3.67 crore eligible voters in the state , which means the alleged ' fake voters' constitute about 16 percent of the total electorate.

Case of Fraudulent Electoral Roll listing in Andhra Pradesh in 2019

> ***"As per my assessment, there are about 12 percent errors in the voter rolls across India today."***
> ***- Mr. Jaya Prakaksh Narayana, founder of Lok Satta Party***

(Source:https://www.news18.com/news/india/the-curious-case-of-voter-fraud-and-duplicate-voters-in-andhra-pradesh-2055237.html)



(***Source:https://www.moneycontrol.com/news/politics/17-lakh-fake-voters-found-in-madhya-pradeshs-53-assembly-segments-congress-2868071.html)***

Case of Non-Inclusivity in the voter registration process

(Source: https://thelogicalindian.com/news/voter-card-dog-photo-20008?infinitescroll=1)

West Bengal: Man Gets Voter ID Card With Dog's Photo Instead Of His Own

Sunil Karmakar on March 4 said that he had applied for a correction in his voter ID card and the revised card had a dog's photo instead of his own.

Debarghya Sil

India | 5 March 2020 / Updated : 5 March 2020 7:11 PM

Editor : Prateek Gautam | By : The Logical Indian Crew

- ***The total number of internal migrants in India, as per the 2011 census, is 45.36 crore, or 37% of the country's population. Hence, I needed to be mindful of the whole migrant population while redesigning the election system in terms of it being Universal.*** **(Source:https://indianexpress.com/article/explained/cor**

onavirus-india-lockdown-migran-workers-mass-exodus-6348834/)

Only 51,750 (5%) of the total VVPATs used in elections, which are 1.035 million, are tallied and corroborated against its corresponding EVM machine to check for claims of hacking of EVMs. This minuscule number is not enough to get an accurate picture and in turn, greatly reduces the election's transparency.

(Source:https://qz.com/india/1591214/indian-election-2019s-voters-polling-booths-and-candidates/amp/)

11 Million: **Election personnel being deployed to conduct 2019 Election polls.**

This statistic perfectly corroborates what Mr. Ravindra, Master Trainer & Govt. College Professor was saying during the interview.

(Source: https://qz.com/india/1591214/indian-election-2019s-voters-polling-booths-and-candidates/amp/)

The Findings

After all the research, Insights were generated based on the Observations & personal Knowledge to club the research and move towards building a solution.

1.**There is a lot of scope for human-induced error in the election conduction process; especially in the pre-electoral and electoral phases**.

These errors can and has had:

- ***detrimental legal ramifications for the Election Officials and induce fear in them.***
- ***voters lose their right to vote and reduce the transparency of the election system.***
- ***voters lose trust and credibility in ECI and the Election System.***

Pre-electoral phase-

1. Getting registered as voters by generating valid voter ID cards is troublesome and often error-filled for the voter; especially for the elderly and uneducated. ***(as seen with the old village man with the voter id card photo of a dog)***

2. **Generating the electoral roll is also error-filled.**

Oftentimes, eligible voters lose their right to vote because their name fails to appear in the official electoral roll.

Other times, names of deceased voters remain written in official electoral rolls which give rise to electoral malpractices like voter fraud and booth capturing.

Caption: Experience of an eligible voter's name not being in the electoral roll

(Source: Review of PwD App by ECI in Play Store)

Electoral phase-

1. **Mis-identification of voters by 'Polling Officer 1' in polling stations due to manual voter authentication that takes place.**

   The pictures on voter ID cards are almost always black & white, grainy, and old which makes it very difficult for Polling Officers to correctly identify and authenticate the voter. They often resort to just asking some very basic identifying questions about the voter which can easily be answered by somebody else who's not the voter- Mr. Manish, Polling Officer 1.

This erroneous voter identification increases the chances of electoral fraud like duplicate voting.

Caption: Example of grainy, b&w photos on Voter ID Card (Source: https://www.etawahonline.in/city-guide/important-documents-etawah)

Elections are *not inclusive* and not everybody can exercise their right to vote *(as seen in the case of the migrant domestic help & the voter whose name was not in the electoral roll).* Election conduction is an *extremely slow process* due to some of the major electoral and post-electoral *activities being manually done*.

Voter verification, recording, and tallying of verified voters in the electoral roll as proof as well as tabulation and tallying of VVPAT slips against the digitally computed votes in the EVM are all hectic, time-consuming, and manually done tasks that have a lot of scope for human-induced error.

This leads to a lot of problems like-

- ***A lot of manpower is required to conduct these activities, and most of this manpower is govt. teachers***

and professors who are unable to teach for the duration of the election.

- ***Causing voters discomfort by waiting in long queues to get verified and be able to cast their votes.***
- ***Election Officials are experiencing a lot of fear of making a mistake and possibly losing their jobs (like in the case of voter misidentification leading to voter fraud and voter duplication.***
- ***Election Officials losing efficiency and not working to their fullest potential (seen as only 5% (51,750) of VVPAT results get tallied against their corresponding EVMs)***

4. Voters' lack trust in the Election System and Election Process due to

- ***Personal bad experiences with Election, for example:***
  - ***a. no accessibility guidelines followed thoroughly pan-India for PwD.***
  - ***b. inclusivity issues for migrant voters.***
- ***Mis-identification of voters by Polling Officers***
- ***Name not mentioned of eligible voters in the electoral role forcing them to lose their right to vote***
- ***Names of deceased people still mentioned in the electoral roll sometimes causing electoral fraud- booth capturing, voter duplication.***

- ***Lack of tallying of VVPATs. Only 5% of VVPATs get tallied against its corresponding EVMs- around 57,000 VVPAT machines only out of the 1.035 million used to tally votes.***

This has led to *voters blaming the ECI* as an institution and *Elections losing their credibility and reliability* (*observed in the case of Mr. Lalit*)

As a result, voters are now *more susceptible to believing negative/false claims that the 'Media' might raise* (observed in the case of the uneducated migrant worker who is unable to get her Voter ID card for her constituency).

5. Election Officials will prioritize security and reduction in mistakes/voter fraud over efficiency if it came down to it, it was observed.

Problem Areas

After the Research and Insights generation, problem areas that negatively impacted most of the stakeholders got discovered and defined. After which, some were prioritized due to certain parameters.

The problem areas highlighted in blue are the ones that were prioritized.

Pre-Electoral Phase	Electoral Phase	Post-Electoral Phase
VOTER REGISTRATION- not inclusive difficult to conduct by users sometimes error filled	**VOTER VERIFICATION-** mis-identification voter ids with old, grainy pictures lots of official induced errors - due to slow manual processing leads to malpractices - voter fraud, duplicate voting, booth capturing waiting in long queues	**COUNTING AND TABULATION OF VOTES-** make it easier, convenient and less time consuming only 5% VVPATS being counted against their corresponding EVMs reduces trust of voters on elections & eci reduces transparency EVM DESIGN make it intuitive and more secure to reduce allegations of it being tampered with
OCCUPATIONAL TRAINING- difficult to conduct by officials scope of improvement of educational material on occupational training on the web as well as what is sent out by the ECI	ACCESSIBLE SPACE DESIGN accessibility guidelines ae not being properly followed pan-india	

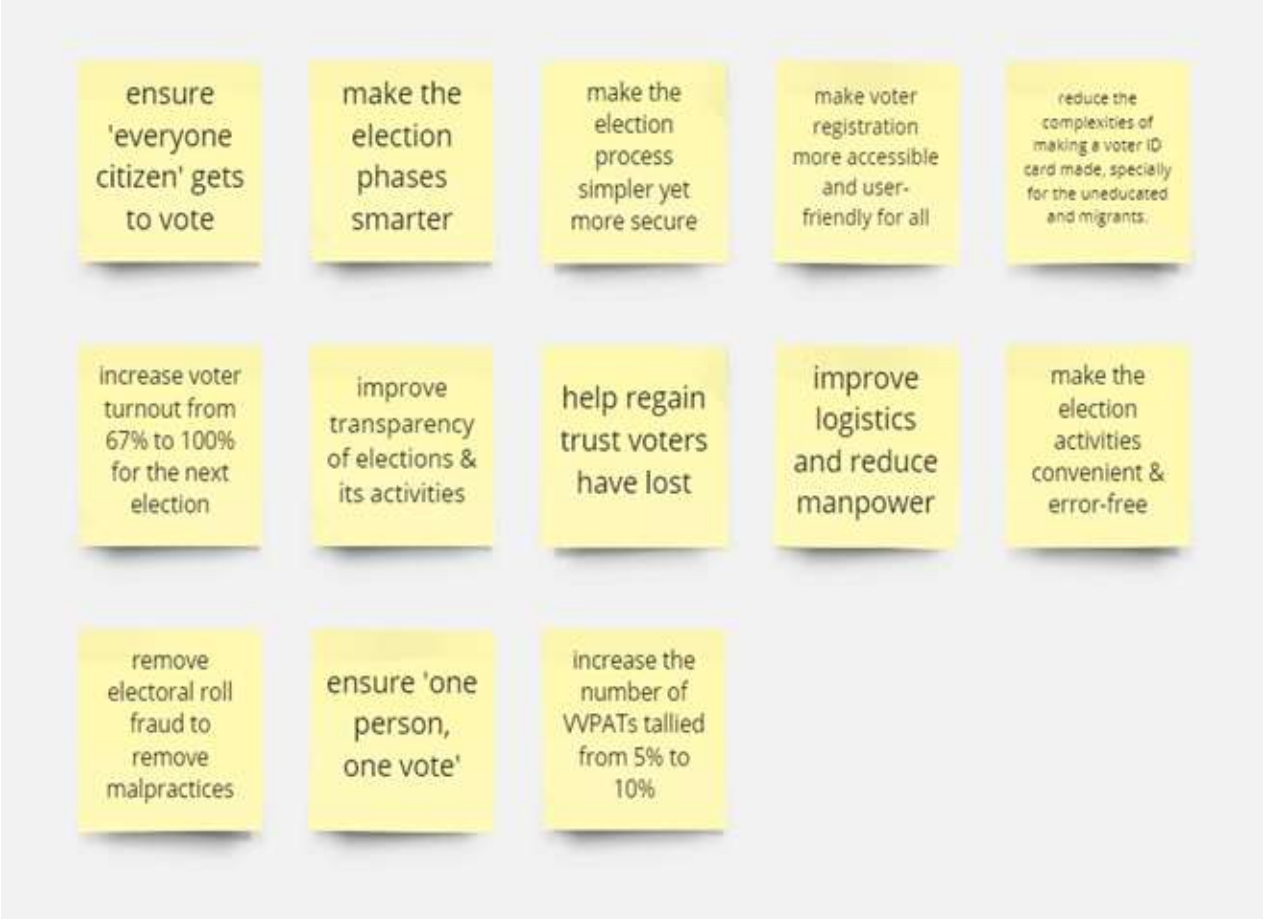
Caption- Highlighted Problem Areas

Note: Areas like 'occupational training', 'improving awareness/educational material for said training' and 'accessible space design were not taken forward because of:

1. ***Difficulty in getting an in-depth understanding of these topics due to it being full lockdown during the making of this project.***
2. ***Difficulty in conducting spatial studies to fully understand the 'Accessible Space Design' problem seeing as it was not 'Election Time'.***

'How Might We' Statements

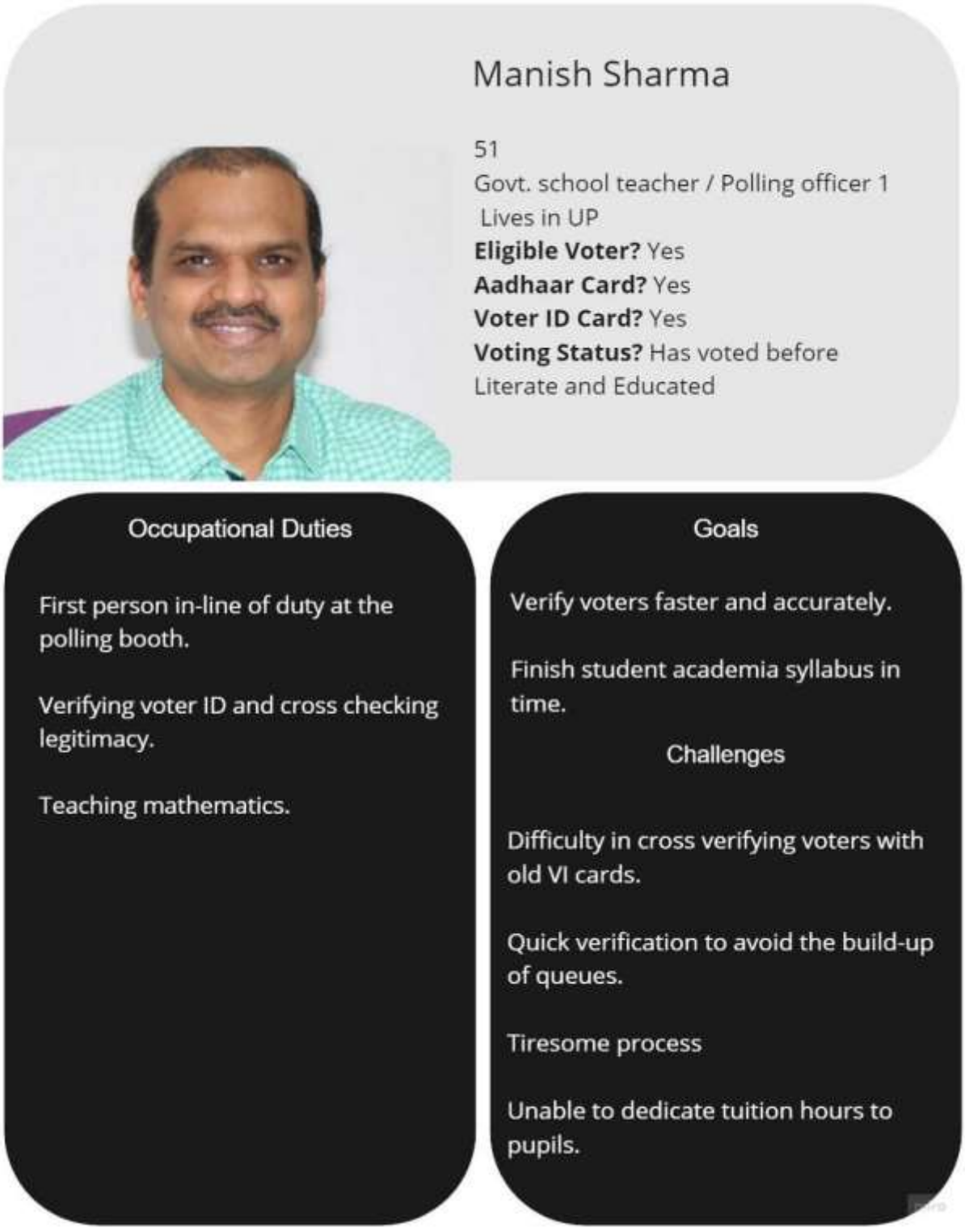
To further define and prioritize the problems that needed to be fixed, 'How Might We' statements were used to define and prioritize project goals.



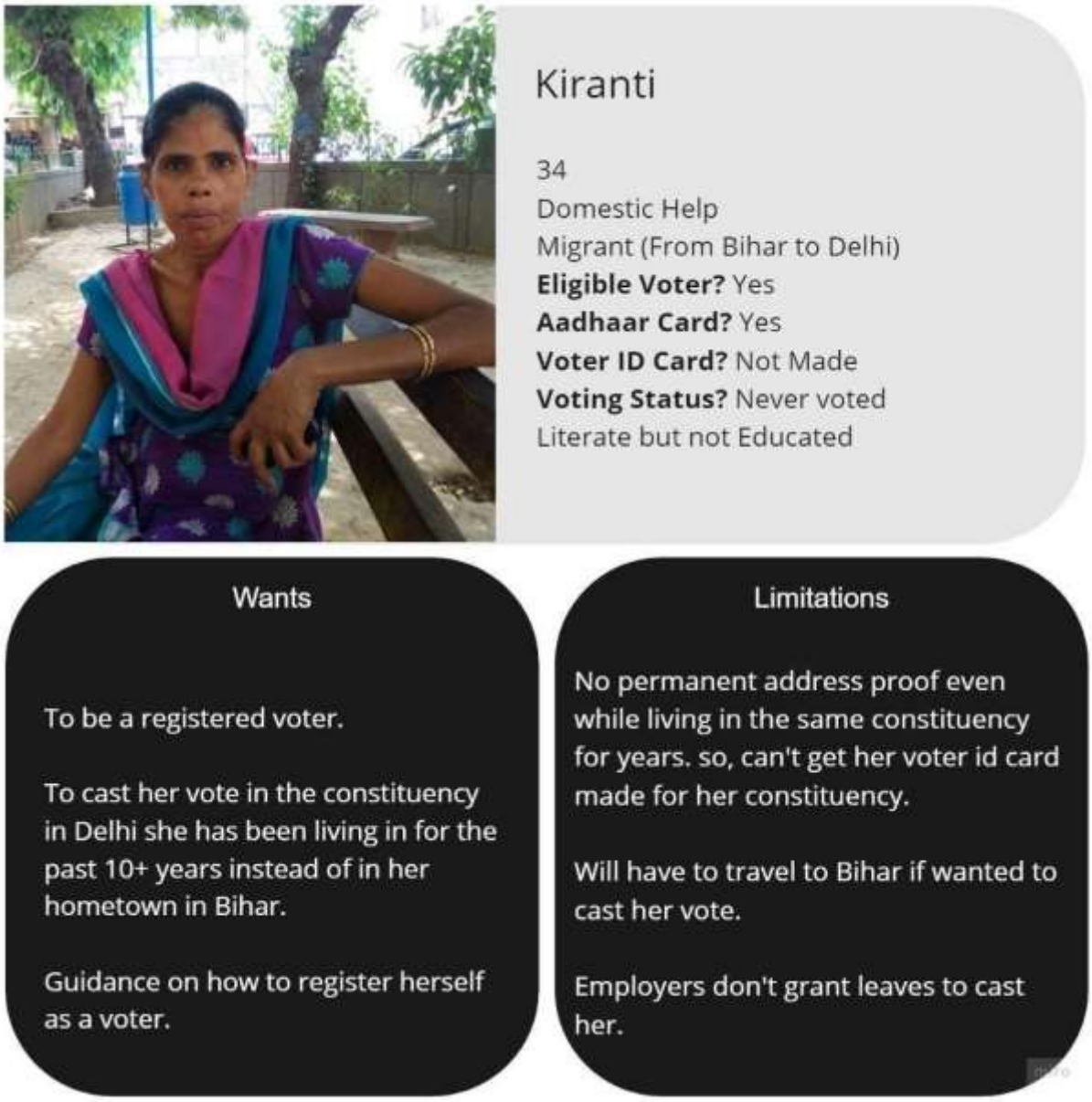
Caption- 'How Might We' statements

Personas

Finally, User Personas were created to club all the needs of both the stakeholders and design accordingly.



Caption- Persona of Polling Officer 1



Caption- Persona of Voter (Domestic Worker, Migrant)

Solution

The final solution has these four primary goals-

1. ***Make the Elections more universal and accessible.***
2. ***Increase transparency of the election conduction system to regain the trust and credibility it lost by the voters.***

3. ***Make the three electoral phases simpler, efficient, majorly errorless, and user-friendly without compromising its security.***
4. ***Improving the logistics; reducing the manpower required to conduct Elections and increasing the voter turn-out.***

The solutions will be based on these three problem areas-

1. ***Pre-Electoral Phase- Voter Registration***
2. ***Electoral Phase- Voter Verification***
3. ***Post-Electoral Phase- Vote Tabulation & Tallying***

Following are the design solutions that came up-

1. An automatic voter registration system backed by Aadhaar (For Voter Registration)

The concept:

Through this, citizens will no longer need to get a voter ID card made to get themselves registered as voters because their already existing Aadhaar Card will act as their new Voter ID card. Their Unique Aadhaar Number will become the new EPIC Number (Electors Photo Identity Card Number) and completely replace the Voter Id Card, i.e, voters will not have to go through the cumbersome process of getting their Voter Id Card made/updated anymore to get themselves registered/re-registered respectively.

Note: The Aadhaar Number is a 12-digit number issued by the Unique Identification Authority of India (UIDAI). This number is

unique to every person who gets an Aadhaar card made by taking into account the person's biometric details such as iris scan and fingerprints, and demographic information like date of birth and address proof.
Aadhaar Number acts as a proof of one's proof of identity, proof of address as well as proof of age anywhere in India.

Citizens aged 18 or above on 1st of January who satisfy the following parameters are considered to be eligible to vote. These parameters include :

- ***The citizen should not be declared to be of an unsound mind.***
- ***The citizen should not have performed corrupt practices or any illegal activities relating to elections.***

Through the concept of Automatic Voter Registration, all eligible voters who already have their Aadhaar Cards made will have their names included in the electoral list automatically by the ECI as the new electoral roll will be backed up by data from UIDAI's Aadhaar Card data.

This automatic registration of eligible voters by the ECI will be done through 3 filtration steps, namely, Eligibility Filtration, Mortality Filtration, and Criminality Filtration.

1. **Eligibility Filtration**

   The Election Commission of India (ECI) of India will get access to the total population eligible as voters on the basis of their age (18 years and above by 1st January of

election year) from CIDR (Central Identities Data Repository), which contains all Aadhaar numbers issued to Aadhaar number holders along with the corresponding demographic information and biometric information .

2. Mortality Filtration

The ECI will receive information about the deceased people in the eligible voter population from the National Population Register (NPR) and remove them from the electoral roll.

3. Criminality Filtration

The ECI will receive information of the convicted criminals from the Crime records bureau (CRB), and remove them from the electoral roll.

Caption: Data Flow diagram for Automatic Voter Registration

Benefits/Pros of the concept:

- **Similar Criteria and Same Proofs to get both Voter Id Cards as well as Aadhaar Cards made:**

  Since to acquire an Aadhaar Card, valid proofs of identity and address are required which is the exact same criteria that is used to acquire a Voter Id Card, it makes more sense to replace the Voter Id card which is an election specific document/card with the Aadhaar Card, which is a very versatile and universally acceptable government-issued document/card that can be used to avail a multitude of Govt. Services, Programmes and Schemes like Acquisition of Passports, Opening of Bank Accounts, and Availing LPG Subsidy to name a few. This versa

- **Reduction in the steps required to become a registered voter:**

  By replacing the Voter Id Card/EPIC Number with Aadhaar Card/UIDAI Number is beneficial as first-time voters/new voters who register for the very first time and/or existing voters who re-register from a different constituency due to them changing their location (Military and Migrant Workers) will simply get their Aadhaar Card successfully made and updated respectively, and their name will automatically be added to the electoral roll.

This 'Automatic Voter Registration System backed by Aadhaar' concept will save voters from going through the hassle of getting a whole new Id card made, i.e, get a Voter Id card made for an event that happens once every 5 years.

The concept, hence, will make the registration process much simpler, shorter and user friendly for all the voters, especially the ones who are uneducated, migrant workers who lack a valid proof of address of the constituency they have migrated to as they generally live in illegal settlements (as they can get an Aadhaar Card made with the help of either, an introducer's or their head of family's Aadhaar Card credentials), and people who quite often move to different places.

Statistics that favour Aadhaar Cards replacing Voter Id Cards:

- ***95% of adults already have Aadhaar.***
- ***92% of people are satisfied by Aadhaar.***
- ***90% of the people trust that their data is safe in the Aadhaar system.***
- ***49% of citizens used Aadhaar to access one or more services for the first time.***

2. Voter Verification System through Biometric Verification

On the day of the election, the first step is to always check the legitimacy of the eligible voters through voter identification and verification by the 1st Polling Officer. Upon successful verification, the

voters are allowed to step inside the polling station and eventually cast their vote in the polling booth that they are assigned.

This manual verification of the voters against the old, grainy and often black & white photos on their Voter Id Card had been quite erroneous in the past. One of the Polling Officers that was interviewed mentioned wrongly identifying and verifying a voter as the photo in his Voter Id Card was grainy, monotone and not identifiable.

The concept:

On the day of elections, the 1st Polling Officer will identify and verify eligible voters by matching their biometric data (either fingerprints or iris scan) against the unique biometric data stored in the CIDR corresponding to the voter's Aadhaar Card Number at the polling station entrance. Only those eligible voters who have readable and verifiable biometrics will be allowed to enter the polling station and go to their allotted polling booth to cast their vote.

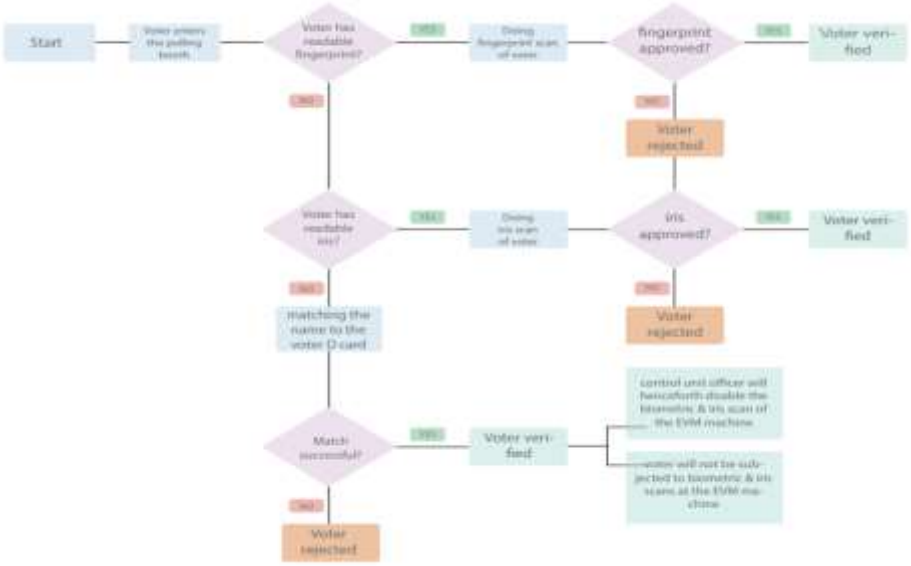
The eligible voters who do not have readable biometrics (both fingerprints and iris scan) will undergo manual verification by the Polling Officer by getting their face matched with the picture stored in the Aadhaar Card data. Once verified through this manual scan, they will be allowed to enter the polling station and cast their vote in the allotted polling booth.

The Polling Officer will not have the Aadhaar data stored of every eligible voter for that particular election pan-india to identify and verify the voters against, but only of those specific eligible voters who

have been allotted the same polling station that the 1st Polling Officer is in command of.

This inclusion of only specific biometric data per polling station adds the 1st layer of security in the electoral process, i.e, the Voter Verification and Vote Casting processes.
This will make sure only verified and actual voters cast their votes, which will further ensure 'One voter, One Vote' right is preserved and voter's trust in the Election system and conduction is regained.
Adequate Leniency is provided for voter authentication as fingerprints of any of the fingers of the voter should match in order to get verified at the polling station.

Counter measures are also provided in the form of Iris scan and manual verification. The voters can undergo these verification measures in case they can't opt for fingerprint verification.



Caption: User Journey for Biometric Voter Verification

Benefits/Pros of the concept:

- ***The process of voter verification will become efficient, quick and secure.***

- ***There will be no cases of mis-identification by the polling officers and human-induced errors will be a non-issue anymore.***

- ***Voter identification problems currently faced by 1st polling officers will be resolved.***

- ***By introducing biometric enabled voter verification, the responsibilities of Polling Officer 2, which is re-checking the identity of the voter once they enter the polling booth and putting indelible ink on the fingers of successfully verified voters, will get removed from the system, which will save 1.035 Million Govt. Employees the trouble of doing Election Duty.***

  Most of these Election Officials are Govt. School and College professors who miss out on teaching their students for months on end. This way, ECI will greatly reduce the manpower it needs to conduct elections.

- ***One vote per voter right will be preserved.***

3. Vote Casting through Biometric Verification & EVM-VVPAT Hybrid

After voter identification & verification, the next step is vote casting on the EVM machine by the voter. This vote casted on the EVM machine is validated by a machine called the VVPAT (Voter Verifiable Paper Audit Trail). Every EVM machine has a corresponding VVPAT machine alongside it.

After a vote is casted on the EVM, the VVPAT prints out a paper slip which reflects the party symbol and party name of the chosen party candidate, in both Hindi and English. This slip remains in view of the voter for a span of 7 seconds as a form of visual feedback, after which it falls into the collecting bin.

After all the votes from the voters in the polling booth are casted, both the EVM and VVPAT are locked and sealed, and are transported elsewhere in order to start tabulating the votes.

Problems with the current vote casting and vote tabulation system:

For the election officials-

1. **Both the EVM and VVPAT machines are very bulky and difficult to transport to the polling stations pan-india.**
2. **EVM is not a secure machine as there are still cases where booth capturing has taken place, and voter fraud happened by threatening the officials with violence.**

For the voters:

1. ***EVM's interface is visually confusing. There are no cues to help voters make connections between the candidate paper slip on the EVM and its corresponding button.***
   This confusion and lack of visual cues increases cognitive load on the voter which can result in a faulty/wrong vote being registered.

2. The placement of the VVPAT machine at the side and at a lower level to the EVM makes it difficult for voters, especially first time voters, illiterate voters, and elderly voters to view the VVPAT's paper slip which shows the selected party.

3. Only 51,750 (5%) of the total VVPATs used in elections, which are 1.035 million, are tallied and corroborated against its corresponding EVM machine to check for claims of hacking of EVMs. This minuscule number is not enough to get an accurate picture and in turn, greatly reduces the election's transparency.

To combat all of the aforementioned problems, the concept of EVM-VVPAT Hybrid was developed. This hybrid makes sure of three things, namely, added legitimacy and security of the votes casted through the inclusion of biometrics, improving voter-friendliness of the vote casting process, and improving transparency of the vote tabulation and tallying process.

The EVM-VVPAT Hybrid has four iterations, out of which one was selected. The general concept of all four iterations is the same with minor differences across them.

Also, the Hybrid works on batteries and not electricity, and on internal SD/Memory Cards and not the internet. This is done to make sure the machine can work in a non-electricity environment and is hack-proof.

The concept:

For the EVM part of the EVM-VVPAT Hybrid-

In case of Iterations 1 to 3, the EVM has 16 fingerprint enabled buttons for each of the 16 candidate categories & an iris scanner at the top of the EVM.
In case of Iteration 4, which is the final solution, the EVM has 1 fingerprint sensor in the shape of a button, and 16 physical, tactile buttons for each of the 16 candidate categories & an iris scanner at the top of the EVM.

Four such EVMs can be placed together to accommodate a maximum of 64 candidates in a constituency.

Each EVM machine contains an SD/Memory Card which contains the biometric data (fingerprint and iris) stored of those 1400 eligible voters that have been allotted the polling booth in which the EVM-VVPAT Hybrid is kept.
This acts as the second level of security and authentication of the voters during the electoral phase, i.e, in the voter verification and vote casting phase as only those voters whose biometric data matches the one stored in the EVM-VVPAT Hybrid in the particular polling booth will be able to cast their votes.

Case 1:

If the voters have readable biometrics, then they will authenticate themselves by either,

1. ***(in case of iterations 1 to 3) simply placing their finger on the fingerprint enabled button corresponding to the candidate they want to vote for. If the fingerprint is verified, then the fingerprint enabled button will light up green and they can press the lit-up button to cast their votes, and (in case of iteration 4) placing their finger on the biometric sensor at the top of the other 16 buttons. If the fingerprint gets verified, then the fingerprint sensor will light up green and they can press the physical button corresponding to the candidate they want to cast their vote for. Upon pressing the button, it, along with the arrow besides it will light up green and the voter will get an audio cue to represent the successful recording of the vote by the EVM machine or,***
2. ***by getting their iris authenticated with the help of the extendable iris scanner attached to the EVM. After getting their iris authenticated, (in case of iterations 1 to 3), the fingerprint enabled button corresponding to the candidate they want to vote for will light up green and they can press the lit-up button to cast their votes, and (in case of iteration 4), the biomentric sensor will light up green and they can press the button corresponding to their preferred candidate to cast their vote.***

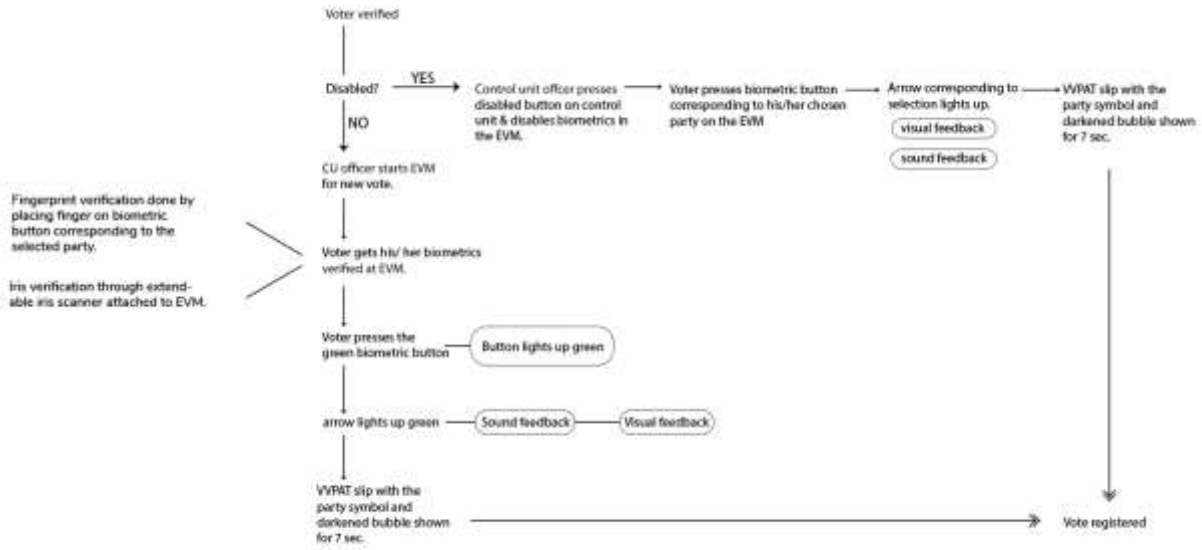
Case 2:

If the voter does not have readable biometrics, then the 3rd Polling Officer will disable the biometric scans (both fingerprint and iris) in

the EVM machine and the voter will simply press the button corresponding to the candidate they want to vote for without having to go through biometric verification.

Upon pressing the biometric buttons for both of the aforementioned cases, the corresponding arrows will light up green and an audio cue will be heard. Hence, both visual and audio feedback will be provided once the vote is recorded in the EVM machine.

The recorded vote will then be reflected on the VVPAT thermal paper slip for some time as a way for the voter to validate and tally it with the recorded vote.



Caption: User Journey for Vote Casting on the EVM machine

For the VVPAT part of the EVM-VVPAT Hybrid-

The VVPAT has been re-designed to work on the 'Dual Thermal Roll Model'. It consists of 2 rolls; one full thermal roll (5.6 cm X 30 meters) and the other, empty.

This continuous thermal paper slip can print results of 1400 votes, the maximum no. of voters allowed in a polling booth.

In this, instead of separating each VVPAT slip for every vote cast, a continuous thermal roll will reflect the party's symbol and name for the voters to tally their vote with.

Mechanism of the Dual Thermal Roll Model

1. ***The unwinding of 1st thermal paper roll after the vote is cast and recorded in the EVM.***

2. Thermal printer prints party symbol and name (in both Hindi and English) and darkens one of the 64 number bubbles corresponding to the party the voter has cast their vote for.

64 is the maximum number of parties allowed in a constituency.

3. Each slip will have dimensions of 5.6cm X 10cm.

4. After the voter slip gets showcased to the voter behind a transparent plastic casing over the VVPAT machine for 7 seconds, this unwinded roll will get re-winded onto the 2nd roll.

5. After all the votes are cast, the thermal paper roll will get completely un-winded from the 1st roll and get re-winded onto the second roll.

The VVPAT Slip

The VVPAT slip is part of a continuous roll of thermal paper and each slip has the dimensions of 5.6cm X 10cm.

Each slip consists of the selected party's symbol and name (in both Hindi and English). It also has 64 bubbles, numbered from 1 to 64 respectively. These numbered bubbles correspond to the party the voter has cast their vote for. Each slip will have one of these numbered bubbles darkened.

Caption: Graphic of the designed VVPAT slip with its dimensions

EVM-VVPAT Hybrid Iterations

Iteration 1

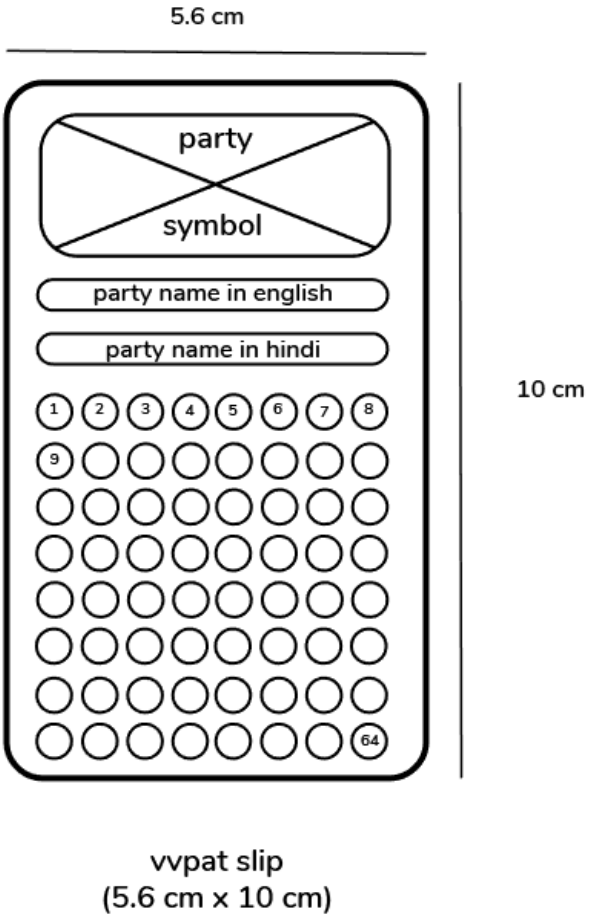
Additional features-

- ***The housings of both the thermal rolls protrude from the top surface of the VVPAT machine. The housing for the 1st thermal roll is made of clear plastic and for the 2nd one, is of white plastic.***

- ***The protrusions were made to give the voters some idea of the mechanism of the working of the VVPAT machine, in hopes to increase the transparency of the vote casting process. This would make the voters feel like their vote matters and will,***

henceforth, help regain trust in the election conduction, its result and the ECI.

Tabulation and counting of votes



vvpat slip
(5.6 cm x 10 cm)

The continuous VVPAT thermal roll will be taken out of the VVPAT machine and put through a light-sensitive thermal scanner which will tabulate the number corresponding to the 64 number bubbles on the VVPAT thermal paper roll.

These 64 number bubbles will correspond to the 64 parties that can be there in a polling constituency.

The light-sensitive thermal scanner will pass light rays through the continuous thermal paper roll and whichever numbered bubble is darkened in each VVPAT slip and does not let light pass through it, will be considered as a vote. This will make it very easy, quick and efficient to tabulate and tally all of the VVPAT votes against its EVM counterpart's votes. Hence, instead of 5% of the total VVPAT machines being tallied against its corresponding EVM's, now, 100% of the VVPAT machines can be tallied against its corresponding EVM's.

Pros of iteration 1

Visual Cues on the Interface of the EVM's Candidate-Party Panel (to lessen the voter's cognitive load)

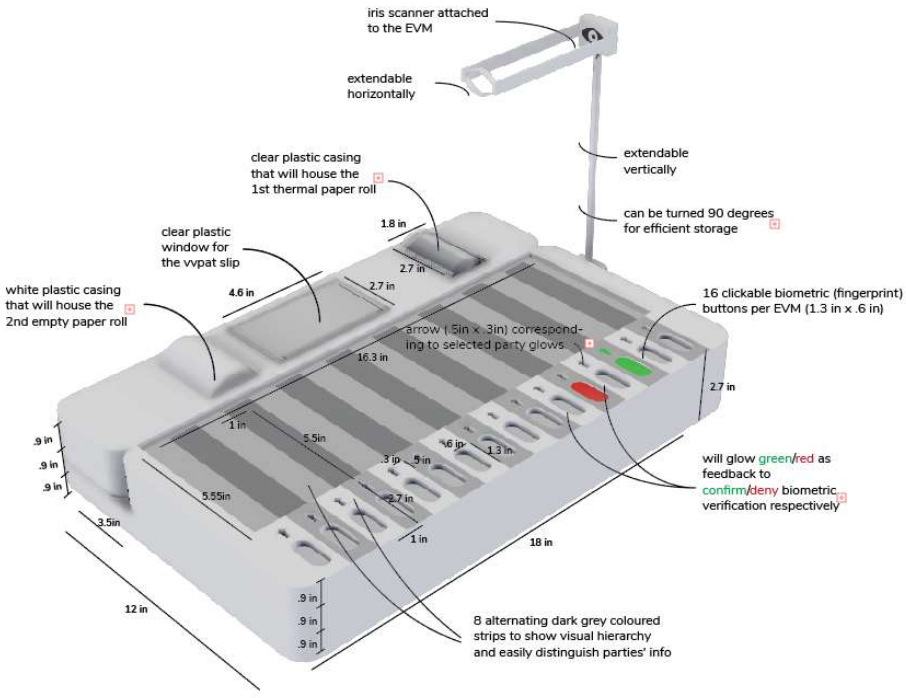
Cons of iteration 1

- ***These protrusions would result in a visual bias in the minds of the voters regarding the candidates by taking and forcing their attention onto the candidates placed against these protrusions.***

- ***The visual perception of the voters regarding the candidates should not be altered in any way by the machine. Each candidate should be on a level playing field.***

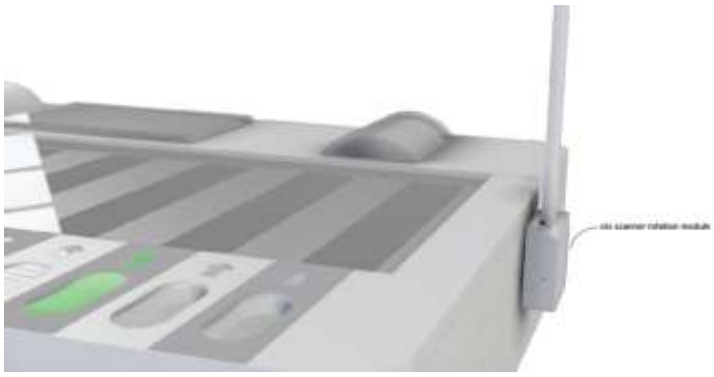
Because of the aforementioned reasons, iteration 1 was rejected.

Caption: Existing EVM & VVPAT machines



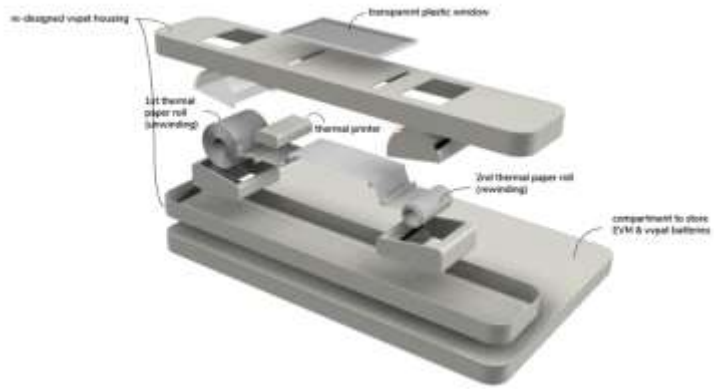
Caption: Re-designed EVM-VVPAT Hybrid (considerable size difference from the existing EVM & VVPAT machines for better portability)

Caption: Iris Scan Module of the EVM-VVPAT Hybrid



Caption: Iris Scan Module of the EVM-VVPAT Hybrid

Caption: Exploded View of the EVM-VVPAT Hybrid



Caption: Iris Scan Module of the EVM-VVPAT Hybrid

Caption: Visual Cues on the Interface of the EVM's Candidate-Party Panel (to lessen the voter's cognitive load)

Iteration 2

Additional features-

- ***The VVPAT assembly was placed down in its housing to make the VVPAT's top surface as flat as possible in order to get minimal possibilities of visual cues that could change the voter's visual perception towards certain candidates.***

- ***The concept of 'Reverse Unwinding' was added to this iteration. In this, a light-sensitive thermal scanner was embedded in the VVPAT module itself. Hence, there would be no need to take the rol lout of the VVPAT assembly in order to tabulate votes. After all the votes have been cast, the 2nd thermal roll would be put through the embedded light-sensitive thermal scanner which will tabulate the number corresponding to the 64 number bubbles on the VVPAT thermal paper roll, just like in iteration 1, and eventually tabulate the votes in the VVPAT slip.***

- ***The concept of 'VVPAT Vote Confirmation' was added to this iteration. A proximity sensor was put behind the transparent plastic casing of the VVPAT machine. After the voters cast their vote on the EVM machine, the VVPAT slip containing their selected party's symbol and name will be showcased to them. If the party reflected on the slip matches with the party they cast their vote for, the voter will place their hand on top of the transparent plastic casing with the proximity sensors in it to confirm the vote. Only after the voter confirms the vote, will the vote be successful and recorded.***

Pros of iteration 2-

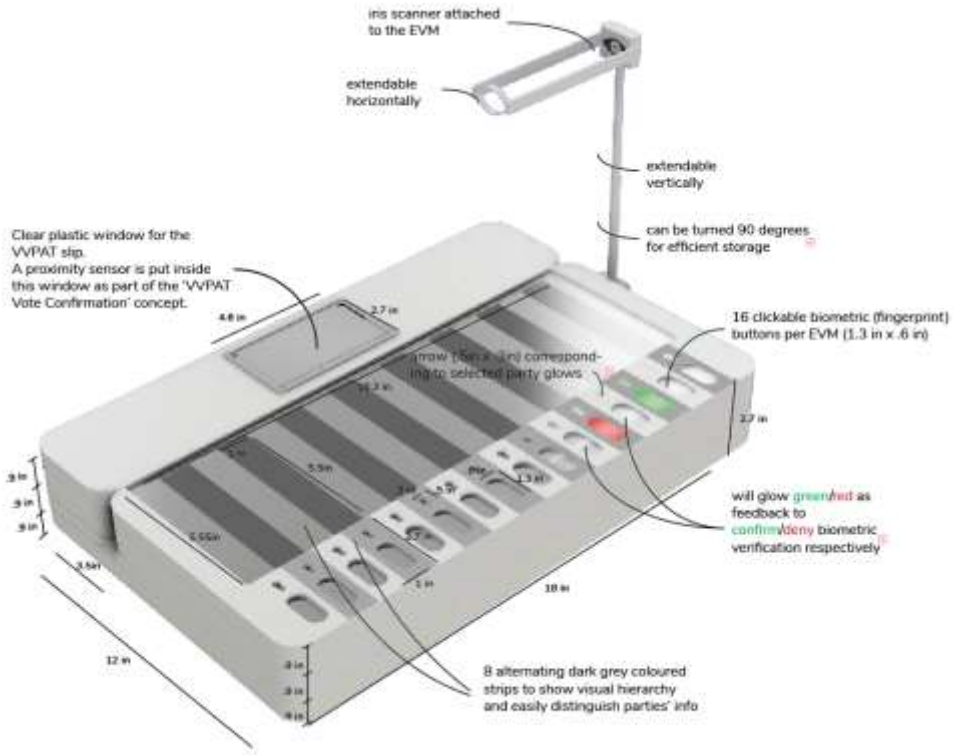
- ***The concept of Reverse Unwinding negates the need to get the 2nd thermal roll out of the VVPAT machine to put it through a light-sensitive thermal scanner as seen in iteration 1.***

- ***Visual Cues on the Interface of the EVM's Candidate-Party Panel (to lessen the voter's cognitive load)***

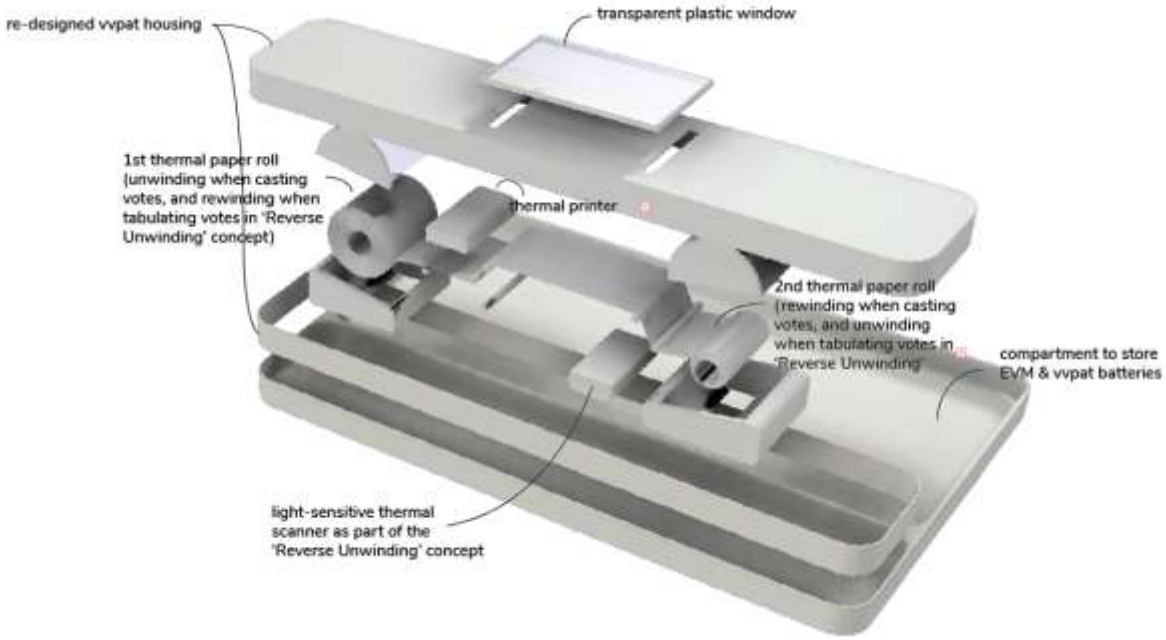
Cons of iteration 2-

Although the feature of VVPAT Vote Confirmation is beneficial for the users as it gives them a sense of control over the vote casting process, the use of proximity sensor inside the transparent VVPAT casing to get voters to confirm their vote seems a little gimmicky.

Because of the aforementioned reason, iteration 2 was rejected.



Caption: Re-designed EVM-VVPAT Hybrid (considerable size difference for better portability)



Caption: Exploded View of the VVPAT with Reverse Unwinding concept

Iteration 3

Additional features-

- ***The VVPAT assembly was placed down in its housing to make the VVPAT's top surface as flat as possible in order to get minimal possibilities of visual cues that could change the voter's visual perception towards certain candidates.***

- ***The concept of 'Reverse Unwinding' was continued from the previous iteration.***

- ***The concept of 'VVPAT Vote Confirmation' was added to this iteration, with some minor changes. Now, a button was placed below the transparent plastic casing of the VVPAT machine. After the voters cast their vote on the EVM machine, the VVPAT slip containing their selected party's symbol and name will be***

showcased to them. If the party reflected on the slip matches with the party they cast their vote for, the voter will press the button below the transparent plastic casing to confirm the vote. Upon successfully pressing the button, it will light up green as a visual feedback to the confirmation of the vote. Only after the voter confirms the vote, will the vote be successful and recorded.

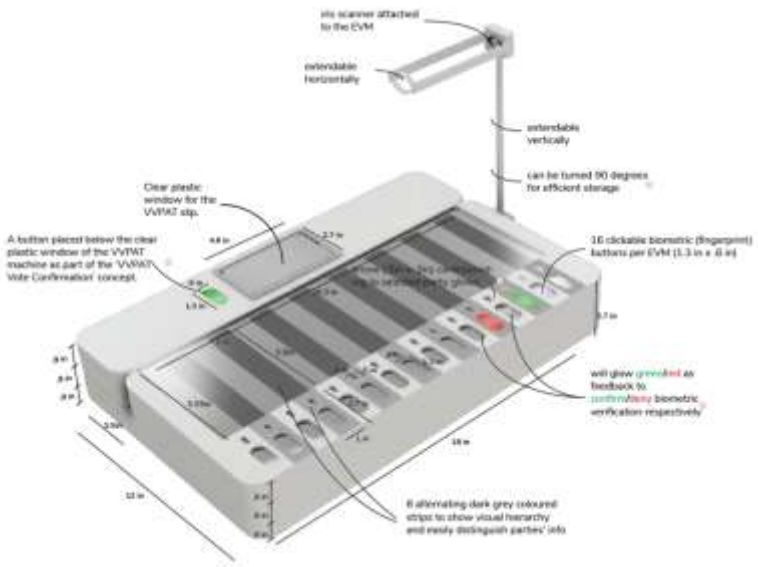
Pros of iteration 3-

- ***The concept of Reverse Unwinding and the re-designed concept of VVPAT Vote Confirmation.***
- ***Visual Cues on the Interface of the EVM's Candidate-Party Panel (to lessen the voter's cognitive load)***

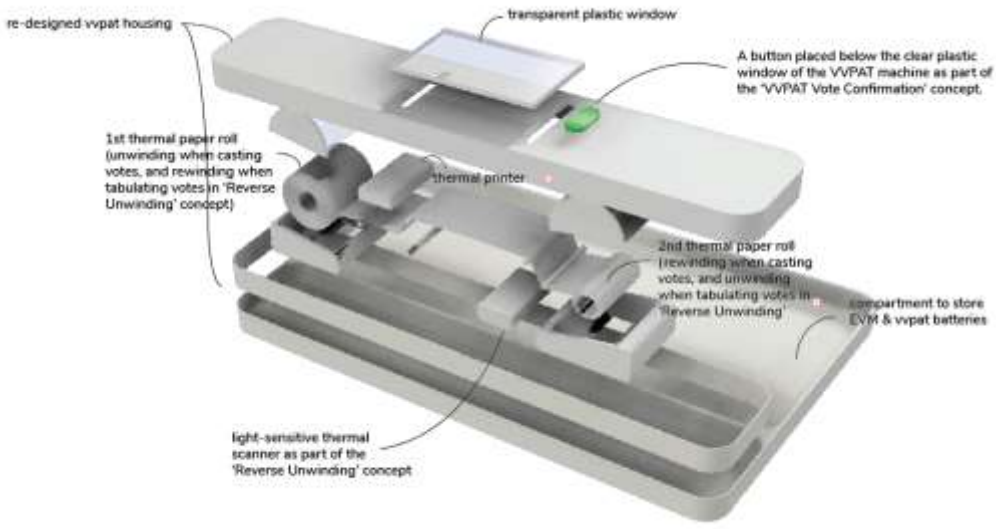
Cons of Iteration 3-

- ***The concept of 'VVPAT Vote Confirmation' making use of a physical, tactile button can be a cause of visual bias in the minds of the voters regarding the candidates by taking and forcing their attention onto the candidates placed against the 'VVPAT Vote Confirmation' button. This is not acceptable as one of the core needs of this machine re-design is to make sure that each candidate should be on a level playing field and that the visual perception of the voters regarding the candidates should not be altered in any way by the machine.***

Because of the aforementioned cons, iteration 3 was rejected.



Caption: Re-designed EVM-VVPAT Hybrid (considerable size difference for better portability) with Reverse Unwinding concept and iterated VVPAT Vote Confirmation Concept



Caption: Exploded View of the VVPAT with Reverse Unwinding concept and iterated VVPAT Vote Confirmation Concept

Iteration 4

Additional features-

- ***The EVM machine has a single, separate fingerprint sensor and 16 physical, tactile buttons that correspond to the 16 candidates on the machine instead of the 16 biometric enabled buttons seen in the previous iterations. This seperate biometric sensor will make sure that the anonymity of the votes remains, which is the core fundamental of elections.***

- ***The VVPAT assembly was placed down in its housing to make the VVPAT's top surface totally flat as compared to 'as flat as possible' observed in iteration 3, in order to get absolutely no possibilities of visual cues that could change the voter's visual perception towards certain candidates.***

- ***The upper housing of the VVPAT machine of the EVM-VVPAT Hybrid is now made up of frosty grey acrylic sheets. This is done to make sure that the VVPAT Vote Slip can only be seen by voters when the slip is illuminated from behind, within the VVPAT housing. This illumination will only happen after the voter has cast their vote on the EVM machine. This frosted grey acrylic sheet will become translucent in appearance only when it gets illuminated from behind.***

  The change in the material of the housing and the usage of illumination after the vote has been cast has been made sure to ensure that there are no visual elements in the form of the VVPAT Slip housing, buttons and roll housing protrusions to

create visual bias in the minds of voters that bring about a change in the visual perception of them towards candidates.

- ***The concept of 'Reverse Unwinding' was continued from the previous iteration.***

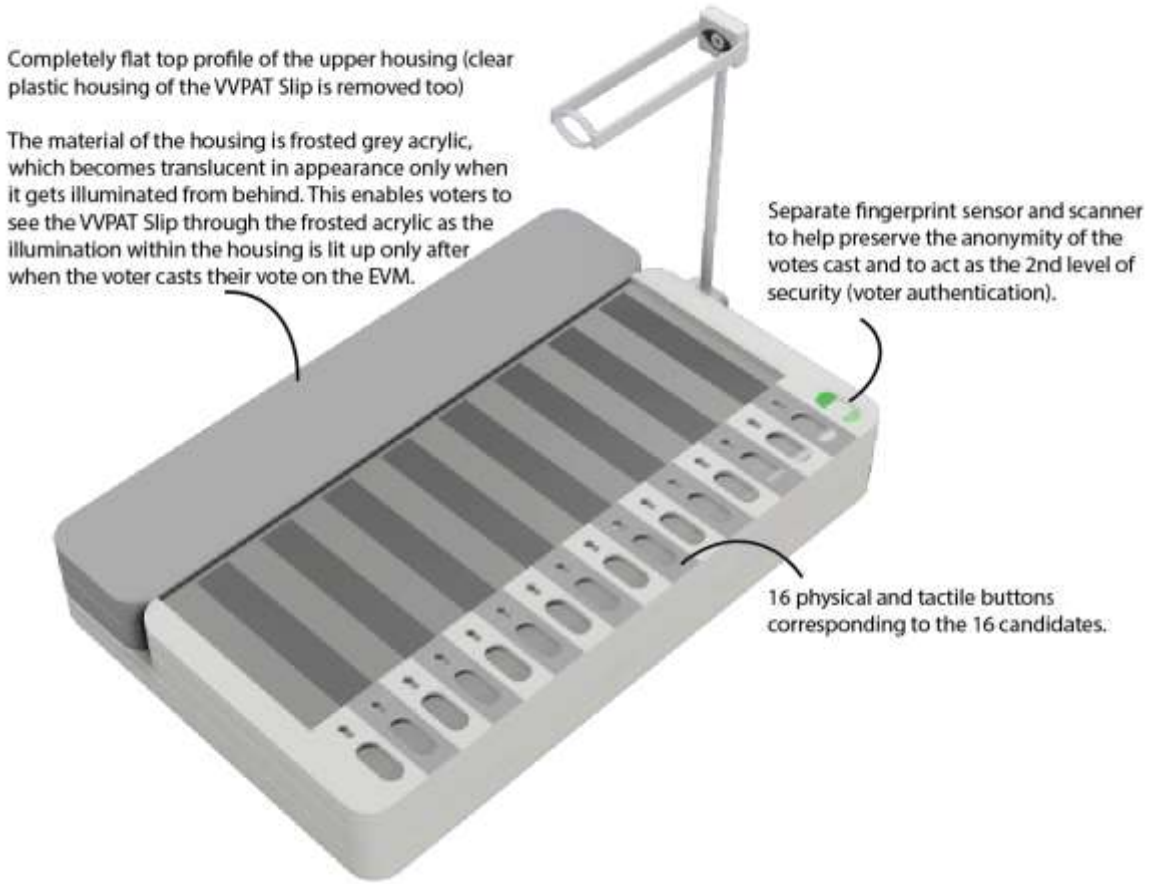
- ***The concept of 'VVPAT Vote Confirmation' continued from the previous iteration, but with some minor changes. Now, the transparent plastic casing of the VVPAT machine has been removed and the whole surface has been made flat. After the voters cast their vote on the EVM machine, the VVPAT slip containing their selected party's symbol and name will be showcased to them by turning on the illumination behind the VVPAT Slip (the voters will be able to see what is behind the frosty grey acrylic sheet only when there is illumination behind it). If the party reflected on the slip matches with the party they cast their vote for, the voter will press anywhere on the top surface of the VVPAT's upper housing to click a tactile button which is placed underneath the top sheet and within the VVPAT housing to confirm the vote. Upon successfully registering a tactile click of the button underneath the top surface, the vote will be confirmed and recorded as the final vote of that voter.***

Pros of iteration 4-

- ***The concept of Reverse Unwinding and the re-designed concept of VVPAT Vote Confirmation.***

- ***There is no more worry of changing the voter's perception about candidates as the top of the VVPAT is completely flat and devoid of any visual cues.***
- ***Visual Cues on the Interface of the EVM's Candidate-Party Panel (to lessen the voter's cognitive load)***
- ***The separate fingerprint scanner makes sure anonymity of the votes is preserved.***

Because of the aforementioned pros, iteration 4 was accepted.



Caption: EVM-VVPAT with the separate fingerprint scanner, iterated VVPAT Vote Confirmation Concept before vote casting on the EVM.

Caption: EVM-VVPAT after vote casting on the EVM, showing its iterated 'VVPAT Vote Confirmation' concept, wherein the voter is able to see the VVPAT Slip from behind the translucent frosted grey acrylic sheet only when there is illumination from within the VVPAT housing after the vote has been cast on the EVM.

Benefits of Vote Casting through Biometric Verification & EVM-VVPAT Hybrid:

- ***The introduction of biometrics (fingerprint buttons & iris scanner) in the EVM-VVPAT Hybrid adds a second level of security to the electoral phase, i,e, the Voter Verification and Vote Casting processes.***

  This will again make sure only verified and actual voters cast their votes, which will further ensure 'One voter, One Vote' right is preserved.

- ***Adequate Leniency is provided for voter authentication as fingerprints of any of the fingers of the voter should match in order to get verified at the polling station.***

- ***Counter measures are also provided in the form of Iris scan and manual verification. The voters can undergo these verification measures in case they can't opt for fingerprint verification.***

- ***Voter casting will become a lot more secure.***

- ***The re-designed VVPAT Hybrid will make sure that all the votes from 100% of all the VVPATs used will be tallied against their corresponding EVMs.***

- ***The re-designed VVPATs 'Dual Thermal Roll Model' design will not only very quickly tabulate the votes recorded in the VVPATs against its corresponding EVMs but will also benefit in its transportation by considerably reducing the re-designed VVPATs size.***

  This 100% tallying of votes will squash all claims of EVM hacking and tampering, as well as help regain the trust ECI and Election has lost.

Conclusion and Learnings

The solution brings a lot of value with it in terms of increased transparency in the working of the elections and its conduction, help to regain the lost trust of the voters in the ECI and Elections which will make them respect the final result of the Election, improved

logistics in terms of reduced manpower required to conduct the elections, improved security measures to make the election conduction more robust to claims of fraudulent voting and mishappenings.

All of this will make sure that the ECI resumes its place as 'Referee/Umpire' between the citizens and the Govt.

Following is the value that the proposed solution brings to the election conduction and its processes:

- ***The simplicity of the proposed Automatic Voter Registration concept makes it so that voter registration becomes much more universal and accessible in nature. Through the inclusion of the Aadhar Card in this process, the majority of the eligible voters will be able to exercise their right to vote as seen in the case of illiterate voters, migrant workers and voters who very often move places, who previously, could and/or did not exercise their right to vote.***

- ***These multi-levelled security measures adopted through the inclusion of biometrics make sure that the election process is being conducted with greater transparency and legitimacy, which in turn makes the voter develop faith in the election, its result and the ECI.***

- ***Due to the inclusion of biometrics from the Aadhaar data to carry out biometric voter verification, the responsibilities of polling officer 2 will get removed from the system, i.e, ECI will greatly reduce the manpower it needs to conduct elections.***

Introducing biometric voter verification will save 1.035 Million Govt. Officials the trouble of doing Election Duty, most of which are Govt. School and College professors who miss out on teaching their students.

- ***The re-designed VVPAT Hybrid will make sure that all the votes from 100% of all the VVPATs used will be tallied against their corresponding EVMs, hence, squashing all claims of EVM hacking and tampering, as well as help regain the trust ECI and Election has lost.***

Following are the learnings from this project:

- ***This project solidified in my mind just how crucial good user research is for any design project, especially to get an idea of genuine and accurate problems that plague the stakeholders.***
- ***I realized just how different opinions and experiences seemingly similar people can have on the same topic.***
- ***I also got to understand how important it is to validate hypotheses against user-driven data to come up with design decisions that actually yield good, meaningful experiences for the stakeholders involved.***

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Letter from the Chairman's Desk By Sunil Bhatia PhD

A few days back I experienced eruption of some problem in my stomach and realized diarrhoea is triggering and in no time it will burst. Before I could spring to action for some solution my problem was established and it never allowed me to be at rest. As soon I came out of the toilet feeling somewhat relieved, sooner I felt like sit again on the toilet seat and my body fluid was exhausting with every uncontrollable motion and experiencing more helpless . I was alone at my home , no medicine was available , midnight time, shops and local doctor clinic were closed and did not wish to disturbed my neighbours and I was left with only option of waiting for daybreak and somehow manage this terrible night.

While sitting at the toilet seat I imagined how our ancestors in absence of medicines or with limited options of solutions manage such life threatening issues and possibly majority died and some few who accidentally found some solutions of eating herbs or seeds or the body itself had come for rescue survived. They were at the mercy.

As I closed my eyes I realised my recently died mother is standing close to me . She was asking me ''son. do not worry I am here''. Those words in my ear infused some confidence and her presence around me and the way her affection and love of taking care took me to another level of confidence that I am no more alone and

felt gradually coming out of helpless state. Someone is caring and few affectionate words are the best medicine.

Immediately I thought in this situation how my mother would have behaved for a solution. First thing she will not go to sleep until I am better and not leave me alone, and then she would have tried all possible solutions known to her from her past experiences and tried every possible solution from available resources to her. Her first action would be to soothe me and divert from the suffering by speaking affectionate words for boosting my low confidence, cuddling, even softly move her hand on my back or even massaged mild hot oil on my stomach and keep requesting of intake of water from glass or spoon or some time lemon, salt sugar solution for compensating loss of body fluid. I did the same and was busy in experimenting what my mother would have done I realized while doing this a day was about to break and my body got enough time not to defend rather attack the diseases with my mind power.

Mothers have a natural instinct of psychological design and from every platform I say who so remembers her mother can only understand a loving world. World is not working on mechanical power. It has a different dimension that is love, care and affections that allows undercurrent for real progress in humans. Mother always searches for solution from available resources and it works because our element of faith and her genuine nature of taking you from trouble is engraved . They are natural masters and from centuries it is passing information from one generations to another that makes a psychological design master.

When I observed a child hurt and there is no cut but the child is crying, she comes forward and lifts the child and takes out of the scene in helping for forgetting the place where he was hurt or goes to

recreate the scene where the child was hurt. She will first blow the air from the mouth at the hurt area and in case it did not work. She will hit the ground by saying 'Look I have beaten' and keep asking should I beat more. Once crying child says no either by action or verbally she stops her fake actions . She laughs and cuddles the child and he comes back to normal life. Her act of punishing the ground appears absurd that hurts the child but helps in relieving his pain.

Modern designers are mechanical and emotions are framed not in a natural way but mechanical style. Every big actor of the film weeps in the same way as if his screen mother died. But in reality encountering such situation he behaved in under influence of natural emotion and it is completely different. Modern designers do not understand psychological design rather they believe in designing the interface based on functionally mind and other organs behaviour and it adds complexity and in direction of not attempt for simplicity as the user thinks. My satellite service provider for television programs offered me a firestick that works with the internet for free trial. I found it so cumbersome that for pressing any button I have to understand the mind of designer . I could not enjoy and requested to remove this service.

I admire the wisdom of ancient people who acquired knowledge by experimenting and experiencing and helped in the progress of humanity. hey understood at a very early stage that collective growth and making environment conducive is the key to safety. I was hurt and the cut on my hand's finger was so deep it was impossible for me to give time for clotting to stop bleeding. Clot is a natural way of stopping bleeding and I pressed with my other hand finger over cut but it was not working. Immediately I pressed and raised my finger above the horizontal and blood supply became

limited and clotting began. A simple design of hanging or raising of the hand increases the flow of blood in that area and raising above makes it limited .When an attack of a wild animal might poison the body they used the tie tightly a strong rope close to the bite area so that poison should not spread into blood and cut that area for allowing poison flow out of the body. Is it not the simplest design for saving lives? When life can be saved with simple tricks and does not need any degree for operation than why modern designers are making simple tasks complex by design and thinking themselves intelligent. They add an element of cleverness and believe no one can understand their cheating. When a toaster cover is designed its cover lid is locked with a small lock and accidental fall breaks its cover and the customer is forced to buy a new one or replace it with parts .Similarly operating system of mobile phone is designed or after some months in the name of updates of better version introduce the software for deliberating corrupt the system and out of frustration customers left with a option of discard the existing and buy new one. Intention and values decide the design of the products. Helping intentions and guiding values for progress of the people is always appreciated by masses and cumbersome intentions and negative values confuse the majority.

Lambert Academic publication for celebration of 150th special issue by publishing a book by compiling editorials "Design For All, Drivers of Design" translated in eight different languages from ENGLISH into French, German, Italian, Russian, Dutch and Portuguese. Kindly click the following link for book. "Morebooks", one of the largest online bookstores. Here's the link to it:

https://www.morebooks.de/store/gb/book/design-for-all/isbn/978-613-9-83306-1

With Regards

Dr. Sunil Bhatia

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Tel 91-11-27853470®

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Forthcoming Issues

July 2021 Vol-16 No-7 Raja Schaar

Raja Schaar, IDSA is Program Director and Assistant Professor of Product Design at Drexel University's Antoinette Westphal College of Media Arts and Design. She also co-chairs IDSA's Diversity, Equity, and Inclusion Council. She is an industrial designer with an extensive background in museum exhibit design who is passionate about ways design can make positive impact

intersections with health, the environment, and education.

Raja's interdisciplinary research focuses on addressing inequities in maternal health; methods for engaging black girls and underrepresented minorities in STEM/STEAM through design and technology; innovation and entrepreneurship education; and biologically-inspired design and sustainability.

Raja currently co-leads two collaborative research projects. She works

with faculty from Drexel's College of Nursing and Design and Merchandising Programs the development of low-cost wearables for maternal health. She is co-PI on an interdisciplinary research project funded by the US Department of Education Promise Neighborhood Grant entitled "Black Girls STEAMing through Dance," where she works with students and faculty from Drexel's departments of Computing and Informatics, Dance, and the School of Education to uncover STEAM identities, literacies, and self-concept in African American girls through the development of wearable technology. Raja is also PI on a Venture Well Faculty Grant that connects Product Design, Biomedical Engineering, and Entrepreneurship to examine the role of clinical immersion on product innovation on campus.

As an educator, Raja works to infuse Drexel's Product Design Curriculum with society-centered design principles that address impactful, real-world problems. She teaches a number of traditional and research-based studios across the curriculum, but her favorite courses to teach are Interdisciplinary Product Design, Bio-Inspired Design and Sustainability, Design and Waste, and Wearables for Health.

Before joining Drexel's Product Design faculty, Raja taught at Georgia Tech School of Industrial Design and the Wallace H. Coulter Department of Biomedical Engineering at GA Tech and Emory University. Raja received her BSID from Georgia Tech in 2001 and completed her graduate work at the School of the Art Institute of Chicago in 2003.

December 2021 Vol-16 No-12 Ricardo Gomes, IDSA

Professor Ricardo Gomes has been a faculty member in the School of Design at San Francisco State University for over 29 years. He was the Chair of the DAI Department from 2002-2012.

Prof. Gomes coordinates the Design Center for Global Needs and the Shapira Design Archive Project in the School of Design (DES).

This non-profit international research and development center is dedicated to promoting responsive design thinking methods and solutions to local, regional and global issues such as: inclusive/universal design, health care, the aging, community development, social innovation and sustainability of the built environment.

Prof. Gomes was awarded the 2020 Faculty Award for Excellence in Service Learning, from the Institute for Civic and Community Engagement, SFSU; and the IDSA 2020 Education Award presented in recognition of significant, distinguished, and long-term contributions of faculty to the field of industrial design academia

Prof. Gomes is on the Board of Directors of the Institute for Human Centered Design in Boston. He is also a member of the Industrial Designers Society of America; and Trustee of the Beta Beta Chapter, Epsilon Pi Tau International Honor Society for Technology in the School of Design, SFSU. Prof. Gomes was a Fulbright Research Scholar from 1984-1986 at the University of Nairobi, Kenya. He conducted post-

graduate research and product development of a container system for mobile health care delivery in East Africa from 1982 – 1987. In 1986, he was Program Coordinator of Design Projects in Developing Countries, Les Ateliers, Ecole nationale supérieure de création industrielle (ENSCI) in Paris, France where he directed student liaison projects with European international development agencies.

For over 30 years, Prof. Gomes has conducted keynote speeches, presentations, symposiums and workshops at universities and international conferences throughout Africa, Asia, Europe, Latin America and the U.S. In addition, he has served on juries related to Inclusive Design; Universal Design; Design for Social Responsibility; Sustainability; and Equity for BIPoC in the Built Environment.

Prof. Gomes received his MFA in Industrial Design for Low-Income Economies from the University of California, Los Angeles (Design of a Container System for Mobile Health Care Delivery in East Africa). He received an M.A. in Architectural Building Technology from School of Architecture and Urban Planning at UCLA (Analysis of Alternative Building Materials and Construction Systems for Small-scale Industries in the Cape Verde Islands, West Africa); and a BFA in Industrial Design from Massachusetts College of Art (Design of an Adaptive Structural Environment for Severely Disabled and Developmentally Challenged Children).

Africa Origin Designer year 2021

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New Books

it is available on **www.morebooks.de** one of the largest online bookstores. Here's the link to it:
https://www.morebooks.de/store/gb/book/design-for-all/isbn/978-613-9-83306-1

The Ultimate Resource for Aging in Place With Dignity and Grace!

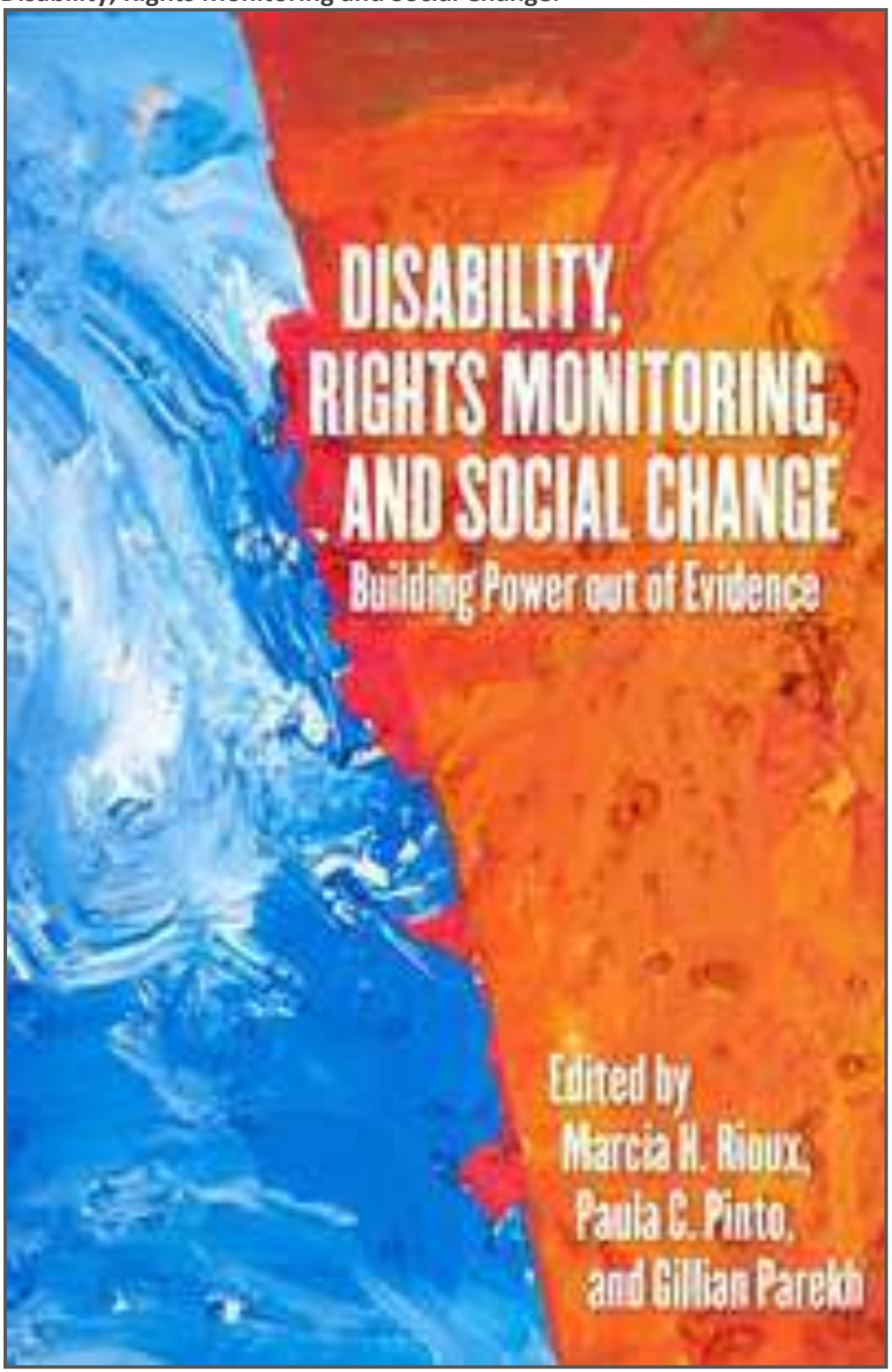
Are you looking for housing options that are safer and more accommodating for independently aging in place? Do you want to enjoy comfort, accessibility, safety and peace of mind – despite your disabilities, limitations and health challenges? The help you need is available in the Universal Design Toolkit: Time-saving ideas, resources, solutions, and guidance for making homes accessible.

This is the ultimate resource for individuals and professionals who want to save time, money and energy when designing, building, remodeling or downsizing a home. The Universal Design Toolkit will help you take the steps to design homes for your clients or yourself while eliminating the costly trial and error challenges you'd inevitably encounter if faced with this learning curve on your own.

Rosemarie Rossetti, Ph.D., teamed with her husband Mark Leder in creating this unique Toolkit. They bring ten years of research, design and building expertise by serving as the general contractors for their home, the Universal Design Living Laboratory– which is the highest rated universal design home in North America.

Within the Toolkit's 200 richly illustrated pages, you'll find: Insights that distinguish *essential* products, services and resources from the *unnecessary*.
Proven, realistic tips for finding the right home.
Home features you need to look for. Nothing is assumed or left out.
Handy home checklists and assessments.
Interview questions to help you hire industry professionals with knowledge and experience.
Photographs that provide a frame of reference to inspire, clarify and illuminate features andbenefits.
Valuable resources to save you time, money and energy.
Helpful sources of funding.
Space planning dimensions for access using assistive devices such as wheelchairs andwalkers.
And so much more!
If you want useful, dependable advice and easy to implement ideas from respected experts who know the ropes, you'll love Rossetti and Leder's perspective. As a speaker, author and consultant who uses a wheelchair, Rossetti has helped hundreds of people design their ideal homes. Now her comprehensive Toolkit is available to help and support you!
Get the Universal Design Toolkit now to start your project!

Disability, Rights Monitoring and Social Change:



New Update: ELIVIO BONOLLO (2015/16) PRODUCT DESIGN: A COURSE IN FIRST PRINCIPLES

Available as a paperback (320 pages), in black and white and full colour versions (book reviewed in Design and Technology Education: An International Journal 17.3, and on amazon.com).
The 2018, eBook edition is available in mobi (Kindle) and ePub (iBook) file versions on the amazonand other worldwide networks; includingon the following websites:
ePubversion:www.booktopia.com.au
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READING HINTS: ePub files can be read with the iBook app on Apple MacBook/iPad devices; ePub files can also be read on Desktops PCs, Laptops and Surface devices using readers such as the Microsoft *freda*ePub reader. The Kindle (mobi file) reader isflexible and suitable for reading the eBook on PCs; Kobo readers can also be used to read ePub files on MacBook and iPad. All formats are very interactive with very good navigation.

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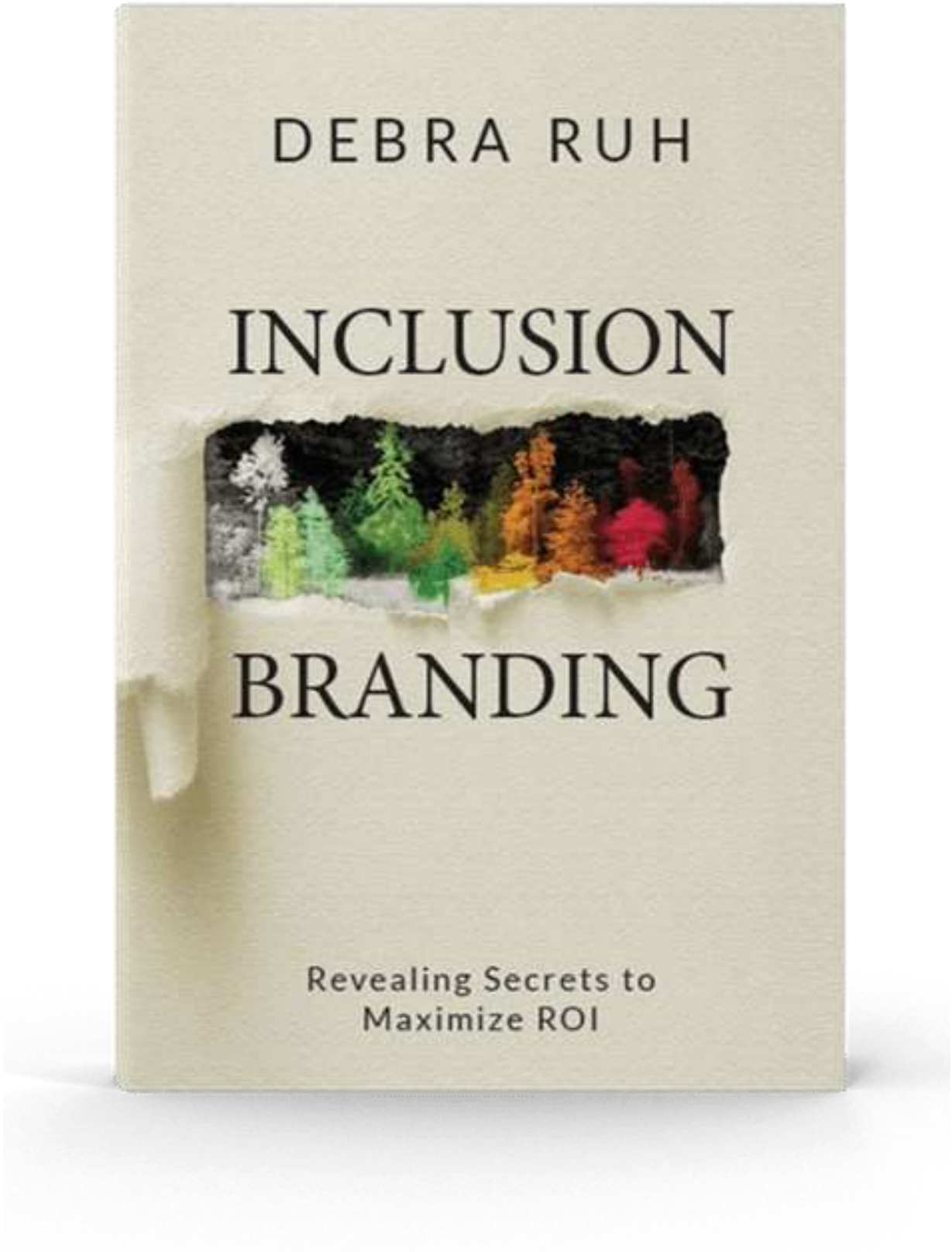
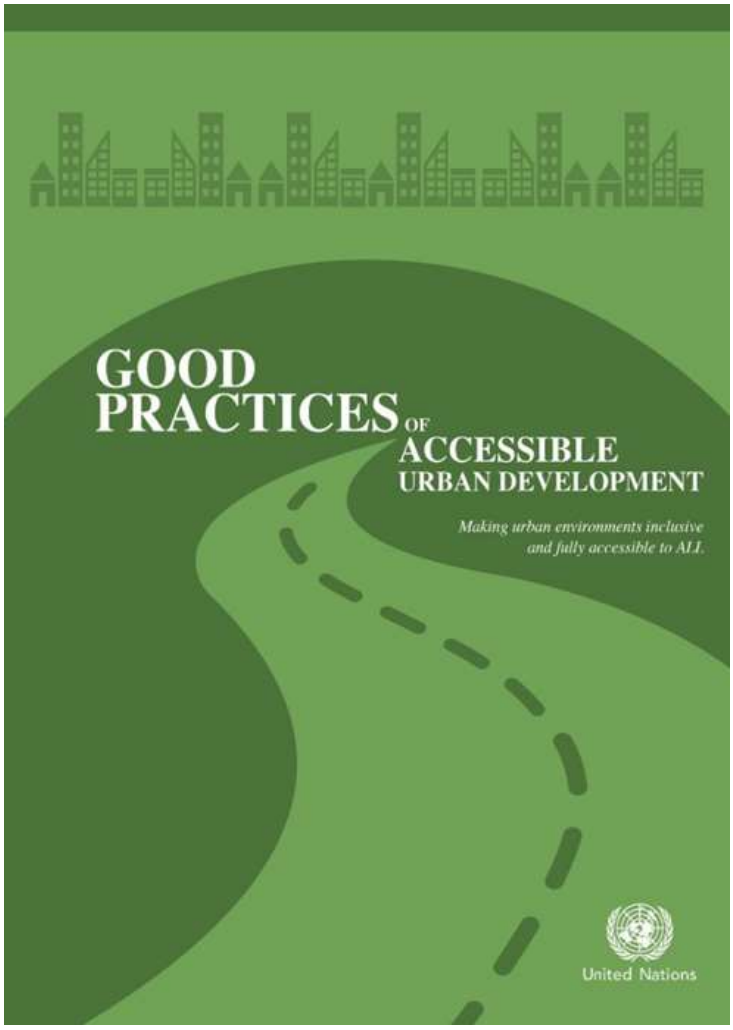


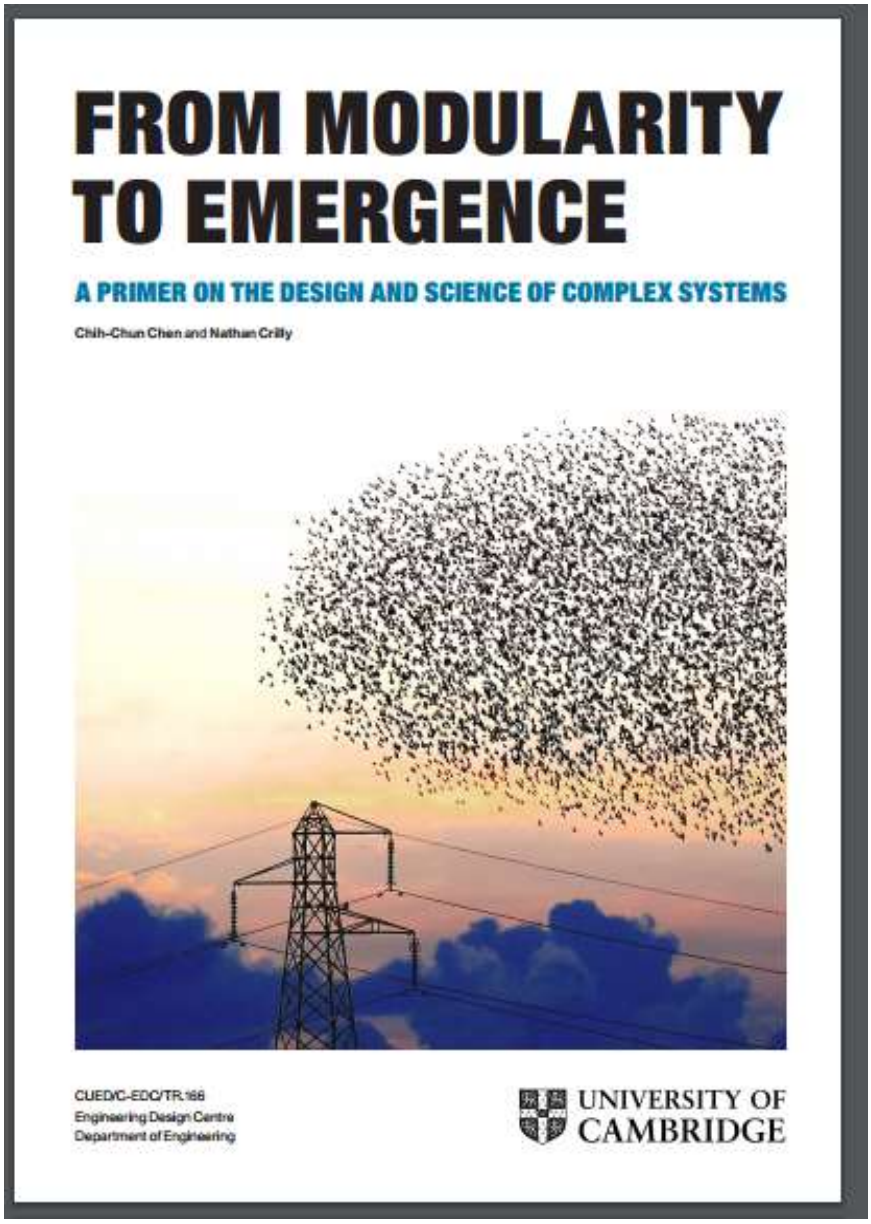


In light of the forthcoming United Nations Conference on Housing and Sustainable Urban Development (HABITAT III) and the imminent launch of the New Urban Agenda, DESA in collaboration with the Essl Foundation (Zero Project) and others have prepared a new publication entitled: "Good practices of accessible urban development".

The publication provides case studies of innovative practices and policies in housing and built environments, as well as transportation, public spaces and public services, including information and communication technology (ICT) based services.

The publication concludes with strategies and innovations for promoting accessible urban development.

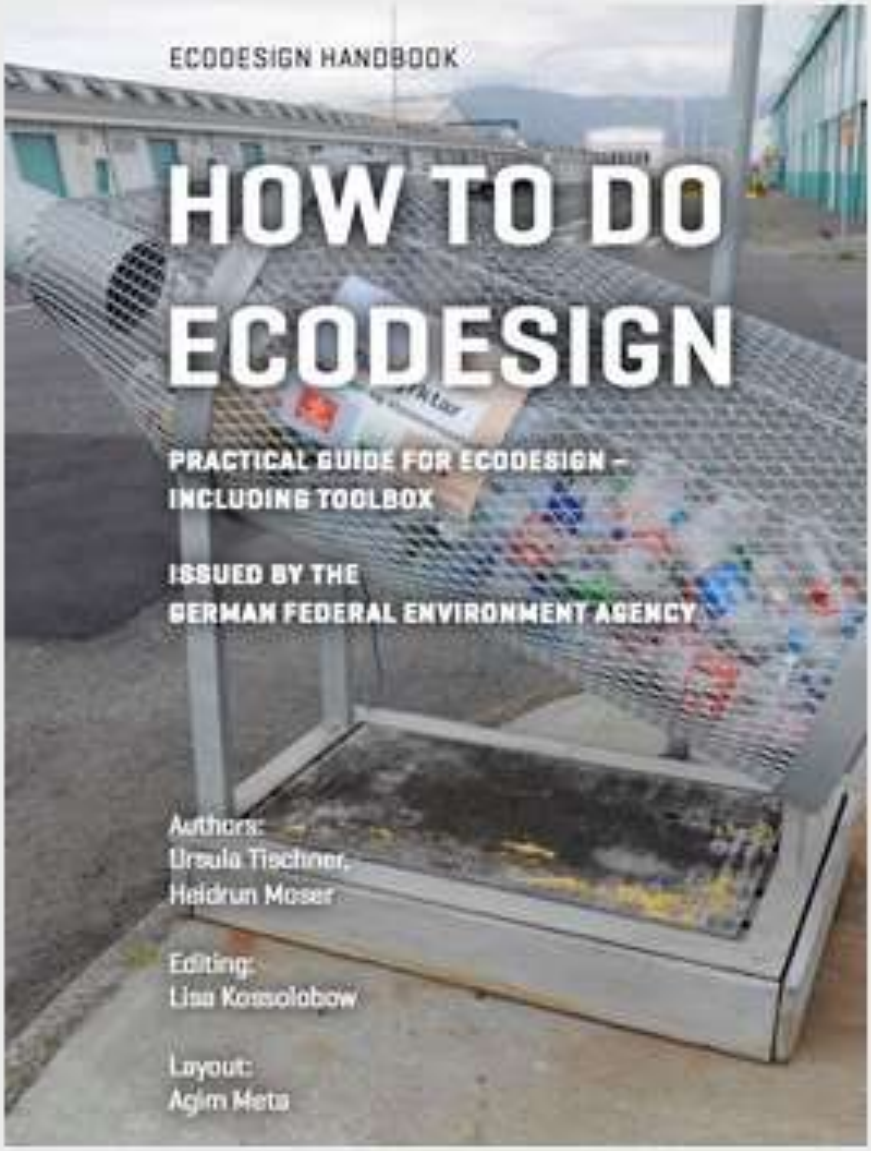
The advance unedited text is available at:http://www.un.org/disabilities/documents/desa/good_practices_urban_dev.pdf



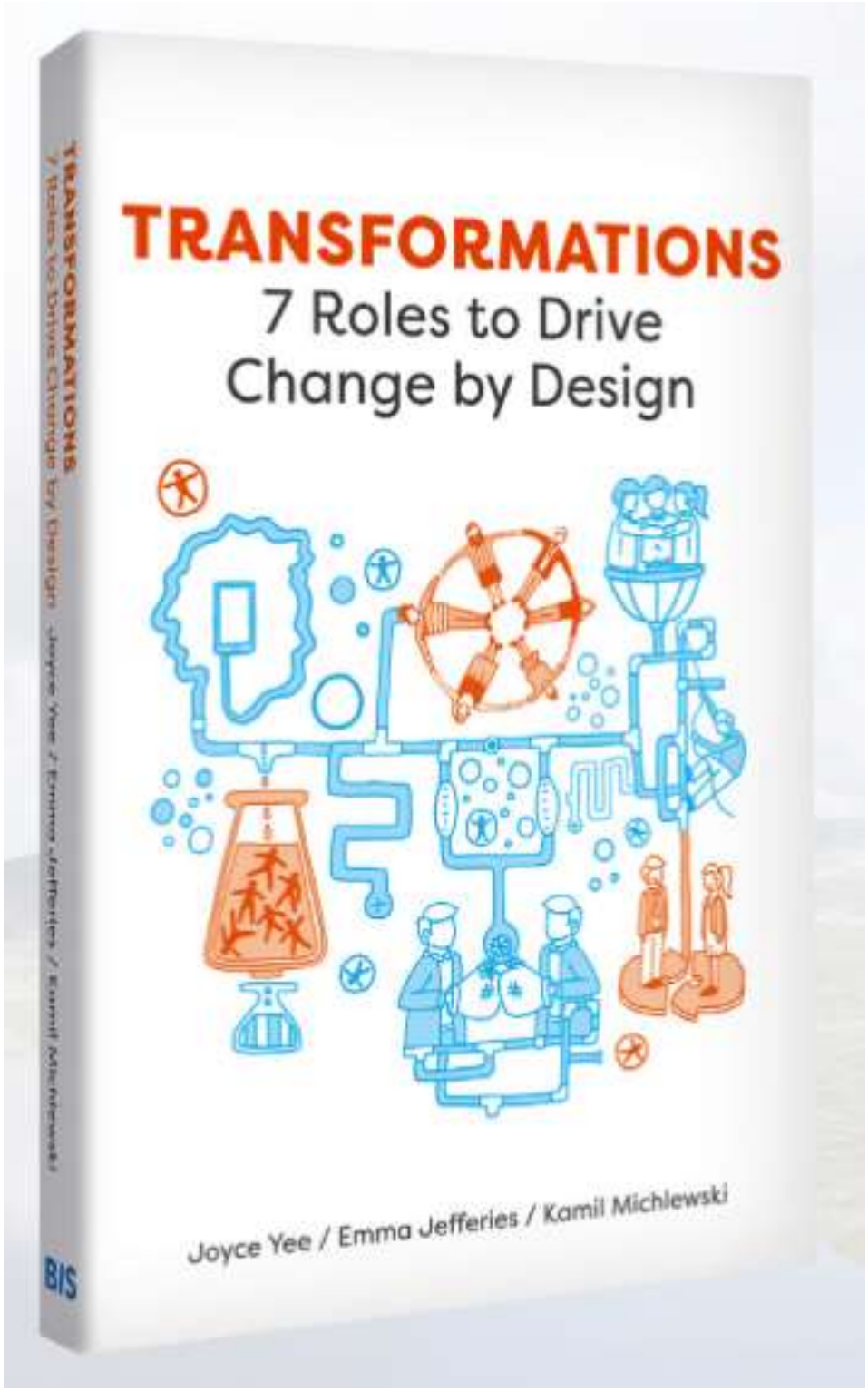
Dr Chih-Chun Chen and Dr Nathan Crilly of the Cambridge University Engineering Design Centre Design Practice Group have released a free, downloadable book, _A Primer on the Design and Science of Complex Systems_.
This project is funded by the UK Engineering and Physical Sciences Research Council (EP/K008196/1).
The book is available at URL: http://complexityprimer.eng.cam.ac.uk

Changing Paradigms: Designing for a Sustainable Future

New iBook / ebook:
HOW TO DO ECODESIGN

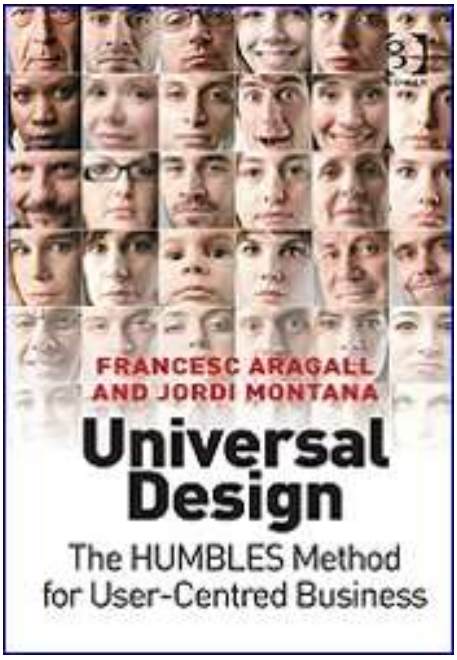


Practical Guide for Ecodesign – Including a Toolbox
Author: Ursula Tischner


TRANSFORMATIONS
7 Roles to Drive Change by Design
Joyce Yee / Emma Jefferies / Kamil Michlewski
BIS


Arnar Árnason and Sigurjón Baldur Hafsteinsson
DEATH AND GOVERNMENTALITY
Neo-liberalism, grief and the nation form

Universal Design: The HUMBLES Method for User-Centred Business



"Universal Design: The HUMBLES Method for User-Centred Business", writtenbyFrancescAragall and JordiMontañaandpublishedbyGower, providesaninnovativemethod to supportbusinesseswishing to increase the number of satisfiedusersand clients andenhancetheirreputationbyadaptingtheirproductsandservices to the diversity of their actual andpotentialcustomers, takingintoaccounttheirneeds, wishesandexpectations.

The HUMBLES method (© Aragall) consists of a progressive, seven-phaseapproach for implementing Design for All within a business. Byincorporating the user'spoint of view, itenablescompanies to evaluatetheirbusinessstrategies in order to improveprovideanimproved, morecustomer-orientedexperience, andtherebygain a competitiveadvantage in the marketplace. As well as a comprehensiveguide to the method, the bookprovidescasestudies of multinationalbusinesswhichhavesuccessfullyincorporated Design for All intotheirworkingpractices.

According to SandroRossell, President of FC Barcelona, who in company withotherleadingbusiness professionals endorsed the publication, it is "requiredreading for thosewhowish to understandhow universal design is the onlyway to connect a brand to the widest possible public, increasing client loyaltyandenhancing company prestige". To purchase the book, visiteither the **Design for All Foundation website**

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News

1.

Neurodiversity and the University

Assistant Professor of Communications Jim Cherney, Ph.D. discusses neurodiversity, what it is and what it means to the Wolf Pack community, as well as a new University alliance

By: James Cherney, Ph.D.

Associate Professor, Department of Communication Studies

Neurodiversity is the idea that people with neurological and/or psychological conditions deserve respect, should not be pathologized, and are entitled to live full and satisfying lives. Those who identify as neurodivergent consider their conditions as an important aspect of who they are and the neurodiversity movement affirms their right to live without discrimination and as complete persons. The neurodivergent do not consider themselves "broken," and while many do seek treatments and accommodations to improve their lives, they do not view their conditions as illnesses that need to be cured.

A common misconception is that neurodiverse is a synonym of "autistic," but as used here the neurodiverse population also includes those with a wide variety of conditions including and certainly not

limited to Attention-Deficit Hyperactivity Disorder (ADHD), depression, dyslexia, dyspraxia, epilepsy, schizophrenia and Tourette's. The range of neurodiverse conditions is so large that some consider it easier to understand neurodiverse as meaning anyone who is not "neurotypical."

Even in an academic setting, neurodiversity matters because of the ways that it shapes how we behave, work and socialize, as well as how it impacts thinking and learning. As in most places, however, the neurodivergent have faced a history of ableist discrimination, institutional barriers and unintentional injustices that rise from ignorance. Recognizing this pattern of discrimination, advocates for Diversity, Equity and Inclusion programs have begun to include neurodiversity as part of their project of social justice. In some cases, this emphasis on providing Access has added that term to the acronym and renamed it IDEA.

Many members of the Wolf Pack community (faculty, staff and students) have conditions that qualify them as neurodivergent, which often means that they struggle for social acceptance, fair treatment and accessibility. For years, the Disability Resource Center has arranged reasonable accommodations to allow all students to have an equal opportunity for a great education. But the DRC points out that engaging the issue does not end with providing eligible students extra time on exams. As Assistant Director Mary Anne Christensen puts it, "Neurodiversity affects far more than the neurodiverse population; it impacts the entire university."

This year the Faculty Diversity Committee at the University took an important step to addressing this situation by creating the Neurodiversity Alliance. The Neurodiversity Alliance's mission is to

raise awareness, promote access, and ensure equity for the neurodiverse population at the University of Nevada, Reno. The NA advocates Universal Design for Learning, an approach to learning that recognizes variation in human cognition and neurological conditions as natural, to afford every student an equal opportunity to succeed. It works to reveal institutional barriers that disadvantage neurodiverse people, and to develop alternative practices that do not discriminate. It also works to coordinate faculty efforts with the Student Working Group for Neurodiversity and form an alliance to meet the different needs of every neurodiverse person at the University.

On April 8, as part of the 2021 Northern Nevada Diversity Summit, the NDA will take its first official action by publicly announcing its formation, presenting its goals and activities, and discussing the way it can best serve the UNR community. Participation in the NNDA is free but requires registration.

James L. Cherney (Ph.D. Indiana University, 2003) is an associate professor in the Department of Communication Studies at the University of Nevada, Reno. His primary area of research is the rhetoric of ableism, particularly as it operates around sport and visibility. He has published articles in such outlets as the *Western Journal of Communication, Disability Studies Quarterly*, and *Argumentation and Advocacy*. He frequently co-authors work on disability and sport with Kurt Lindemann of San Diego State University and he has been highly active in the Disability Issues Caucus in the National Communication Association (NCA). His book *Ableist Rhetoric: How We Know, Value, and See Disability*, will be published by Penn State University Press in 2019.

By: James Cherney, Ph.D.
Associate Professor, Department of Communication Studies

(Curtsey: Nevada Today)

2.
Special Children, Special Care

Charles Xiaoxue Wang, Doug Carothers, and Steven Bianco offer tips for K–12 teachers during and beyond the pandemic

With COVID-19, many schools are utilizing online instruction. At this time, we must not forget our children with special needs. Children with disabilities are entitled to a free appropriate public education in the least restrictive environment. For them to successfully learn online requires multifaceted measures using all available tools and approaches. This is best achieved when schools, teachers, and parents work together.

With that said, here are some general ideas for how educators can better fulfill their obligations to students with disabilities who are being educated online during this COVID-19 global pandemic:

1. Before putting instruction online, talk to students/parents about how best to help accommodate their disabilities when engaging in online learning. This will ensure access to online instruction and offer you a clear picture of technologies students have at home.

2. Modify instructional presentation to meet the individual or disability-specific needs of your students and provide learning materials in advance. For example, use highly contrasting colors for students with visual disabilities. Microsoft Office and many learning management systems such as Canvas have the function to check online instructional materials for potential barriers.

3. Ensure flexibility with student submissions to demonstrate their knowledge, providing appropriate assignment alternatives for the students' disability-specific needs. We recommend the use of the Universal Design for Learning framework for educators to design instruction for the variability within the classroom to provide mastery-oriented instruction for all students.[1]

4. Keep auditory disabilities in mind and ensure that audio recordings are high quality with accurate captioning. Video-hosting services like YouTube allow users to edit the automatic captioning for accuracy and to add punctuation. When recording audio or video content, describe what is on screen and announce what is being selected or written. Remember that media that communicate clearly to you may not communicate as clearly to others with sensory impairments.

5. Set up your virtual office hours to work with those students with special learning needs. Be flexible and accommodating. Provide communication instruction through both visual and auditory

modalities and allow multiple ways of responding and enough time for response.

6. Provide timely feedback on student learning and offer students prompt encouragement. This timely communication with students increases the social, cognitive, and emotional presence of your online instruction.

7. If possible, assign workgroups of students with and without disabilities so they can learn from and help each other during this special time. Ensure that one student is assigned the role of note taker for the group and that if a student requires American Sign Language (ASL) the interpreter is within the same workgroup. Learner–learner interaction is as important as learner–content interaction and learner–instructor interaction for online learning.

As teachers, we also need to work with parents more closely at this time. Here are some tips for how to work with parents of children with disabilities who are learning online at home.

1. Maintain clear and frequent lines of communication that are respectful of family schedules and that use means of communication that are preferred by families.

2. Make a schedule to communicate with them regularly and inform them of your virtual office hours.

3. Avoid the use of jargon and clearly explain those terms used within the student's individualized education plan (IEP) so that it can be maintained within the home as a learning environment.

4. Create an online parent community. Share relevant and useful resources with parents that assist their children with effective online learning. At the same time, through this online community, encourage parents to share their thoughts and ideas on how to better assist their children in online learning.

5. Provide parents with information to ensure that they are using needed accessibility features on their computers. Sites like Office Accessibility Center[2] with built-in accessibility features for operating systems like Windows or Mac and UsabilityGeek[3] can be especially helpful.

6. Offer parents relevant online learning resources so they are better informed of how to help their children with disabilities learn. Sites such as LD OnLine[4] and Understood.org[5] provide information about instructional techniques with links to specific online instructional activities that will enable children to practice skills independently.

7. Provide examples of how typical household tasks can be used as instructional activities. For example, use recipes when cooking family meals to reinforce concepts related to measurement, have the child watch/read the news, and have discussions about current events to promote concepts related to civics, government, etc.

8. Identify what operating system, speed of internet, and special software students utilize at home and within the classroom. Offer free alternatives for screen reader applications, magnification, text to speech, dictation, and file conversion to aid parents. UsabilityGeek, Control Alt Achieve,[6] Microsoft Learning Tools,[7] SensusAccess,[8] and Zamzar[9] are all free tools to aid parents.

The impacts of COVID-19 are far-reaching and are changing our teaching practice. Within every challenge is an opportunity. We hope these tips can better help students with disabilities and can help parents play an increasing role in their children's long-term educational success by better implementing the home–school partnerships envisioned in IDEA (Individuals with Disabilities Education Act).

Links

1. ***www.cast.org/impact/universal-design-for-learning-udl***
2. ***https://support.microsoft.com/en-us/office/office-accessibility-center-resources-for-people-with-disabilities-ecab0fcf-d143-4fe8-a2ff-6cd596bddc6d?ui=en-us&rs=en-us&ad=us***
3. ***https://usabilitygeek.com/10-free-screen-reader-blind-visually-impaired-users***
4. ***www.ldonline.org/educators***
5. ***www.understood.org***
6. ***www.controlaltachieve.com/2016/10/special-needs-extensions.html***
7. ***www.onenote.com/learningtools***
8. ***www.sensusaccess.com***
9. ***www.zamzar.com***

Dr. Charles Xiaoxue Wang is a professor of educational technology and Lucas Faculty Fellow (2020–2021) at Florida Gulf Coast University.

Dr. Doug Carothers is a professor of special education at Florida Gulf Coast University.

Steven Bianco is a graduate student at Florida Gulf Coast University, the Electronic Information Technology (EIT) accessibility specialist for Florida SouthWestern State College, and the chair of the Florida State EIT Consortium for FL-AHEAD.

(Courtesy*: Language magazine)*

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Programme and Events

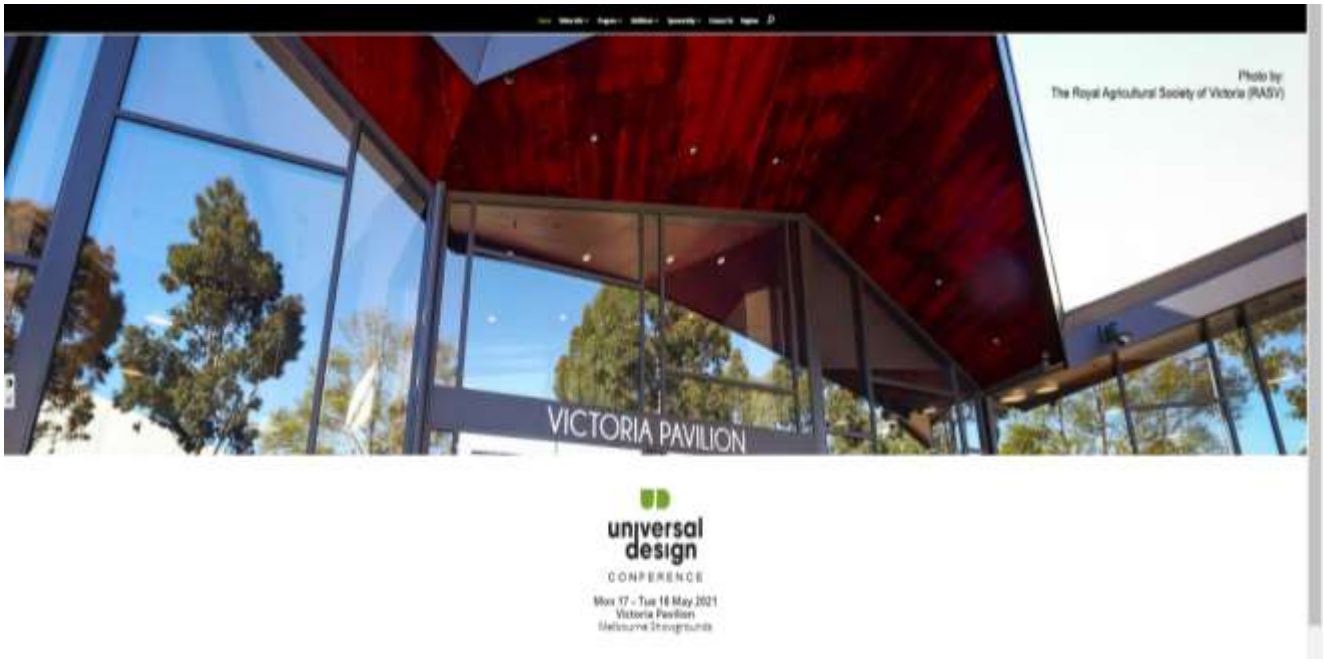
Conferences / 2021 / August 2021 in London / Inclusive Design and Manufacturing

ICIDM 2021: 15. International Conference on Inclusive Design and Manufacturing

August 19-20, 2021 in London, United Kingdom

Universal Design Summit 7

Universal Design Summit is a preeminent conference in North America, drawing experts in universal design from across the globe. UD Summit has traditionally focused on universal housing and inclusive communities. Event organizers are pleased to announce the expansion of UD Summit to include inclusive design in digital spaces. Our current plan is to offer simultaneous)



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As restrictions start to ease across Australia we can't wait to celebrate the very best in design and innovation with our 2021 Good Design Award Winners. Booked for Fri 17 September at The Star in Sydney, this year's Good Design Awards Ceremony will be one you don't want to miss!

We think our design community deserves an extra special celebration this year, so save the date and get your entries in!

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