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BUILDING BETTER
HOMES, TOWNS
AND CITIES

....

Ko ngā wā kāinga hei
whakamāhorahora

Building Research Capacity in Communities
Community Workshop Feedback Report #1

Urban Narrative

October 2017 to April 2018

THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

OPUS

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Building Better Homes, Towns and Cities National Science Challenge

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Chapter 1: Introduction

1.1 General

As part of the National Science Challenge for Better Homes, Towns and Cities; "Urban Narrative" has been funded as a proof-of-concept research project with the aim of creating prototype digital ethnographic tools that enable towns and cities to becoming 'listening organizations' with authentic conversations and two-way relationships with local communities and neighbourhoods by means of data storytelling that supports better decision making for future urban planning and design.

The project works in partnership with Napier City Council and Christchurch City Council on two separate neighbourhood case studies that involve Maori and non-Maori communities respectively. This report outlines the public engagement and science undertaken during the first six months.

Chapter 2: Māori and non Māori Urban Design Principles for Better Homes Towns and Cities

2.1 General

There already exists a national urban design protocol for New Zealand (Ministry of the Environment, 2005) with several other notable commentaries on best practice (Miller and Beattie, 2017; Higgins, 2010; Austin, 2003; Auckland, 2018a; Auckland 2018b). However, as part of an initial investigation into developing digital tools and protocols for data storytelling to inform value based urban design decision making, a review was undertaken of urban design principles from Māori and Pākēha perspectives in Aotearoa/New Zealand. The methodology and results are summarized and discussed below.

2.2 Māori and non Māori Cultural Value and Human Needs

Two sets of human value systems or worldviews were examined to provide a comparison between Māori and Pākēha perspective on urban design. The Pākēha or Western European perspective was based on an assessment of Maslow's *Hierarchy of Needs* (Maslow, 1943) as a framework for human values and priorities. In comparison, Māori perspectives were provided by *Te Whare Tapa Whā* as a Māori wellness/holistic health model (Durie, 1998), as well as *Te Aranga Design Principles* (Te Aranga, 2008) and *Papakainga Design and Development Process* by Awatere *et al*. (2010).

Firstly, considering a Pākēha worldview, Maslow's *Hierarchy of Needs* was seen as a useful but rarely used framework for assessing people's requirements or needs for an urban environment. The hierarchy is well known as a motivational theory developed by psychologist Abraham H. Maslow (1908-1970) that comprises a five-tier model of human needs, often depicted as hierarchical levels within a pyramid as shown in Figure 2.1. The theory characterizes human values deemed important for survival and power to motivate individuals (Maslow, 1943). The majority of the literature relating to Maslow's *Hierarchy of Needs* exists in the context of the health, well-being and psychology fields; whilst a noticeable gap exists in the literature considering the potential applicability of the model in an urban design context.

As such, Maslow's *Hierarchy of Needs* can be seen as a potentially useful goal-based framework to connect soft and hard urban infrastructures (Dyer *et al.*, 2017) with the inherent needs of individuals and the community (Yawson *et al.*, 2009). However, while Maslow's hierarchy is useful as a psychological framework to construct practical human-centered frameworks to improve the quality of life in our cities from a western perspective, it makes limited reference to conditions outside the individual such as the environment, health, poverty in minority groups, etc. (Hagerty, 1999). It is acknowledged that the development of any 'neighborhood hierarchy of needs' would need to extend beyond the needs of the individual to encompass a broader range of characteristics in order to construct a reliable framework (Scheller, 2016).

Figure 2.1. Maslow's Hierarchy of Needs

In comparison with Maslow's hierarchy, three Māori based value systems were examined to help construct a broader set of value-based urban design principles. These models were the *Te Whare Tapa Whā* model for Māori wellness/holistic health (Durie, 1985; Durie, 1998), the *Papakainga Design and Development Process* (Awatere et al. 2010) and *Te Aranga Design Principles* (Te Aranga, 2008). As we outline below, each of these models is more communal and spiritual focussed than, and could be used to offset the more individual perspective offered by, Maslow. However, as with Maslow's *Hierarchy of Needs,* there is a scarcity of literature and evidenced-based research to analyse the effectiveness and relevance of the models in an urban design context. Yet internationally, and in New Zealand, there is growing recognition of the intersections between health, well-being and built environment with a greater need for integrated thinking between the health, urban design and planning disciplines. We now discuss each of these models in turn.

Te Whare Tapa Whā depicts Māori health as comprising four integral cornerstones (Ministry of Health, 2018); the individual cornerstones are briefly described in Table 2.1. While there is no direct discussion of urban design context in *Te Whare Tapa Whā*, it is understood that a shortcoming or demise in one cornerstone will undermine the stability of the whole system of a person or community's health and well-being (Ministry of Health, 2017)

Taha tinana (physical health)	Good physical health is required for optimal development, where physical 'being' supports inner essence and provides shelter from the external environment. For Māori the physical dimension is just one aspect of health and well-being and cannot be separated from the aspect of mind, spirit and family.
Taha wairua (spiritual health)	The capacity for faith and wider communication, where health is related to unseen and unspoken energies, where the spiritual essence of a person is their life force. This determines individuals and communities by who and what we are, where we have come from and where we are going. A traditional Māori analysis of physical manifestations of illness will focus on the wairua or spirit, to determine whether damage here could be a contributing factor.
Taha whānau (family health)	The capacity to belong, to care and to share where individuals are part of wider social systems. Whānau is seen as providing inner strength to be who we are. This is the link to ancestors, ties with the past, the present and the future. As such, understanding the importance of whānau and how whānau (family) can contribute to illness and assist in curing illness is fundamental to understanding Māori health issues
Taha hinengaro (mental health)	The capacity to communicate, to think and to feel mind and body are inseparable. Thoughts, feelings and emotions are integral components of the body and soul. This is about how we see ourselves in this universe, our interaction with that which is uniquely Māori and the perception that others have of us

Table 2.1 Four cornerstones of Māori health and well-being from *Te Whare Tapa Whā*

In comparison, *Te Aranga Design Principles* (Te Aranga, 2008) were developed to provide guidance for design of the environment by engaging with mana whenua; enhancing mana whenua visibility in the design of the public realm and cities; and for enhancing development outcomes. Based on Māori cultural values, Te Aranga Māori Cultural Landscape Strategy was developed to articulate Māori interests and design aspirations in the built environment through a hui in Te Aranga, and led to the formulation of the Te Aranga Design Principles. As such it comprises seven core values that underpin *Te Aranga Design Principles* as described in Table 2.2.

In a similar vein, the later publication *Developing Māori Urban Design Principles* by Awatere *et al*. (2010) recommends taking a wider holistic cultural approach to urban development to address inequality in Māori and non-Māori home ownership and standards of housing by including Orangatanga and Mauritanga as part of a set of nine Māori urban design principles and values listed in Table 2.2.

ngatiratanga	right to exercise authority and self-determination within one's own <u>iwi</u>/ hapū realm
tiakitanga	naging and conserving the environment as part of a reciprocal relationship, based on the Māori worldview that we as humans are part of the <u>natural</u> world
naakitanga	ethic of holistic hospitality whereby <u>mana whenua</u> have inherited obligations to be the best hosts
iruatanga	immutable spiritual connection between people and their environments
ahitanga	ty, cohesion and collaboration
anaungatanga	lationship through shared experiences and working together which provides people with a sense of belonging
tauranga	ori / <u>mana whenua</u> knowledge and understanding
ngatanga	*intaining the health and well-being of the community*
uritanga	*derstanding of community history, identities, character*

Table 2.2 Māori Seven Urban Design Principles from *Te Aranga Māori Cultural Landscape Strategy* (Te Aranga, 2008) plus two additional principles of Orangatanga and Mauritanga from *Papakāinga Urban Design* (Awatere et al 2010)

2.3 Discussion

There are several striking similarities and areas of agreement between Maslow's *Hierarchy of Needs* and *Te Whare Tapa Wha* and the *Māori Urban Design Principles*. The first of these is the requirement for good physical health (Taha tinana) through shelter from the external environment which Maslow expresses as a basic physiological need in terms of food, water, shelter and rest. The second is a requirement for self-determination within one's own iwi or hapū realm (Rangatiratanga) which shares similar characteristics to Maslow's need for esteem in terms of local democracy and listening to people's voices. The third area of agreement is the need for being part of a wider social system (Taha whanau) or, as Maslow indicates, having a sense of belonging or love. The fourth area of agreement is spiritual essence (Taha wairua) or self-actualisation in Maslow's terms.

These four areas can be used as points of reference for developing digital tools for data storytelling about an individual or community's cultural values and needs within an urban built environment. The areas of alignment are listed below in Table 2.3 for future reference.

Te Whare Tapa Wha	Te Aranga Māori Urban Design Principles	Maslow's Hierarchy of Needs
Taha wairua (spiritual health) **Taha hinengaro (mental health)**	Matauranga	Self-Actualization
	Rangatiratanga Manaakitanga	Esteem
Taha whānau (family health) **Taha tinana (physical health)**	Kaitiakitanga Wairuatanga Whanaungatanga Kotahitanga Orangatanga Mauritanga	Belonging
		Safety
		Physiological

Table 2.3 Interpreted similarities between Māori and non Māori cultural values and human needs

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Future Reading

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Chapter 3. Maraenui Stakeholder Workshop, Napier

3.1 General

From consultation with local cultural and political representatives, Napier City Council nominated the Maraenui Neighbourhood as a partner for the development of digital tools to enable local citizens to express their cultural, social, religious and political values to aid future urban design decision making. The consultation process comprised an earlier hui based at the Pukemokimoki Marae on 29 November 2017 followed by a stakeholder workshop at EIT Learning Centre in Maraenui on 23 February 2018 as shown in Figure 3.1. The format and outputs from the stakeholder workshop are reported as follows.

Figure 3.1: Maraenui Stakeholder Workshop at EIT Learning Centre in Maraenui

3.2 Stakeholder Workshop at EIT Learning Centre in Maraenui

The objectives of the stakeholder workshop held at EIT Learning Centre in Maraenui on 23 February 2018 were as follows:

1. To introduce University of Waikato academic staff and establish working relationships with Maraenui citizens and their cultural and political representatives, together with key staff from Napier City Council and other relevant Napier organisations;
2. To enable Maraenui community to express relative priorities based on earlier studies of Māori and non Māori cultural values and human needs in relation to soft and hard infrastructures of the neighbourhood

In planning the workshop, it was appreciated that Maraenui has already been the focus of research on multiple previous occasions, not all of which has been perceived as being beneficial by the Maraenui communities themselves. It was therefore important at the initial meeting to understand

the views being expressed and clearly communicate the benefits the project will bring to Maraenui, not just to the researchers. In addition, issues relating to relationships between Maraenui community members and Napier City Council were voiced, and expectations regarding the project, and its potential benefits in terms of solid outcomes for the community and Council's ability to fund any identified outcomes were traversed and clarification sought. By the close of the workshop, community representatives were persuaded of the benefits of the project and expressed willingness to become involved.

3.3 Workshop Structure and Methodology

The workshop was structured around the earlier review of Māori and non Māori cultural values and human needs in particular Te Aranga Design Principles (Te Aranga, 2008), Papakainga Design and Development Process by Awatere et al (2010) and Maslow Hierarchy of Needs (1943).

The workshop comprised a mix of stakeholders including local residents, ward councillors, council staff and representatives of social/health services. Each exercise comprised three working groups, composed of 10-15 participants at any one given time. The informal structure of the workshop allowed participants to step in/out of the session, which allowed engagement with a broader spectrum of the community, in particular young families, who could not attend the entire duration of the workshop. The importance of hearing 'quiet voices', which are often overlooked in traditional consultations, was paramount.

The workshop opened with a presentation by the University of Waikato researchers, introducing the aims of the urban narrative project, and providing information about the fourteen Māori and non Māori cultural values and human need listed in Table 3.1.

The participants were subsequently organised into three groups of five participants to explore the relative importance participants attached to the Māori and non Māori cultural values and human needs using a set of pre-labelled cards. Planned as three separate exercises, the groups of participants discussed the relative importance attached to each value or needs and how it translated into a requirement for urban infrastructure and subsequently into a software application (APP) to create digital data stories. A more detailed description of the workshop exercises is given as follows.

| Te Aranga Māori Urban Design Principles	Maslow's Hierarchy of Needs
Rangatiratanga Kaitiakitanga Manaakitanga Wairuatanga Kotahitanga Whanaungatanga Mātauranga Orangatanga Mauritanga	Self Actualisation Esteem Belonging Safety Physiological

Table 3.1 Cultural Values and Human Needs explored at Maraenui Stakeholder Workshop

In scientific terms, the workshop effectively used a Q-type methodology to study workshop participants' subjective values, viewpoints and priorities. A Q approach looks for correlations between subjects across a sample of variables. Q factor analysis reduces the many individual viewpoints of the subjects down to a few "factors," which represent shared ways of thinking. The data for Q factor analysis come from "Q sorts" performed by subjects, whereby variables are commonly ranked in order to capture the concept that people think about ideas in relation to other ideas, rather than in isolation.

Exercise 1: Discuss and choose five values you consider important for Maraenui?

For the first exercise, each group were presented with fourteen cards which represented the fourteen core value identified in Table 3.1. Blank cards were provided for workshop participants to include additional values that had not been identified on the pre-labelled cards, but that they considered were important to Maraenui.

Participants were asked to rank the different cultural values and human needs based on their relative importance. Each participant was allocated five dots and asked to place the dots on the cards that most represented that values of Maraenui as shown in Figure 3.2a. By the end of the exercise, the values, which resonated most with Maraenui workshop participants, were easily identifiable as these had the greatest number of dots on the cares. These value cards were then used in Exercise 2, outlined below.
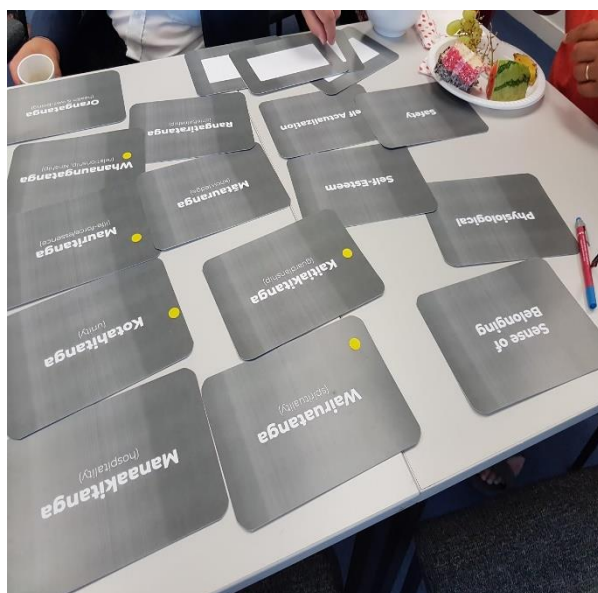
Figure 3.2a. Exercise 1. Participants place yellow dots placed on five cards to indicate relative importance of cultural values and human needs for Maraenui.

Figure 3.2b. Exercise 2. Participants indicate on reverse-side of cards urban design measures that relate to prioritized cultural values and human needs for Maraenui.

Exercise 2: How would you express your top five values in practice?

For the second part of the exercise, participants were asked to write on the back of the cards identified as key values from Exercise 1, a set of indicators which best describes the value. This was a group exercise, so allowed different stakeholders the opportunity to discuss their interpretation of individual values. Through this method of storytelling a set of indicators were identified by each group.

Exercise 3: What technologies could you imagine using?

The final part of the exercise required participants to identify possible ways to measure and present data and information about the cultural values and human needs prioritized in previous exercises. Three examples were given as possible measurement tools, which were photos, texts and mapping. However, participants were encouraged not to let their knowledge of pre-existing technologies constrain their ideas.

3.4 Workshop Results and Analysis

3.4.1. Relative ranking of cultural values and human needs

Figure 3.4 shows the relative ranking of twelve cultural values and human needs discussed as selected by Maraenui workshop participants. As shown, the community tended to favour the Māori Urban Design Values above those expressly identified as Maslow's Hierarchy of Needs. All the Māori Urban Design Values feature in this list, whereas only three values within Maslow's Hierarchy of Needs are present.

Whanaungatanga and Wairuatanga were the two Māori values that were ranked highest. Based on the literature review (see chapter 2) and discussions that took place during the course of the workshop it is understood that both values relate to connectivity, be it between people or the environment. As set out in Fig. 3.6 participants emphasised the role physical spaces have in facilitating connectivity within the Maraenui community, in particular social relationships.

Figure.3.4 Relative ranking of cultural values and human needs by Maraenui workshop

.

The value participants identified as most relevant within Maslow's *Hierarchy of Needs* was safety. Participants broadly defined safety in terms of physical infrastructure and social relationships. In particular, the safety of children was identified as important within the context of Maraenui. It is interesting to note that 2013 census data shows that Maraenui has a much higher proportion of younger people (0 to 17 years) compared to Napier City as a whole (The Population Experts, 2013). Interestingly, there are similarities between how participants expressed the concept of 'safety' and the Māori values of Whanaungatanga and Wairuatanga in terms of a connected Maraenui. This overlap is identified in the literature review, see table 3.1.

Another need participants identified as important from Maslow's hierarchy was self-esteem. Whereas safety is a basic need, self-esteem is a psychological need, so perhaps more abstract. Participants understood self-esteem within the context of a community, not just an individual, identifying education and self-governance as two key factors that can instil self-esteem. The need to recognise community achievements was another important aspect that was identified by participants. Self-esteem was also seen as synonymous with a sense of community pride.

This preference towards Māori Urban Design values perhaps could be explained, in part, by the ethnic population of Maraenui which is 47% Māori (The Population Experts and Napier City Council, 2013). This is considerably higher than Napier City as a whole, which is below 20% (Stats NZ Tatauranga Aotearoa, 2013), as well as New Zealand as a nation.

As set out in the preceding paragraph, participants were able to put forward additional values on blank cards, which did not perhaps align with the values that were pre-printed on the card. Four main additional values were identified by participants, three of which are associated with a Māori world view.

- Te Ao Māori (Word View); Te Ao Huri Huri (Changing World)
- Taonga tuku iho (Heritage)
- Turangawaewae (A place where one has rights of residence)
- Love of Children

While none of these values were ranked highly by participants, it is worth noting that the first two values emphasise the importance of a person being able to place themselves in the wider context, particularly in relation to the natural environment (land), but also in relation to the community (people). This was a recurring theme throughout the course of the workshop. This holistic, collective and non-hierarchical approach to a value system, stemming from a Te Ao Māori perspective, differs from perspectives captured in Maslow's Hierarchy of Needs, which is akin to a more Western/ Pākēha worldview associated with individualism.

The third value, Turangawaewae, is a value that is embedded in Māori culture. It appears to relate to values such as Rangatiratanga (chieftainship) and Whanaungatanga (kinship); the term quite literally translated as a 'place to stand'. The final theme emphasizes the importance of children within Maraenui. The need to consider and prioritise children and youth was another recurring theme throughout the course of the workshop.

3.4.2 Urban Indicators and Guiding Principles

Having identified relative ranking of cultural values and human needs by Maraenui workshop, further examination was made of the indicators or guiding principles ascribed by participant groups for each core values. The urban indicators are shown plotted on Figures 3.5 and 3.6.
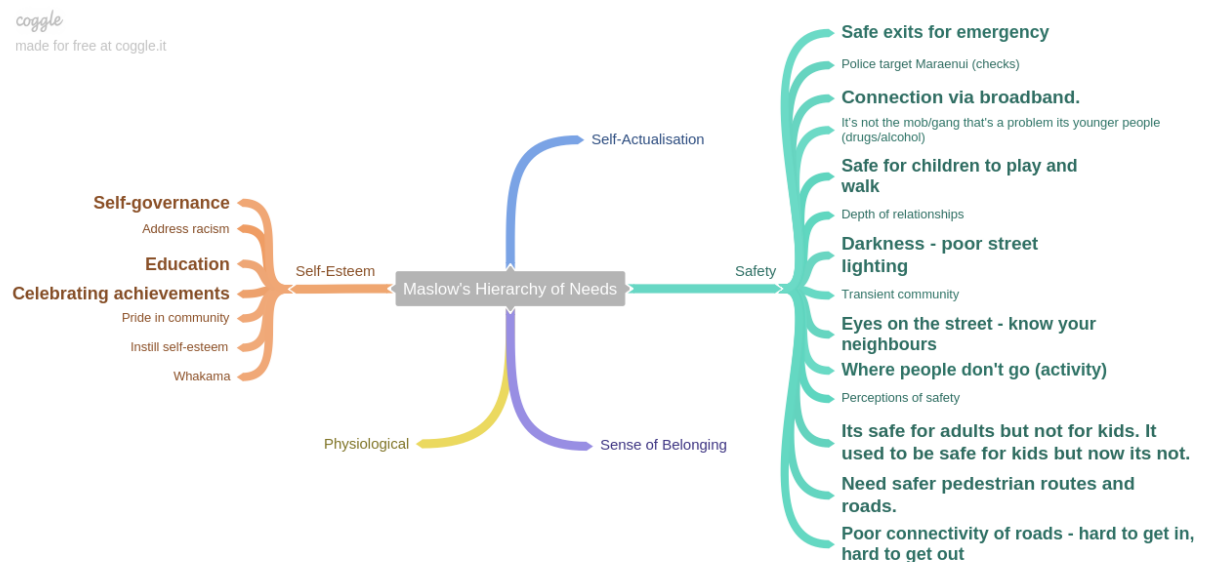

Figure. 3.5 Urban indicators participants identified for Maslow's Hierarchy of Needs
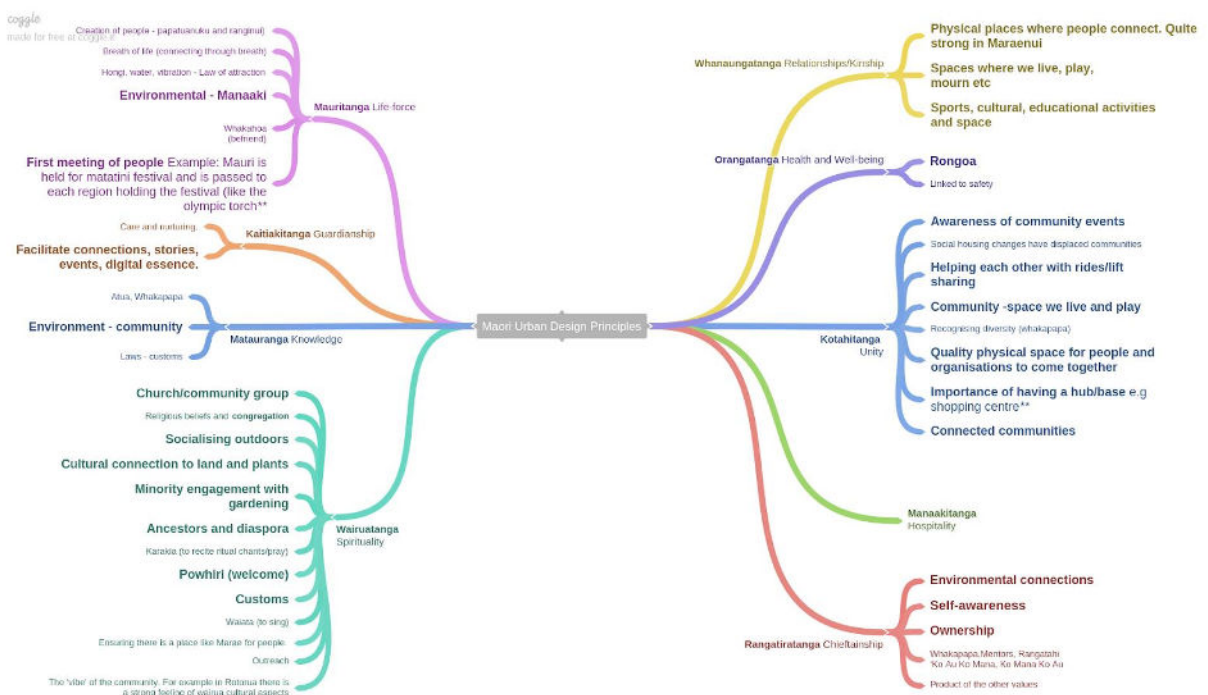

Figure 3.6. Urban indicators participants identified for Māori Urban Design Cultural Values

The information plotted in Figures 3.5 and 3.6 provide a valuable insight into how Maraenui workshop participants express the cultural values considered most important to them. Following a preliminary review of the data, the urban indicators participants identified for each value were translated into practical actions and a set of guiding principles for urban planners as follows

- Children-friendly spaces
- Spaces for community events and activities
- Safe, accessible and social able spaces for all
- Access to educational facilities
- Well-lit streets and footpaths
- A space for the community to share information (online and in real-life)
- Active citizens engaged in decision making
- Spaces to welcome and host visitors
- Safe pedestrian footpaths
- Footpaths and streets are well connected in Maraenui and the surrounding area
- Access to recreational spaces
- Protection of the natural environment
- Spaces to practice customs (singing, prays, chants, meetings)
- Community focal point
- Acknowledgment of community heritage and culture
- Access to health services

These guiding principles relate to both hard (physical built environment) and soft (facilitating institutions) infrastructure. Based on these guiding principles a suite of digital tools can now be developed to capture the necessary data to inform 'why' rather than 'what' people desire for future development in Maraenui. In turn, the digital tools can enable citizens to articulate shared urban values and prioritise challenges through their day-to-day experience, leading to a co-created urban design brief (the 'what').

3.4.3 Data Collection and Visualization

Figure. 3.7 Proposed Measurement and Visualisation of Cultural Values and Human Needs

Following the preliminary establishment of urban indicators and guiding principles to address the relative ranking of cultural values and human needs, participants began to propose methods to measure and visualize data to characterise these values and principles. It was observed that participants appeared to find this exercise most challenging out of the three. This was partly due to

the need for a high degree of prerequisite knowledge about communication technologies via mobile apps and the Internet of Things (IoT). Nevertheless, as shown by Figure 5.7, participants indicated a willingness to gather and shared digital data about a wide variety of activities including individual movements, community gatherings, mental wellbeing as well as the condition of the built environment (street lightning, roads, pathways). However, this willingness was dependent on developing a collaborative framework that allows communities to work with experts from University of Waikato and Napier City Council to develop digital tools specifically tailored to capture data relevant to the community that could be used to inform future urban design decision making. Hence by facilitating the transfer of knowledge from 'experts' to citizens, it is envisaged that citizens shall be able to engage in the design, production and application of digital tools.

3.5 Summary

3.5.1 Key Findings

The workshop revealed several interesting characteristics about Maraenui that will inform future design and implementation of digital tools for data storytelling.

1. Participants expressed a preference for Māori Urban Design values over Maslow's Hierarchy of Needs, even when the two sets of values and needs were aligned. Hence, there was a similar preference for a holistic and participants preferred non-hierarchical approach towards a value system where one value was often intrinsically linked to that of another.
2. The workshop also highlighted the importance of contextualizing urban design values/principles at a neighbourhood scale, while recognizing how Maraenui sits in relation to the city-wide scale of Napier.
3. Participants indicated a willingness to gather and share digital data about a wide variety of activities, however this willingness was dependent on developing a collaborative framework with University of Waikato and Napier City Council to for the design, production and application of digital tools.
4. Lastly Cultural Values and Human Needs were readily translated into urban indicators or design principles such as creating an urban infrastructure to support a child friendly environment

3.5.2 Outcome

The workshop enabled citizens to articulate shared urban values and prioritize these values by anecdotal storytelling. Utilizing the information from the bibliometric analysis of existing apps, and the preliminary guiding principles identified from the workshop, a suite of digital tools can now be developed to capture the data based on the guiding principles/values. This data will help inform the framework of the urban design brief.

The workshop identified a need to further develop the community's understanding of ICT, apps and IoT so the everyday citizen is better equipped to explore ideas and capture data themselves. However, the workshop was the initial step towards equipping the Maraenui community stakeholders with the tools they require to co-create a site-specific urban design brief for Maraenui.

Ongoing engagement with Napier City Council, and communicating the progress of the project with all community stakeholders in Maraenui, is identified as critical to the project success. It is envisaged that a pilot app will be ready for trial by the Maraenui community by May. To facilitate dialogue between all interested parties, Urban Narrative has also a dedicated webpage which provides information about the project's objectives, activities and partnerships, available at https://urbannarrative.nz/activities/.

3.6 References

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Chapter 4: Exploring Digital Software and Tools

4.1. General

One of the means by which Urban Narrative will enable citizens' voices to be heard is through digital ethnography tools. Both active and passive means to gather citizen's stories and related data were analysed. For active data capturing, the use of mobile apps was explored to gather citizen stories. Section 4.2 summarizes the review of existing apps that may be useful in the context of forming urban narratives as well as other social media and passive data gathering technologies. For passive data capturing, a similar analysis was undertaken of existing data held in social media accounts linked to target areas. Section 4.3 gives an overview of the technologies and media explored, in particular mining data from social media or collecting data from devices in situ without active citizen engagement.

4.2 Review of Published Apps and Active Data Gathering

4.2.1 Methodology

Identifying relevant apps does not follow an established process such as those used for literature research and analysis of bibliographic data. However, as part of the initial feasibility study a review was carried out of range of existing mobile phone apps, with the following questions in mind:

1.   Which capture apps exist in the areas of citizen science and urban narrative?
2.   Which goals are addressed by existing capture apps ?
3.   Which apps are suitable for community groups and re-use?

The review targeted apps available for Android phones, as these have more than 80% market share. Furthermore, Android implementations are a typical choice for research projects, due to the simplicity of the testing and publication process.

Phase 1: keyword identification & app search
In a first phase, a list of keywords lists were created to search the app store involving four different methods as follows:

1. the abstracts of 1000 pertinent scientific papers downloaded from google scholar for their most relevant terms
2. keywords in relevant literature (on urban narrative) obtained through the bibliometric data analysis,
3. keywords identified by experts (on urban narrative)
4. significant verbs that were observed to appear in high frequency in the descriptions of relevant applications on citizen science.

Each of the list of keyword lists were used in an automatic search for the Android app store, noting the (possibly repeated) occurrence of any keywords in the app descriptions.

Phase 2: app goals & relevancy
In a second phase, a basic statistical analysis was carried out on the apps found. Those apps that were relevant to the project were identified, excluding those that were clearly about unrelated applications even though their descriptions used keywords from our lists.

Phase 3: open access to data
In the third phase, the remaining apps were analysed in detail, noting how the data captured from app users would be stored, and if users or third parties would have access to the underlying data or merely to summary visualisations. This was used to determine possible -re-use of available software and data.

4.2.2 Summary of Results: Citizen Science

Apps identified by keywords from scientific publications
In phase 1 of the analysis of scientific publications, the following nine keywords were used as follows: environmental sustainability, environmental conservation, endangered bird(s), pollution, emissions, community learning, urban communities, global sustainability, citizen science. As a result, the search identified 1043 apps that mention these keywords, of which 874 apps were related to citizen science. Furthermore, the search found that 11 of these app descriptions mentioned 2 keywords from the list and 1032 mentioned one keyword only from the list.

In phase 2, a basic statistical analysis was performed on the apps data, the results of which are summarized in the charts below.
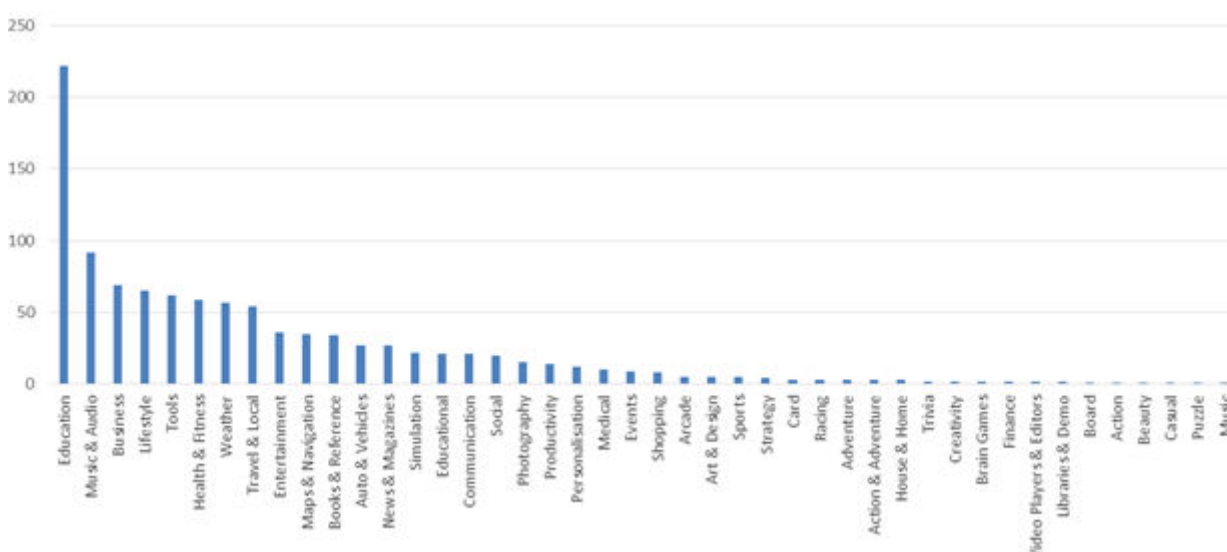


Figure 4.1: categories of found apps (no duplication)

Unfortunately, there was no specific category for "Citizen Science" so that relevant apps are distributed across a number of categories. We also found that education type apps (represented

strongest in the result set) focused largely on providing information and learning and not on collecting data.
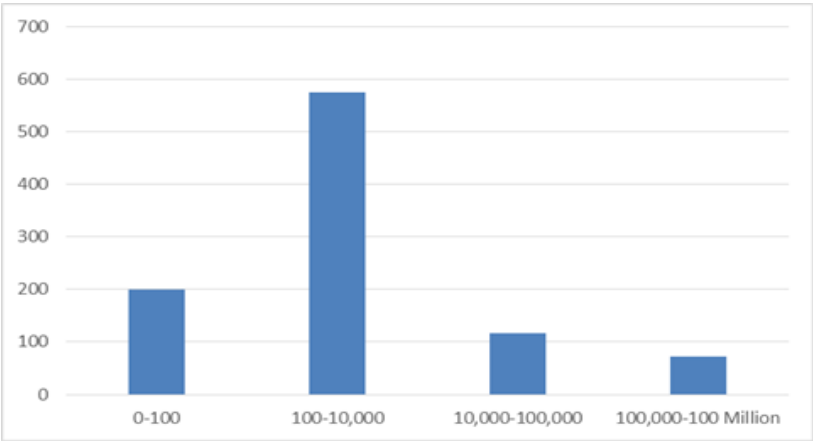
Figure 4.2: number of apps vs installations/user numbers

Many of the found apps did not have a wide user basis (199 apps), while the majority had the beginnings of an established user basis (575 apps). Very few had a wide or very wide distribution (116 and 73 respectively).
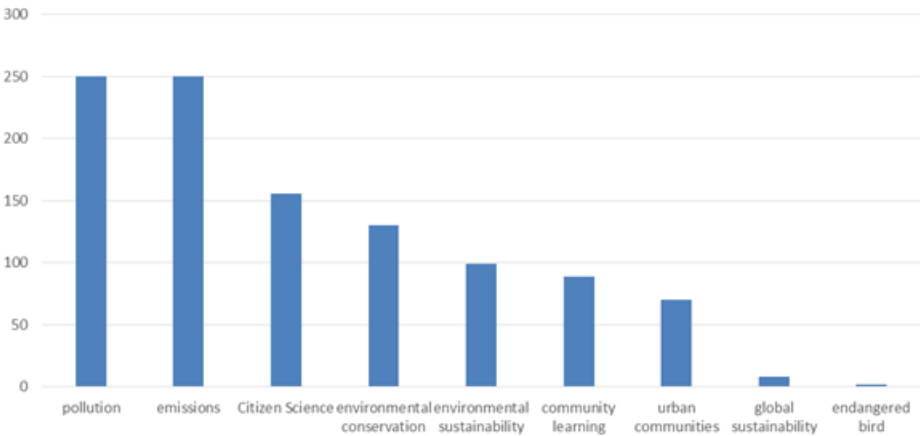

Figure 4.3: Number of apps found for each keyword (duplication of apps allowed)

When reviewing apps for data capture and re-use, it was found that those apps were most commonly related to apps engaged in some form of "Citizen Science" (i.e. the keyword "Citizen Science" was used in 151 single keywords and 5 with two keywords including environmental conservation (1), pollution (1), and emissions (3). These 156 apps of the 1043 apps original data set were then analysed during phase 3 for their provision for data and software access.
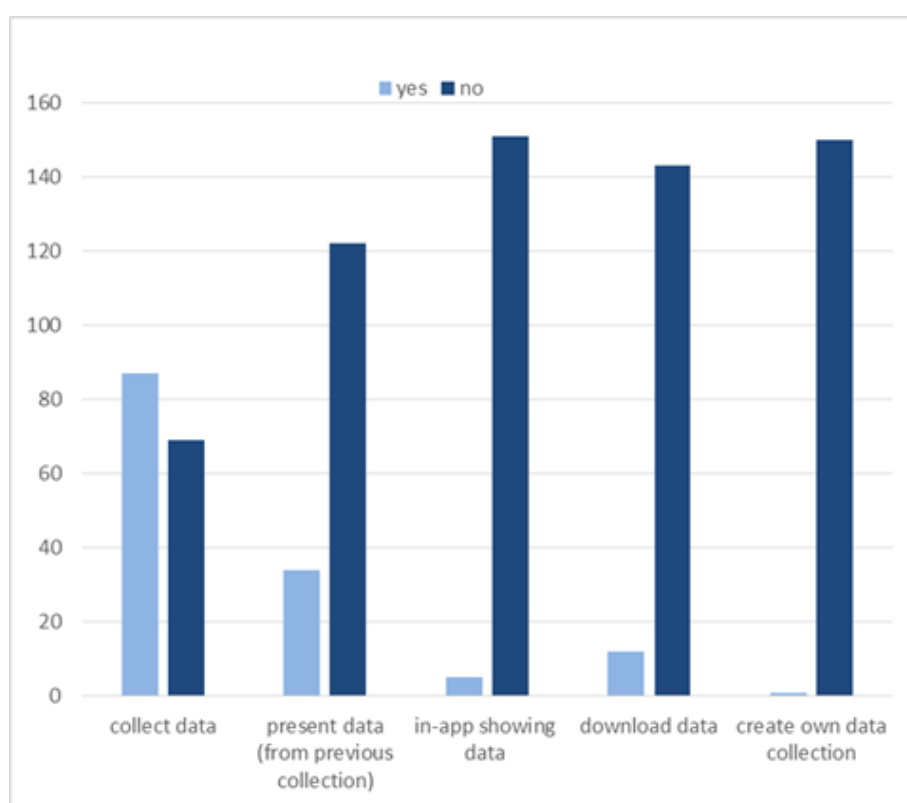
Figure 4.5: Analysis of data handling in citizen science apps

Out of the 156 apps related to citizen science data, only 87 actively collected data, while 34 presented data that had been previously collected and 5 apps presented data from ongoing collections. Based on this information, it was concluded that only 12 apps allow the download of collected data, mostly from separate websites, and only 1 app allowed the creation of one's own data collection. The apps that allow data download are mostly research apps that make their data available to interested users. For example, Riverside Nature Spotters, Atlas of Living Australia
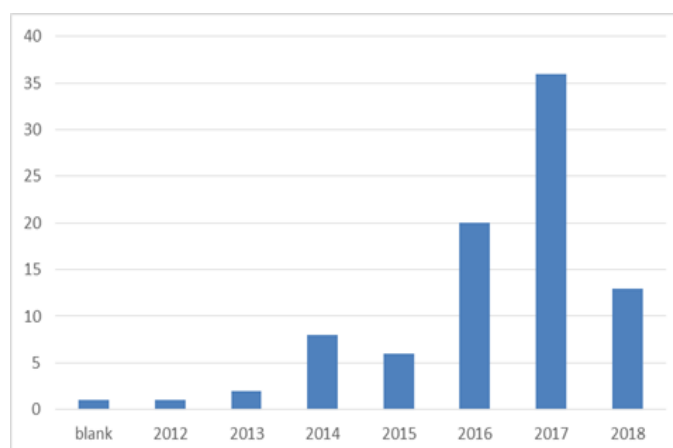
Figure 4.6: Chronological order of 87 data collection apps

The study also analysed the last time each app was updated to estimate if these apps are still maintained and actively supported. 49 of 87 apps (56%) are actively supported (i.e. updated within the last calendar year) and can be assumed to be relatively recent developments. The 87 apps collecting data are relatively highly rated (9 without rating, 8 of ratings below 3, a further 19 of ratings below 4, and 51 rated 4 or higher). Most apps (70) were rated by less than 100 users, only 4 received 50-100 reviews, 5 received 100-500 reviews, and only 3 received over 500 reviews. The three apps with the most user reviews are

1. "iNaturalist" (up to 5 Million installations, 1116 reviews, rating 4.1) by the California Academy of Sciences, which allows data collection about nature observations and setup of user observation projects and data download. The project is active and has only recently been updated
2. "Vespa Velutina - Expansión" (up to 50,000 installations, 988 reviews, rating 4.8) which is an app for supporting a community of beekeepers in staying informed about the health of hives. The app was updated 2017
3. "Loss of the night" (up to 100,000 installations, 692 reviews, rating 4.3) which measured light pollution, but is from 2016 and the project is no longer actively maintained (German research project)

One further app worth mentioning is "Lapis Guides"; although it is still unreleased. This app allows users to build their own citizen science data gathering app and publish data through the project's web server. As such it provides a meta-software that allows researchers to create their own data gathering apps. This concept is particularly relevant for the Urban Narrative project.

Exemplar 1: "iNaturalist"

The iNaturalist is a combination of mobile app and web server, which was created to support scientists in collecting data with the help of citizen scientists. The users can log observations and photos of species of plants, animals or fungi. The data can be uploaded via the app (see screenshots in Figure 4.7) and via the web interface (see Figure 4.8). As such, citizen scientist volunteers can upload either casual or more focussed research-relevant observations. The uploaded data can then be used by researchers and scientists for in-depth analysis.
The incentive for the volunteers (i.e., citizen scientist users) is to use the system as a means to organise their observation data and share it with fellow users. To some extent, the iNaturalist platform and app functions are similar to a social media platform for community of like-minded people. It contains features familiar from social networking, such as 'observation of the week', which support community building and friendly competition.
The data uploaded to iNaturalist is being verified in a number of ways to ensure data quality (He and Wiggins, 2015). Protecting the privacy of the contributors is an important aspect of iNaturalist (Browser et al., 2014), which also applies for the Urban Narrative project.
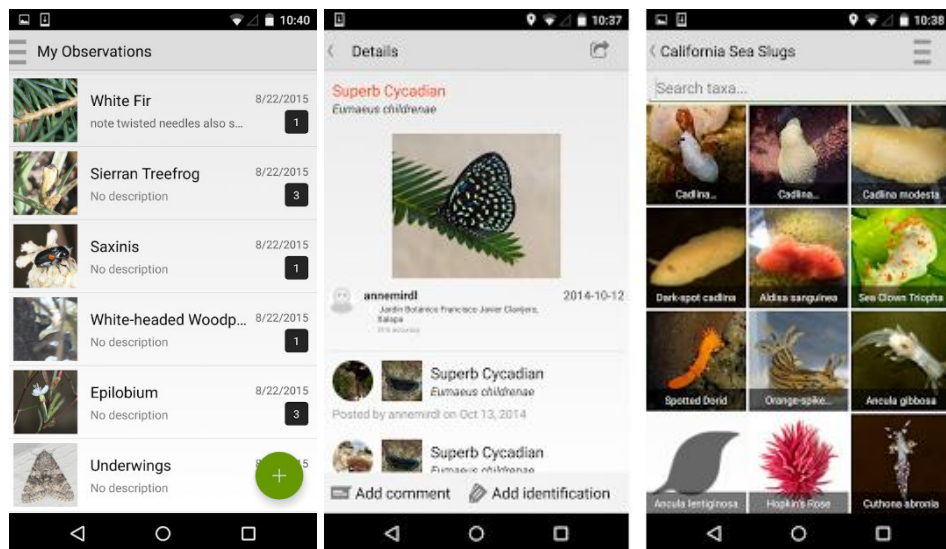
Figure 4.7: Screenshots of iNaturalist: observations overview, observations details, and overview of species (https://play.google.com/store/apps/details?id=org.inaturalist.android)
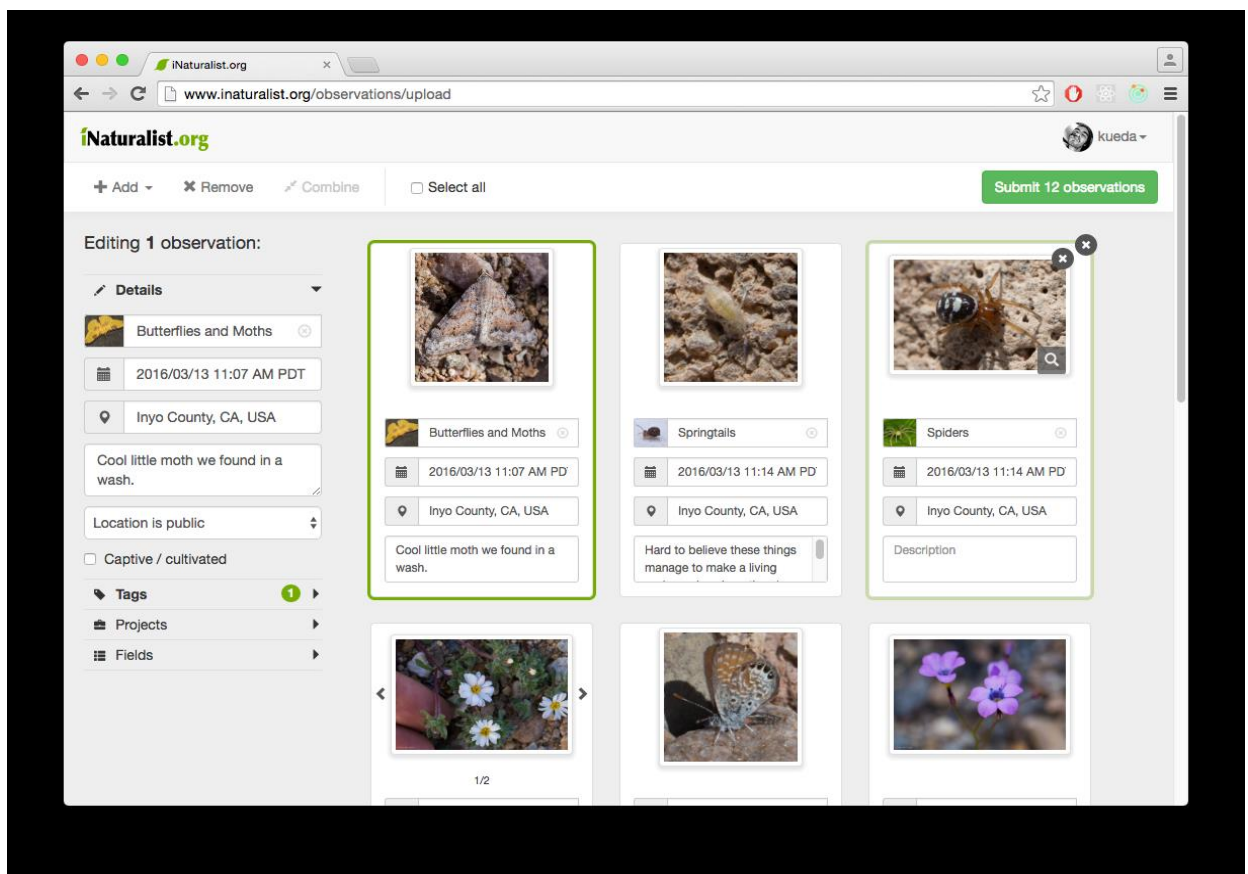

Figure 4.8: Screenshot of web interface for uploading observational data (https://www.inaturalist.org/posts/6518-a-new-way-to-add-observations)

The data collected via iNaturalist is open data available to experts or scientists. Its main focus is biodiversity data. As such, it has obvious characteristics to Urban Narrative although not immediately applicable.

Exemplar 2: "Vespa Velutina - Expansión"

The app is a practical tool for beekeepers. The app can be controlled via the graphical interface (see Figure 4.9) and voice activation. It also supports QR code reading for hive and crop identification. The app offers a number of functions such as recording of flying activities of hives, geo-alerts for and identification of invasive species. It also supports recording and monitoring of hives including recording income and expenses related to apiaties. Beekeepers can use the app to keep their aviary related tasks and notes, and access statistics about their hives. The collected data can be shared via social networks and emails and exported into excel spreadsheets.
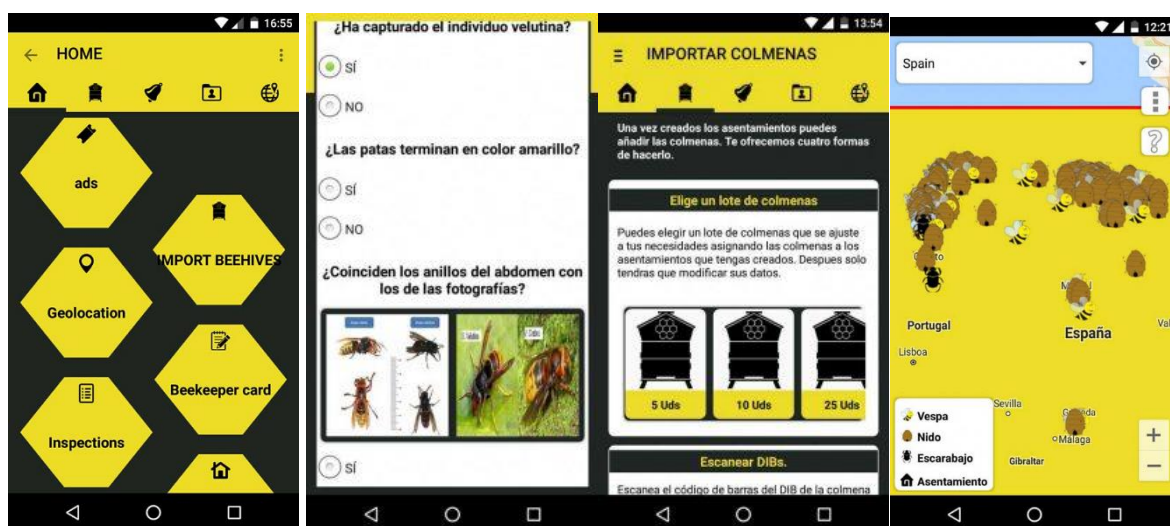
**Figure 4.9:** Screenshots of Vespa Velutina - Expansión app interface

Vespa Velutina Expansión is not a typical citizen science application but rather a tool to manage data with some options of sharing data. There is no focus on analysing the gathered data or making these available to scientists, but rather on making location information about the expansion of wasp invasion available amongst the participants. Its main use is in the in-time notification and alerting of the community based on the gathered data. However, the type of data that is gathered would allow for further analysis.

The relevance of this app for the Urban Narrative project lies in its high acceptance by its user group considering the niche target market. It has impressive user numbers and clearly provides relevant information to its registered users, who collect and share relevant data within the community. The interactions are via a functional rather than high-end graphical interface. By providing relevant and timely information, the app has found high acceptance and has regular contributions from its users.

Exemplar 3: "Loss of the night"

The 'Loss of the Night' is a citizen science app in which users report how bright the night sky is in their current location and by implication the level of light pollution. As such, it provides a qualitative measure of light pollution and so-called 'skyglow' impacts that outshines the celestial stars.

Hence the app offers a tool to measure indirectly light pollution by using human perception of the night sky (instead of in-built sensors), see Figure 4.10. Users are encouraged to look for certain stars in the sky, and report via the app whether or not they can see these stars. Aggregating this data creates data for scientific exploration, in addition to providing a fun activity for the users.
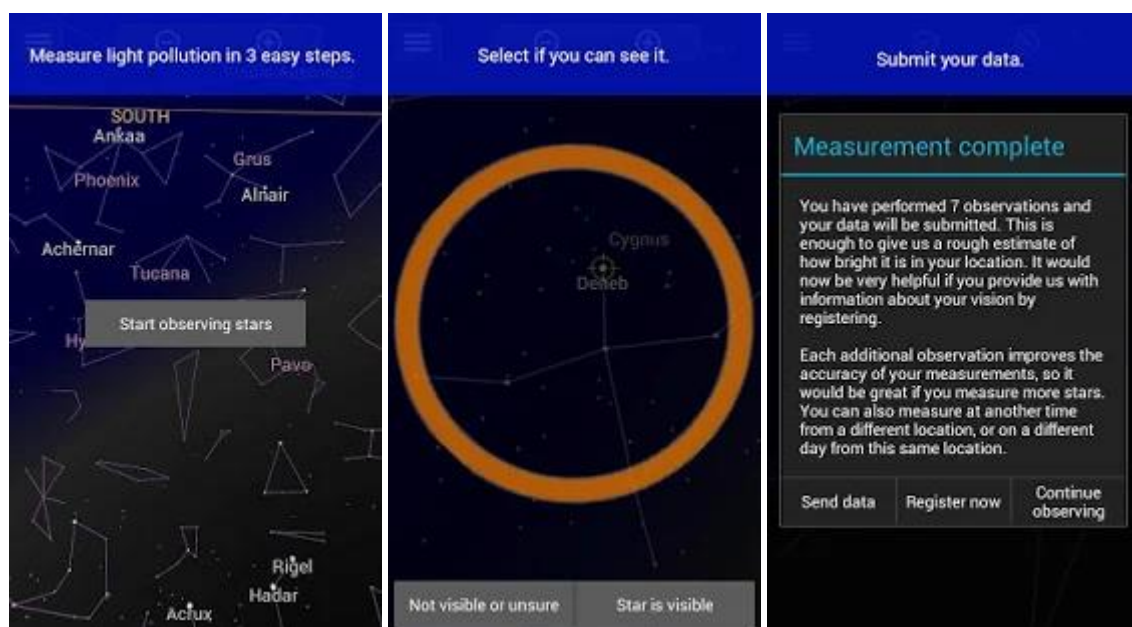
Figure 4.10: Screenshots of 'Loss of the night' app interface
(https://play.google.com/store/apps/details?id=com.cosalux.welovestars&hl=en)

The resulting data is aggregated by the GLOBE at Night project; users receive feedback about observations via a map in the app and online (http://www.myskyatnight.com). As a result of the app use, a world atlas of artificial night sky brightness has been created (Falchi et al, 2016). The resulting maps are examples for how citizen generated data can tell a story about locations (see example map in Figure 4.10).
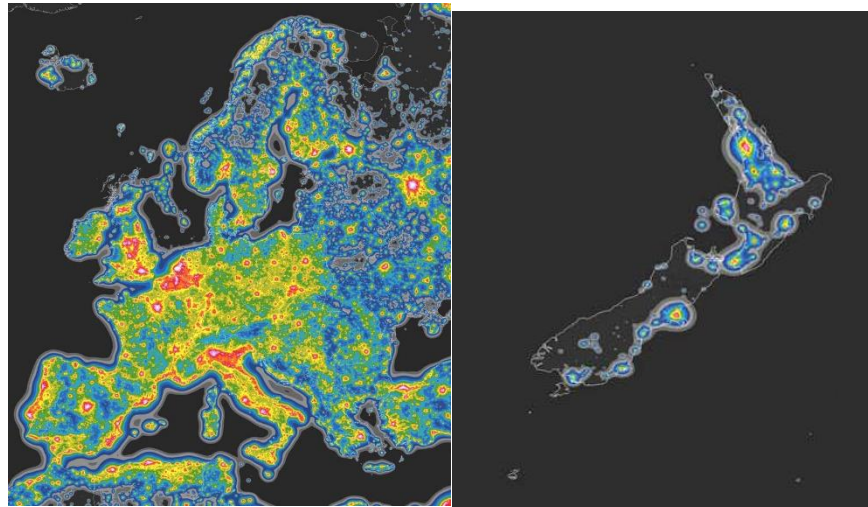
Figure 4.11: Light maps for locations in Europe (left) and New Zealand (right), (Falchi et al, 2016)

The relevance of 'loss of the night' for the Urban Narrative project is in the use of human observations as indirect assessment of an otherwise complicated physical measurement. Not only is this a more engaging way for the users to measure the light pollution (instead of an automatic sensor reading), but it provides wider options for citizen participation and engagement. It allows citizens to determine which location they wish to include in the studies, thus directing research into certain regions. The project showcases an application in which the absence of easy-to-use sensors is turned into an advantage, which may indicate options for Urban Narrative in how to handle cases in which official or measured data is hard to come by.

Ongoing work

Based on analysis of high frequency key terms occurring in descriptions of citizen science apps (see process description 4), the following 19 words were identified as activities relevant to citizen science: *monitor, observation, sighting, record, contribute, participate, investigate, compare, volunteer, collected, involved, report, joining, database, collect, community, track, observers, input.* Additionally a black list of keywords was identified as follows: *awareness, search, provides, Government, Showcase, tips, guide and gallery*. These blacklisted words often occur together but did not lead to apps that focussed on data gathering but rather on data visualisation and information provision.

Using these keywords, 4490 apps were identified as being loosely connected to concepts of citizen science. Out of these, only 5 mention three keywords from our list, 24 mention 3 keywords, 194 mention 2 relevant keywords, and 4267 app descriptions mention a single relevant keyword. Further statistics about these apps are currently under evaluation.

In addition, our analysis of apps related to urban narrative has collected initial sets of data. For example, our analysis of scientific publications, we identified the following 10 key phrases: urban narrative, rural regeneration, city migrants, violence in neighborhoods, urban cities, socio urbanism, post urbanism, cultural heritage, city planning strategies, neighborhood narratives. As an outcome of

phase 1, we found 291 apps that mention these keywords, with each keyword appearing only once per app description. Two further data sets are currently being evaluated.

4.2.3 Summary

A methodology has been developed for analysing related work in app development. Based on this five app related data sets for citizen science and urban narrative have been collected. From the analysis of the first set of 1043 apps, it was noticed that most apps do not collect data, even fewer provide access to data to their users. Nevertheless, two apps were identified that allow the reuse of existing platforms for data collection, of these the iNaturalist is the only app in use. However, neither of these platforms focus on tasks related to urban narrative, but rather observations about nature. Even so, existing apps can undoubtedly provide inspiration for app development for the Urban Narrative project, especially for data gathering about citizen movements.

4.3 Social Media and Passive Data Gathering

This section describes the methodology and results of ongoing investigations into mining data from social media and/or collecting data from devices in situ without active citizen engagement.

4.3.1 Instagram

Instagram is a public social media platform for sharing images, text and content. Content made available on Instagram by its users may be either private or public. This study into data mining and analysis is only concerned with the public data. Instagram data can be accessed automatically either via a public API (Application Programming Interface) or via existing tools for data harvest. In order to ensure the privacy of personal data, the study's approach to collecting any Instagram data only uses open source software (in which the methodology used is available for inspection).

Data collection tests

The Python software tool Instagram-scraper (github.com/rarcega/instagram-scraper) that supports downloading of Instagram images and text, restricted to a particular location, hashtag or user name. Our study collected Instagram data in a number of test sets containing the following information (Napier and Hawke's Bay are included for reference purposes to gain an impression of the wider context):

- Set 1: 1800 posts containing images only,
  location restricted to *Napier*, posting dates 2017
- Set 2: 2000 posts containing images, video, text, number of likes, comments,
  location restricted to *Napier*, posting dates in 2017 (image selection see Figure 4.12)
- Set 3: 4500 posts containing images, video, text, number of likes, comments,
  with hashtag restricted to *Napier*
- Set 4: 236 posts containing images, video, text, number of likes, comments,
  with location restricted to Hawke's Bay, August 2014-March 2018

- Set 5: 213 posts containing images, video, text, number of likes, comments, Location restricted to *Napier/Maraenui*, posting dates in 2016-2018, (see Figures 4.12)
- Set 6: 4000 posts containing images, video, text, number of likes, comments, Location restricted to *Napier, New Zealand*, posting dates in 2014-March 2018
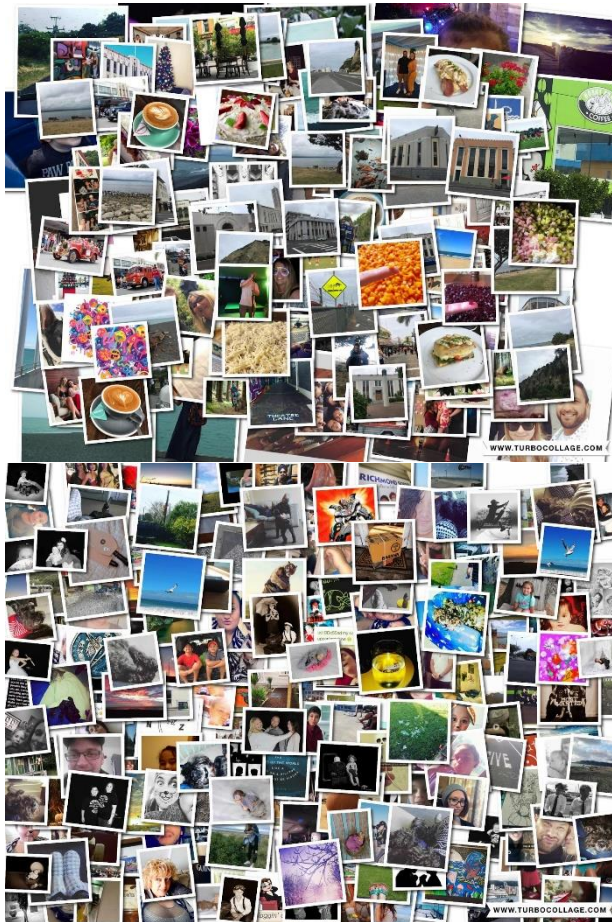

Figure 4.12: Image collages of set 1 (left) and set 5 (right)

Data filtering and clustering

A simple visual comparison of the available images sets on Napier and Maraenui indicate a higher proportion of architecture, beach and 'tourist'-type images for Napier (see Figure 4.12, left) vs more community, homes images for Maraenui. Formal image analysis is still ongoing.

Having conducted an initial investigation of the potential use of the Instagram data, the following methods could be applied to Urban Narrative:

1. Images of a location over time: Figure 4.13 shows a selection of Maraenui Instagram images (above), and the same images ordered by year (below).
2. Location data for tracking movements in a certain area over a certain period of time.
3. Analyse posts and images with regards to identifying opinions about a certain place.
4. The numbers of followers, and comments (positive or negative) to establish social connections of a person
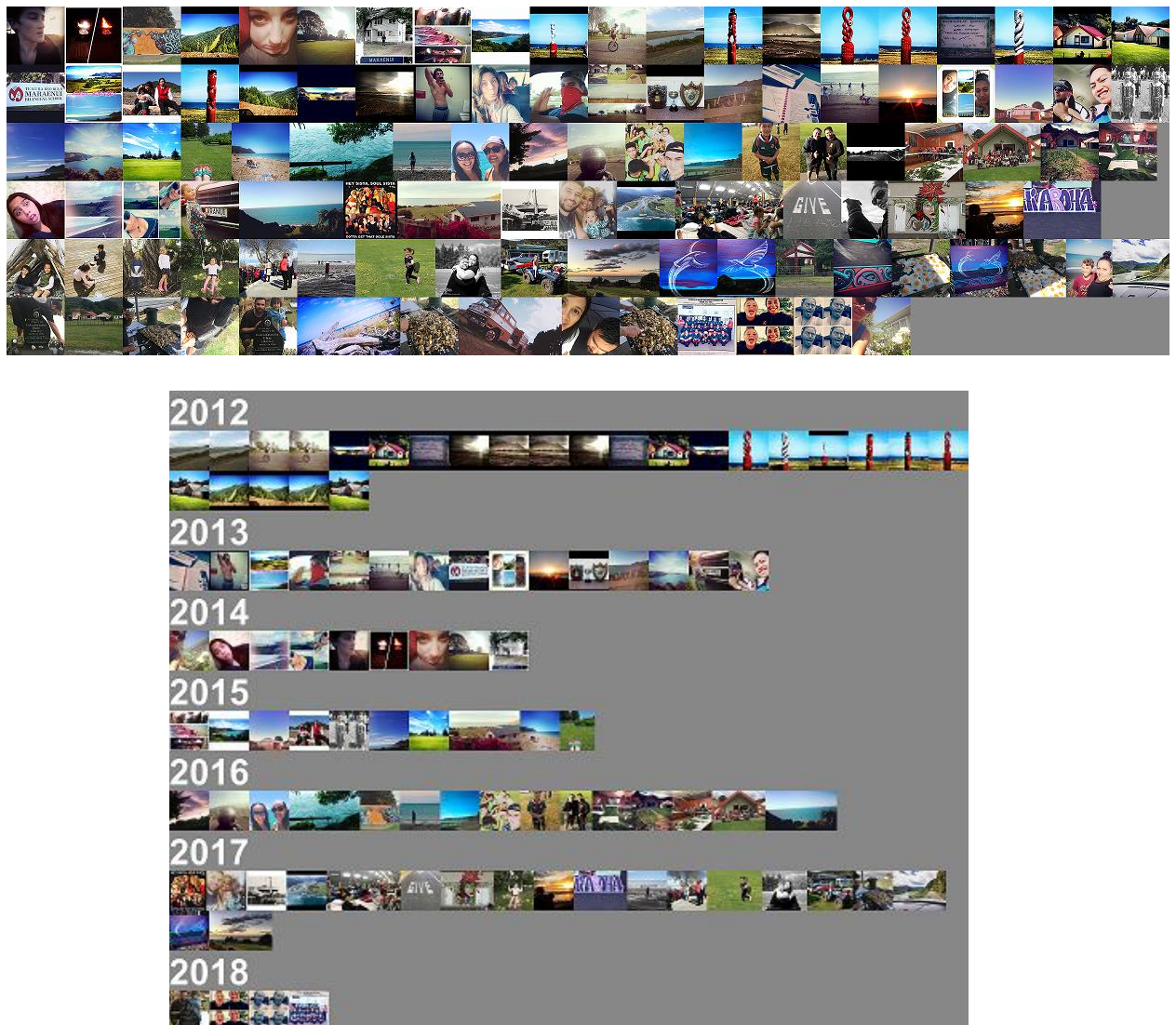
Figure 4:13: original image collection (above) and image clustering by year (below)

The following issues with using Instagram passive data were identified:

1. data may not be representative of the whole population
   (majority of instagram users are generally from younger generation)
2. data may not reflect a wide variety of community life
3. sparse data (i.e. low number of posters, especially in small areas like Maraenui)
4. Influence of tourism and outsider postings
5. Potential ethical issues: while the data is public, care needs to be taken in how to visualise and use the data to protect people's privacy

In conclusion, Instagram is a suitable tool for data gathering for passive data gathering though its limitations for small communities need to be borne in mind. However, some of these shortcomings could be resolved by targeting a representative active group from the local community and city council. This subgroup could be encouraged to actively post on Instagram according to given topics (e.g., using project related hashtags).

4.3.3 Twitter

Twitter is a public social messaging service for sharing text messages with optional images. Content made available on twitter by its users is public. We conducted studies on gathering data from twitter and analysing the resulting text sets for sentiments (sentiment analysis).
The following data sets were created using text search within the tweets:

- Set 1: search term Maraenui: 148 tweets, 2016 to March 2018
- Set 2: search term Napier: 30,001 tweets, January to March 2018

The different volumes in tweets become immediately apparent. Figure 4.14 shows word clouds for sentiment analysis of Maraenui-related tweets separated by sentiment. For Maraenui, the sentiment clustering finds 36.3% negative tweets, 32.2% neutral and 31.5% positive tweets. The negative tweets are mainly about lost cats and dogs. For Napier, the sentiment clustering finds 21.4% negative, 37.4% neutral and 41.2% positive tweets. Here the negative tweets are more mixed primarily relating to smells, money and crimes, while the positive tweets are strongly influenced by local businesses (terms such as necklace, pendant, vintage, carved, free).

Neutral: 32.19%   Positive: 31.51%   Negative: 36.30%
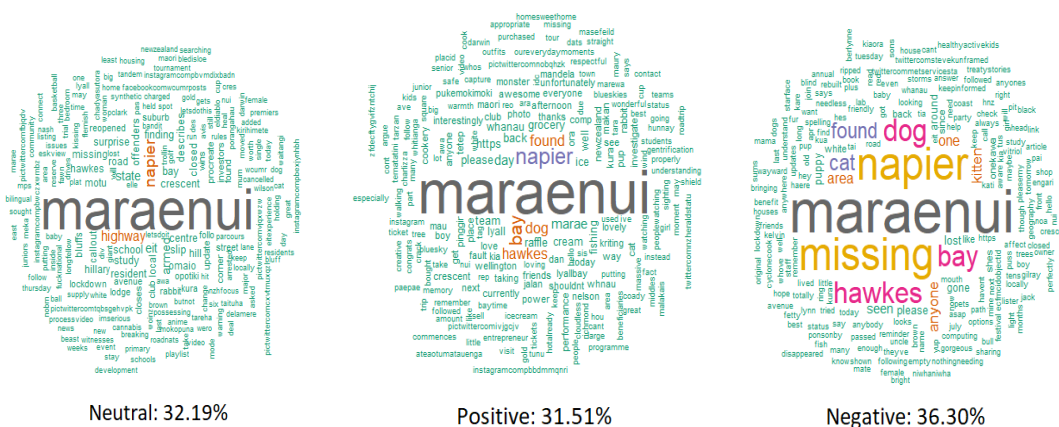
Figure 4.14: Sentiment analysis of Maraenui tweets (set 1)

4.3.2 Internet of Things (IoT) and Passive Data Gathering

In 1999 Kevin Ashton was the first to use the term Internet of Things (IoT) to describe a technological situation where computers gather data without human intervention (Ashton, 2009). Since then, the IoT has been described in different forms. Uckelmann, Harrison, & Michahelles (2011) characterise it as a concept in which the virtual world of information technology integrates seamlessly with the real world of things. Said & Masud (2013) define it as the process of connecting machines, equipment, software and things through the use of the unique Internet protocol address that permits things to communicate without human intervention. Haller, Karnouskos, & Schroth (2008) explain it as a world where the physical objects seamlessly integrate into the information network and where the physical objects can become active participants in the business process. It is generally agreed that in years to come the IoT will be one of the significant disruptive technological forces. ABI Research indicates that

there will be 40.9 billion internet-enabled devices by 2020 (Drubin, 2014) while Cisco has predicted that there will be 50 billion devices connected by the same time (Evans, 2011).

An IoT project implies different component layers. In typical situations, we will find at least four: a smart physical device, a back end, a front end and end-users. These four component layers are individually outlined below.

Smart physical devices are apparatus assembled with physical and electronic components (hardware), some degree of intelligence (software), and connections to computer networks. The hardware part is a mix of sensors, actuators and single-board microcontrollers; the software part is a series of on-board computer programs. The acquired data — obtained via sensors connected to the board — may be parsed, filtered, mined and represented in different manners.

The back end – sometimes referred as "server-side" – is related to data storage and processing technologies (Pop & Altar, 2014). This set of technologies is the part of a networked computing model that deals with scripting languages, database administration, authentication and authorisation, data storage, transformation and backup. In the client/server computing model, one of the most common forms of data communication architectures (Hanson, 2000), the back end is the server and serves data to multiple clients.

The Front-end can be presented in two areas, considering computers or mobile devices (tablets and smartphones). Front-end web technologies are the combination of techniques used to produce a web application to be used with a web browser. Front-end mobile technologies are software programs created to be used on a mobile device. The most popular operating systems for mobile devices are Android (developed by Google) and iOS (developed by Apple).

In the architecture described above, data can move in different directions (e.g., sensors → single-board microcontroller → actuators). In a possible scenario, for example, it flows from sensors to users. Sensors are used to capture measurements and pass the signal that is received by a single-board microcontroller that manipulates it and produces an output. This output can go to a back end, where it is stored. A change in the back end can trigger messages that are immediately distributed among the subscribed clients (e.g., an alert message in a mobile device). Once stored, the data can be accessed, manipulated or visualised using front-end technologies, via the web or mobile applications. In another possible scenario, the data moves from users to actuators. The user interacts with the front end via the web or a mobile application (e.g., clicking or tapping a button), and these interactions are transferred to the back end where data is stored. The back end connects to the microcontroller that transforms the received input into a perceivable output (e.g., an LED turns on, a robotic arm moves).

Given this technological context, IoT projects can be used to empower users to gather, store, mine and visualise data. The goal could be the generation of social, participatory processes in urban areas. By connecting data, people and knowledge, the objective is to serve as a node for building productive and open indicators and distributed tools. It works in the direction of the joint construction of the city for and by its inhabitants.

In this direction, we have been inspired by projects like Smart Citizen (https://smartcitizen.me/), a platform created to collect data in a participatory manner from an urban environment. The Smart Citizen team are the creators of the Smart Citizen Kit (SCK). The kit comprises three technological parts: a hardware device, a website with an online API, and a mobile app. The hardware part of the SCK is a smart physical device armed with sensors and a data processing board. It senses air composition (CO and NO2), temperature, humidity, light intensity and sound levels.

In the context of our IoT lab, we have been testing different technologies in the identified component layers of an IoT project. We have tested one of the latest Arduino boards (model MKR1000) that provide WiFi and Bluetooth connectivity (see Figure 4.15). We have also examined other microcontrollers explicitly developed for the IoT, like the SparkFun ESP8266 Thing. Different tests have been done in the area of powering the microcontrollers (e.g., connected to the grid, powered by batteries). We have been running experiments with different sensors (e.g., light, force sensitive resistors (FSR), etc.) and actuators (e.g., LED light strips). Our tests include developing connectivity to cloud services, for instance, databases in the cloud (e.g., Firebase).
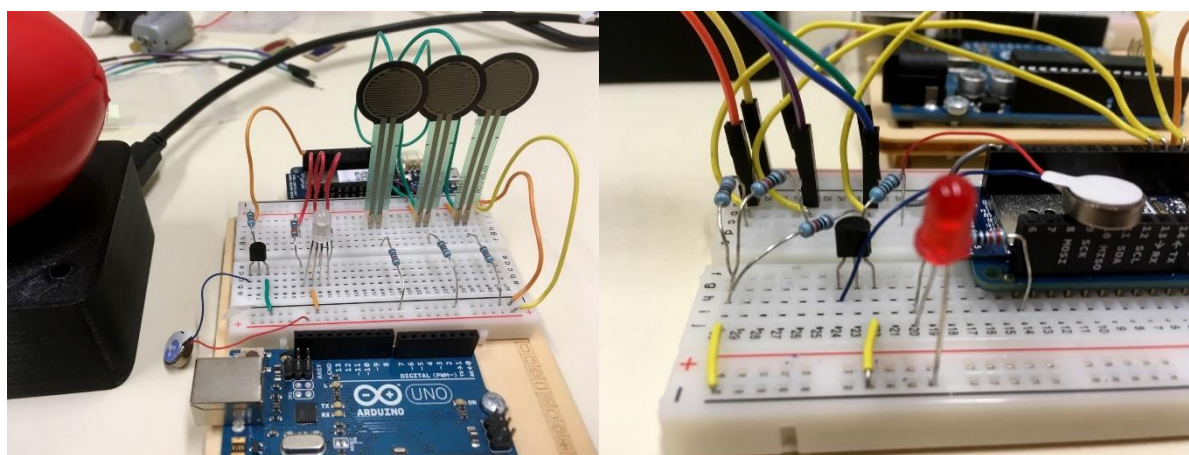
Figure 4.15: Arduino boards setups tested for Urban Narrative study.

Further developments in this area will include progressing in the design and construction of prototypes that can be tested in the field. This will consist of the definition of scenarios of use, the development of the prototypes, the deployment in the field and the evaluation of the projects.

4.3.3 Summary

Methods of passive data mining data from Instagram and Twitter have been identified and trialled for selected locations. Based on the rather small dataset available for Maraenui (in comparison to places such as Napier), the application of these methods working on historic data at smaller geographical scales than the city such as a neighborhood' (in this case Maraenui) raises issues around how 'representative' data is of a community. That being said, the concept of a 'target group' which could be selected from/by the local community has been identified as one possible way to achieve a more representative sample and ensures those gathering the data are residents of the neighbourhood. Methods of active data collection via IoT devices have also been trialled and are

planned to be used for selected focus topics that would benefit from having sensor-measured data (instead or in addition to human generated data).

Ethical issues around public data is used is another aspect of passive data mining that cannot be overlooked. An integral part of developing any collaborative urban planning framework must be that citizens are active participants who ideally are able to gather, store, mine and visualise data without having their privacy invaded. In this respect, passive data mining needs to be coupled with visualisation techniques that do not overexpose the individual but create visual impressions of aggregated data a group.

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Chapter 5: Christchurch City Council

5.1. Stakeholder Consultation

Discussions with Christchurch City Council are less advanced than with Napier City Council. Nevertheless, two stakeholder meetings have been held in November 2017 and March 2018, chaired by Tony Moore, Sustainable Development Officer. The attendees comprised city planners, architects, community officers, and sustainable development officer. The meetings discussed the strategic aims of "Urban Narrative" and provided further clarification on possible outcomes for the project and relevant outcomes for work streams of Christchurch City Council. In particular, the city planners were interested to explore how "Urban Narrative" could address the following questions with an emphasis on Heritage and Culture.

- When does a neighbourhood become a community, and what is the difference?
- What constitutes a "community" in terms of residents and their shared values?
- How does the community identify, use, describe and value "heritage" (including character/sense of place/local distinctness/streetscape/landscape/intangible ideas/history etc.), and to what extent does this influence where people choose to live?
- How could "heritage" help build and/or sustain communities and what is its role in place making?
- What could City Council do to support and enrich this?
- What and who is currently missing from this picture at present and why?
- How can we identify/assess/monitor the benefits to a community of "heritage" as defined above and including how it builds resilient communities and informs place making

The discussions raised questions about the effectiveness of digital data generated by "Urban Narrative" and what was the 'value added'. It was already thought that information available about community and heritage was too subjective, often based on accidental hearsay or perceived opinions rather than facts and data. The challenge of capturing quiet voices to discover their values/needs and measuring how these are met with a particular project was also discussed. For example, if a community developed a heritage trail, could we prove the cost benefit in terms of economic/tourist/community and personal benefits? It was recognised that this was very difficult to measure benefits.

With these aims in mind a community 'case study' could be developed, with a view to using it as a template or model for use elsewhere in the city. The community case study would ideally have the following characteristics:

- A strong presence/history/characteristics which give it a story and a sense of place (includes tangible and intangible)
- A mix of old and new in terms of the built environment
- Currently undergoing changes and developments which are undermining or at risk of undermining its history/character/community, but which at the same time are a record of social change and will potentially become part of the heritage of the area (ie the inheritance and the legacy)
- A varied demographic to include

- o Ethnic diversity
- o Social and private housing
- o Schools (ie families and younger people)
- o Older residents/care homes
- A community containing groups who "DO"
- An engaged community
- Established relationships/networks with Council and an expressed ongoing willingness to work with Council
- Governance staff, including community development staff, who currently have the time, inclination and ability to work with heritage staff and the community on the project
- A community who will 'pay it forwards' ie who will help another community to develop the networks/manage the project after them if it is a success.

In view of the above criteria, possible candidate neighbourhoods are being considered.

In addition, thoughts were given about what data may already exist to give some background/baseline, namely

- Heritage workshops and surveys
- Have your say responses from other Council initiatives in the area
- Share an idea responses from Council
- Social media
- SEISMIC data
- Local publications
- Local community group websites
- Local churches
- Local schools
- Council reports, community board reports and information about Council projects and initiatives in the area
- Libraries
- Deb Lam at the office of Ethnic Communities at the University

In addition, the project group were told about future plans to enhance the digital content and capability of CHCH library which could create synergies with Urban Narrative. In particular,

- The library service have gone out to tender for a new digital repository that can store future data from Urban Narrative
- The library service has recently appointed a digital curator to further engage in the digital agenda
- The library service has recently acquired a mobile interactive digital wall that can display photographs from archives and online collections and will be used for public engagement for the annual "Photo Hunt" in October
- Photography students from The Canterbury School of Fine Art annually undertake a student project called a "Time in Place" that captures images of Christchurch and people in the city and contribute to the Libraries digital collection

Chapter 6: Future Plans

6.1 General

Within the context of the National Science Challenge for BBHTC, the initial studies for Urban Narrative have underlined the need to build trust with both city council and local residents as well as address the following challenges

a.   How do we ensure local residents and stakeholders worldviews and values are recognised for the co-creation of prototype APPS and other digital data gathering methods?
b.   How do we translate this data set into data storytelling that capture the underlying values of the community to make better informed decision making?
c.   How do we translate the data storytelling into guiding principles for urban designers inform urban strategy document and spending plans?

6.2 Maraenui, Napier

In the case of Maraenui, there have been two valuable opportunities to meet residents along with local political and cultural representatives as early steps towards building trust and sharing outlooks on cultural values and worldviews to inform future data gathering and storytelling in relation to the surrounding neighbourhood (urban environment).

Prototype APPS and Hackathon

Based on the initial discussions about shared cultural values at EIT Maraenui Hui in March, plans are underway to design prototype digital ethnographic tools during the next four months (May to September) based on the relative ranking of cultural values (Fig 3.4) and corresponding urban indicators (Figs 3.5 and 3.6). The digital tools use following approaches

a.   Design of prototype APPS inspired by iNaturalist, Vespa Velutina and Loss of Night exemplars
b.   Collection and filtering, clustering and dating of social media (i.e. Tweets and Instagram) from targeted local community groups for topic analysis and sentiment analysis

Having designed and built these prototype digital tools, a weekend Hackathon is planned in Maraenui to test their attractiveness, relevance and robustness

Napier City Councils Long Term Plan

At the same time, it is recognised that the project's success depends on its ability to connect with Napier City Council's own strategic documents, ongoing community projects and spending plans. Napier City Councils Long Term Plan is presently under review and goes out for public consultation towards the end of April 2018. Initial examination of the current Long-Term Plan (2015-2025) shows clear overlaps with Urban Narrative, in particular with Desired The Community Outcomes. In fact,

cross-examination of the key values identified in the Maraenui workshop and The Community Outcomes in the Long-Term Plan show four main overlapping areas which are set out below:

- Safe and secure communities
- Communities that value and promote their unique culture and heritage
- An environment that is appreciated, protected and sustained for future generations
- Strong leadership that is connected to its community

At a more localised level, non-statutory documents present opportunities for collaboration with established community groups working alongside Napier City Council. One example is the *Maraenui Renewal: Concept Plan Development*, which is the first step towards developing a concept plan to guide the urban renewal process in Maraenui. This document outlines the need to confirm a set of values in order to progress the project. Likewise, Napier's *City Vision* specifically identifies 'our people, our stories' as one of six core principles. While the geographical area of this City Vision does not presently include Maraenui, many of the principles are aligned with those of Urban narrative. Consequently, Urban Narrative is well-placed to created digital tools and platforms that generate authentic narratives to support safe and secure communities for future generations.

6.3. Christchurch

Based on stakeholder consultations with Christchurch CC, a four-month period of time (May to September 2018) has been identified to undertake a series of early field studies as follows to identify early successes and obstacles.

- Select a suitable neighbourhood for the community case study and agreed who are the community groups and key stakeholders
- Understand how data collection and storytelling can be used to draft City Neighbourhood Plan
- Undertake a preliminary review, analysis and visualize existing digital data to help create a context for the people and neighbourhood
- Understand how the digital data could be stored, accessed and visualized from the library digital repository
- Co-create digital tools that enable those people to capture personal and community values in the heritage and culture space (tangible and intangible) to give a stronger sense of belonging to inform better urban design decision making
- Run two separate short pilot studies possibly in the form of a mini "photo hunt", mini "story telling" or mini "neighbourhood design challenge"
- Review and provide feedback to the community on the outcomes

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