Engagement-oriented design: a study of New Zealand public cultural heritage institutions crowdsourcing platforms

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Abstract

Purpose – The purpose of this study is to propose a set of design recommendations for crowdsourcing platforms with a focus on user engagement. A sample of New Zealand (NZ) cultural heritage institutions (CHIs) crowdsourcing platforms were assessed, with the aim of offering insights into how they have been designed to encourage dialogue and engagement and to sustain participation.

Design/methodology/approach – The design recommendations were derived from a review of related works. Following this, 12 crowdsourcing projects overseen by libraries, museums and an archive in NZ were assessed against the recommendations through content analysis.

Findings – The recommendations were classified into four main categories. These were promote ease of use, attract and sustain user interest, foster a community of users and show users that their work is contributing to the institution and society. The findings indicated that the sample of crowdsourcing projects assessed were generally successful at displaying the credibility and significance of their projects, and promoting their crowdsourced collections. Many of the projects could nevertheless benefit from providing further support to promoting dialogues and engagement with their users and contributors and sustaining offline community interaction.

Research limitations/implications – The content analysis conducted was focused on the functionality of design elements of the crowdsourcing platforms. The design recommendations derived from the analysis were intended as a starting point for discussion and they would need to be validated in further studies. Other relevant project information such as funding and staffing, promotion and outreach efforts were not solicited in this study. Such information could provide important contextualisation. Future research could take the form of in-depth case studies, including surveying those involved in the projects and stakeholders to investigate such contextual aspects of crowdsourcing projects.

Originality/value – Previous research on crowdsourcing in NZ CHIs consisted of single case studies. This study provides a wider snapshot and insights into digital crowdsourcing platforms from public NZ CHIs. The study findings have practical implications for project managers and Web designers involved in crowdsourcing projects, particularly those in the cultural heritage sector.

Keywords Cultural heritage institutions, Crowdsourcing, Crowdsourcing platforms, Digital cultural heritage, Documentary heritage, Engagement, Online sociability

Paper type Research paper

1. Introduction

Participatory practices such as crowdsourcing, social tagging, public commenting and the promotion of user-generated content have become an integral part of the cultural heritage sector. For many galleries, libraries, archives and museums, crowdsourcing activities are



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Received 14 October 2019 Revised 20 March 2020 Accepted 12 April 2020 seen as a relatively inexpensive means to engage with the public and to solicit valuable content for their documentary heritage collections (Carletti, 2016). This type of user participation can be seen as an extension of the volunteer involvement that has long supported the function of cultural heritage institutions (CHIs).

New Zealand (NZ) CHIs have taken opportunities to share their crowdsourcing experiences with the professional community at conferences and in professional literature (Perkins, 2013; Johnston and Milburn, 2016; Passau and O'Donovan, 2015) but in most cases, these reports only provide the account of one particular project or institution. There is a lack of a broader review of cultural heritage crowdsourcing in NZ. The purpose of this study was to undertake a review of the crowdsourcing platforms of NZ's public CHIs, to examine the design of the platforms concerned and to assess in what ways platforms affiliated with NZ CHIs have been designed to encourage engagement and sustain participation.

A crowdsourcing project's success is dependent on meaningful engagement and contribution from "the crowd" and the quality of contributions institutions receive from "the crowd" is also an important factor in determining the success of a project. It is hence imperative for CHIs to design crowdsourcing platforms that will maximise engagement and meaningful contributions.

A review of studies that investigate factors influencing user participation and motivation in crowdsourcing projects was undertaken (Chiu *et al.*, 2019; Alam and Campbell, 2017; Liew, 2015; Brandtner *et al.*, 2014; Zheng *et al.*, 2011), as well as a review of the toolkits and guidelines that have been created by institutions for crowdsourcing purposes (Greenhalgh *et al.*, 2010; Gunther *et al.*, 2016; Simperl, 2015).

At the time of this study, a number of NZ CHIs were tightening budgets, particularly in the Auckland Region. Proposed cuts in funding created a demand for more core work in CHIs to be done by volunteers and crowdsourcing became a potentially cost-effective means to engage volunteers in contributing to documentary heritage collections, and to increase value for ratepayers. NZ's relatively small population means that there is a smaller pool of potential volunteers to draw from. Hence, it is important that crowdsourcing projects are designed so that they not only successfully attract volunteer contributors but retain their participation.

2. Purpose and scope of research

The purpose of this study is to propose a set of design recommendations for crowdsourcing platforms with a focus on user engagement. A sample of New Zealand (NZ) CHIs crowdsourcing platforms were assessed, with the aim of offering insights into how they have been designed to encourage dialogue and engagement and to sustain participation.

The research scope was limited to crowdsourcing platforms of NZ public CHIs, namely, libraries and museums. The Museum's Aotearoa (NZ) membership directory and the National Library's Directory of NZ Libraries were consulted and public institutions were identified. Institutional websites and social media platforms, if any, were examined for evidence of crowdsourcing. Archives and public art galleries were considered initially however, an initial scoping review revealed very limited crowdsourcing activities among these institutions in NZ.

3. Review of related works

3.1 Crowdsourcing

Enis (2015) makes the connection between crowdsourcing and the longstanding tradition of volunteerism in CHIs and emphasises the importance of user engagement with institutions, rather than simply user output. Like Enis (2015), Alam and Campbell conceptualise crowdsourcing as a new form of "digital volunteerism", that is "neither regulated by contract,

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nor are participants offered financial incentive" (2017, p. 744). A useful definition of NZ public CHIs crowdsourcing that encompasses both for-profit and non-profit approaches is the definition developed by Estellés-Arolas and González-Ladrón-de-Guevara (2012). The authors analysed over 40 existing definitions and proposed that "Crowdsourcing is a type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task" (Estellés-Arolas, and González-Ladrón-de-Guevara, 2012, p. 197).

Crowdsourcing projects can only be successful with the engagement and contribution of "the crowd". Therefore, it is imperative to understand how to best design crowdsourcing websites to encourage user engagement and contributions. Furthermore, the quality of data institutions receive from "the crowd" is an important factor in the success of a project. Carletti (2016) summarises the purpose of crowdsourcing projects into three themes: (1) Exploring new forms of public engagement. (2) Enriching institutional resources through the contribution of the crowd. (3) Building novel resources (e.g. an Archive) through the contribution of the crowd.

3.2 User participation

Recent research has shown engagement to have a strong effect on people's willingness to help others (Chiu et al., 2019; Tasker and Liew, 2018). It is important for CHIs to understand which communities their crowdsourcing projects may be relevant to and the factors that motivate these communities to contribute to the projects to successfully engage and retain their participation.

Alam and Campbell (2017) 's findings on volunteer motivation showed the importance of creating a strong sense of community around the crowdsourcing project, providing acknowledgement and rewards for users and catering to personalised topics and local interests of volunteers. While their study is limited to one specific library project and the sampling pool of volunteers is small, the insights and recommendations this study provides are valuable when considered alongside other literature.

3.3 Crowdsourcing design

McKinley (2012) proposed seven functionality and usability requirements to support volunteer participation and rich data collection using evidence-based heuristics developed by Petrie and Power (2012). She expanded these requirements into a list of 21 design principles that were made available on her website nonprofitcrowd.org. These design principles provided a useful starting point for this study. However, since McKinley's study was published, there had been changes that needed to be noted. In 2016 for instance, mobile Web browsing overtook traditional desktop browsing for the first time globally, changing the way that websites were designed and accessed (Gibbs, 2016). This could have implications for crowdsourcing platforms design as well.

3.4 NZ CHIs crowdsourcing

NZ institutions have adopted a variety of approaches to crowdsourcing over the last 15 years, and used different formats and platforms to promote their projects. CHIs such as Te Papa Tongarewa, Auckland War Memorial Museum and Auckland Libraries have used articles, blogs and social media pages as a straightforward way to reach their audiences and encourage contributions. This type of approach continues to be successful and calls for information or volunteers are often distributed in this way (O'Donovan and Passau, 2015).

Digital crowdsourcing platforms such as Recollect and Zooniverse have afforded crowdsourcing projects with design features that can be adapted to an institution's

crowdsourcing platforms needs. A crowdsourcing platform built specifically for a NZ market is the open source Kete (www.kete.net.nz). Described as, "An online digital knowledge basket", Kete is an online platform designed to host repositories of digitised content from public institutions and encourage the public to contribute to topics and upload materials to their collections.

The Auckland Council's 2018 cultural review reported growth in digitisation and digital access projects driving changes in museums and galleries internationally. The review highlighted the benefits of crowdsourcing and citizen science for the cultural heritage sector. The report also highlighted the need to increase virtual access to digitised collections and enable visitors to engage with CHIs. This support for digital and citizen science projects in the cultural sector is encouraging for NZ institutions considering starting their own projects.

Unique to the NZ heritage sector is the commitment of many of NZ CHIs to bicultural practices.

Biculturalism has been a prominent concern for the library and information profession over the last 20 years (Lilley, 2013). It is expected that this commitment to biculturalism embedded in the strategic plans of NZ CHIs is reflected in their crowdsourcing projects.

Lilley (2013) discussed the importance of reflecting Māori cultural identity and bicultural heritage in NZ public libraries. He proposed a set of evaluation criteria that could be used to measure the level of Māori/bicultural content of NZ public libraries websites. These criteria were considered in the development of the design recommendations for this study. Among the criteria are: Use of Māori language (te reo Māori) on the website; usage of Māori visual imagery; ability to navigate the website using te reo Māori and providing links to Māori resources.

3.5 Sample selection

While effort had been made to ensure that all projects were examined impartially, it needed to be acknowledged that at the time of the research, the lead author was an employee of Auckland War Memorial Museum. As such, she might have additional insights into the Online Cenotaph (Auckland War Memorial Museum) project as compared to other projects.

One of the criteria for including a project in the study sample was that the crowdsourcing project was freely accessible online and was affiliated with at least one public CHI. This includes purpose-built crowdsourcing platforms, projects hosted on international crowdsourcing platforms such as Zooniverse or local platforms such as Recollect and Kete. Photo-sharing sites such as Flickr were out of scope due to their limited functionality. As Terras (2010) suggests, the material uploaded to Flickr by the public is seldom treated as an extension of institutional collections in the same way that other crowdsourced collections are. For the Kete projects, to ensure that the sample was manageable and to avoid duplication of data, only the original project, Kete Horowhenua and one of the more considerable secondary projects by one of the members of APNK, Kete New Plymouth were included. Auckland Art Gallery's Whakamiharo Lindauer Online project displayed some of the elements of crowdsourcing, including a call to action, comment functionality and the formation of a "Whakamiharo Lindauer Online community". However, a close examination revealed that the purpose of the site was to inform the public and to promote the institution's Lindauer collection rather than to engage users in the undertaking of a crowdsourcing task. Hence, this was excluded from the study. The Measuring the Anzacs project was a collaboration between The University of Minnesota, Archives New Zealand and Auckland War Memorial Museum and was the only archive-affiliated project in the study.

Sample selection was also limited to only projects that were active, ongoing and publicly accessible at the time of this study. The final sample was composed of 12 projects (Table 1).

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The final sample ranged from relatively simple fixed-term transcription projects to larger, ongoing social history projects. Basic project information of each institution is summarised in Appendix 1. NZ public CHIs crowdsourcing platforms

4. Design recommendations with a focus on engagement and participation

Informed by the literature, a list of 24 design recommendations for crowdsourcing platforms were derived. The recommendations and the literature that inform them are outlined in Appendix 2. The recommendations were used to analyse the features and content of the study sample. The platforms were reviewed following a process of first examining the homepage of the crowdsourcing website and then the crowdsourcing platform, registering for an account if there was a registration option. Field notes and screenshots were collected to document examples of compliance or non-compliance with the recommendations. The design and functionality of the platforms were checked on a desktop computer, a smartphone and a tablet to test for mobile functionality.

Sections of platforms that displayed evidence of full compliance with recommendations were given a rating of Achieved. Those that displayed no evidence of compliance were giving a rating of Not Achieved and those that partially complied or had examples of both compliance and non-compliance were given a rating of Partially Achieved. For example, when reviewing compliance with the Recommendation "Provide mobile friendly / responsive design", platforms that were optimised for mobile accessibility and usability were given a rating of Achieved. Those that were mobile responsive but were not fully functional when accessed via a mobile device were given a rating of Partially Achieved and platforms that were not accessible at all on a mobile device were given a rating of Not Achieved. This process was followed for each recommendation. Projects were given numerical ratings according to their level of compliance. They were given a score for each recommendation. 1 point was allocated for recommendations that were rated Achieved, 0.5 for Partially Achieved and 0.0 for Not Achieved. The coding manual is available from the corresponding author.

Exploring new forms of public engagement	Enriching institutional resources through the contribution of the crowd	Building novel resources (e.g. an archive) through the contribution of the crowd
Discovery Wall (Christchurch City Libraries) Digital NZ Stories (Digital NZ-National Library of New Zealand)	Online Cenotaph (Auckland Museum) Measuring the Anzacs (Auckland War Memorial Museum, Archives New Zealand, University of Minnesota)	Kete Horowhenua (Horowhenua Public Libraries) Kete New Plymouth (Puke Ariki)
	William Ockleford Oldman Archive Research Materials (Te Papa Tongarewa, National Museum of the American Indian, The Smithsonian Institution)	Scattered Seeds, He Purapura Marara (Dunedin Public Libraries)
	G.R. Macdonald Dictionary of Canterbury Biographies (Canterbury Museum, University of Canterbury) Hudson Registers (Te Papa Tongarewa)	Recollect: Upper Hutt City Libraries Heritage Collections (Upper Hutt City Libraries) Manawatū Heritage (Palmerston North City Library)

Table 1. Study sample of crowdsourcing projects based on Carletti (2016)'s categories

It must be acknowledged that even within the NZ cultural heritage sector, crowdsourcing projects "differ widely in their aims, content, structures and participant groups" (Liew, 2015). This study does not prescribe universal requirements for crowdsourcing. Rather, recommendations that may lead to design improvement especially for encouraging and sustaining participation and contributions are put forward. Themes and patterns in the literature on the design of crowdsourcing platforms were analysed. These are discussed in the next section.

4.1 Promote ease of use

Promoting ease of use encourages new users to contribute and established users to continue contributing. Ease of use should be encouraged at all stages of the crowdsourcing project. Entry barriers should be as low as possible (Liew, 2015; McKinley, 2012) and platforms should be accessible on a wide range of device types to increase user engagement. Once users have made the decision to contribute to a project, it is important that they encounter a simple and easy to understand description of the crowdsourcing task (Simperl, 2015).

Crowdsourcing platforms are most effective when they are useable across devices, allowing institutions to reach a broad audience. Developments in mobile technology have led to a growth in mobile Web browsing, making flexible, mobile-friendly design a requirement for most interactions (Gibbs, 2016).

4.2 Attract and sustain user interest

Attracting and sustaining user interest over time is a key aspect of successful crowdsourcing projects. Platforms that are attractive, fun to use and responsive can increase enjoyment of the site, as well as visitor expectations about the project's success. Researchers have pointed to the importance of displaying project progress online to sustain user interest (Alam and Campbell, 2017; Causer and Terras, 2014). When data is shared openly, it has been found to increase participants trust in the organisation and the project concerned (Liew, 2015). It also contributes to a sense of achievement and encourages users to contribute further.

Gamification is suggested by Brandtner *et al.* (2014) as a useful way to convey a sense of fun and retain participants' interest. However their research into user motivations suggests that what users consider to be fun can be highly subjective. If platforms provide task options and choices, participants can select those tasks that reflect their interest. Targeted content can be useful, providing participants with content that they are likely to want to engage with and retain interest.

4.3 Foster a community of users

Chiu *et al.* (2019) and Alam and Campbell (2017) found that creating a strong sense of community around a crowdsourcing project can create a supportive team dynamic in which users are self-motivated. Fostering a community of users in NZ should also include supporting Māori and other minority communities to participate. Work towards biculturalism in the cultural sector has been growing momentum since the early 1990s (Lilley, 2013). Public CHIs in NZ undertaking crowdsourcing projects could benefit from reflecting this commitment in their crowdsourcing projects and engaging with Māori communities in an authentic way.

Supporting offline interaction can help publicise the crowdsourcing project and gain buyin from the wider community. Some institutions supplement their online projects with physical events in the community such as exhibitions of crowdsourced material, workshops and events encouraging people to contribute to their projects. Outcomes of crowdsourcing projects become more visible in the community and as Liew (2015) suggests, offline

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interaction has been found to "reinforce altruistic motivations and participation rates by demonstrating the value of volunteers' work". Online Cenotaph's outreach project "He Pou Aroha" is an example of a digital project that has been made available offline and brought into community spaces and public events.

4.4 Show users that their work is contributing to the institution and wider society

Liew (2015) proposes that the goals and underlying purposes of a participatory projects including crowdsourcing must be clearly articulated and communicated to prospective participants, indicating the significance and impact of the work and who could benefit from the project.

Presenting reasons to contribute helps visitors to determine the benefits of the project for the institution and wider society; therefore, it is important for institutions to convey the credibility of the project to users. Feedback and acknowledgement on successful task completion provides recognition for participation. It is important for users to feel that their contributions are appreciated but also to understand how these contributions will be used and managed, and for what purposes.

5. Research design

Cox *et al.* (2015) and Kim and Kuljis (2010) applied content analysis to online citizen science projects and Web 2.0 websites respectively, and provided valuable insight into the benefits of the approach and some of its challenges. Advantages to the approach are its unobtrusive and context sensitive nature and enable the examination of artefacts of communication. A disadvantage of the approach is that it does not always work well with the dynamic nature of the Web. Kim and Kuljis (2010) suggest that this can be overcome by prompt data collection.

5.1 Delimitation and limitations

The content analysis for this study took place between March and April 2019, providing a snapshot analysis of crowdsourcing practices overseen by NZ public libraries and museums at this time. We do not intend to claim generalisability of the findings beyond this. It is recognised that crowdsourcing is an evolving practice and further studies might be undertaken to enable longitudinal analysis. The content analysis focused on the functionality of design elements of the crowdsourcing platforms. Other project information related to funding and staffing, promotion and outreach efforts that were not publicly available were not solicited. Such information could be valuable in providing contextualisation and could have implications on crowdsourcing project outcomes. Future research could take the form of in-depth case studies, including surveying those involved in the projects and stakeholders to investigate such contextual aspects of crowdsourcing projects.

6. Findings

The results of the content analysis are summarised in Table 2. The codebook, including notes and examples extracted from the platforms reviewed are available from the corresponding author. Y (Yes) indicates compliance of the platform with the corresponding recommendation, P (Partially) indicates partial compliance and N (No) indicates non-compliance with the corresponding recommendation.

Projects were given a score according to their compliance with each of design recommendations and categories (Table 3 and Table 4). The average (mean) score for library projects was 16.57, while the average score for museum projects was slightly higher at 17.

OIR 44,4	Kete New Plymouth	Z	Υ	N	N	γ	Ь	Ь	Υ	Ν	Υ	Y	γ	Y	ontinued)
894	Kete Horowhenua	Z	Υ	ХN	Ν	N	Ь	Ν	Υ	Ν	Υ	Υ	γ	¥	<u>s</u>
	G.R. Macdonald dictionary of Canterbury biographies	Y	Υ	Y	Υ	Υ	Υ	Υ	Υ	Ν	Ν	Z	Y	Х	
	Scattered seeds, He Purapura Marara	Y	Υ	Y	N	Υ	Y	N	Υ	Ν	Υ	Y	Υ	Y	
	Hudson registers	N	Z	d N	Υ	Υ	Р	Ь	Ν	Υ	Υ	Z	Z	N	
	William Ockleford Oldman archive research materials	Y	Υ	P N	N	Υ	Υ	N	Υ	Υ	Υ	Y	Υ	Y	
	Measuring the Anzacs	Y	Υ	Υ	Υ	Υ	Ь	Ъ	Υ	N	Υ	Y	Υ	Y	
	Digital NZ stories	Y	Υ	Y	Ь	Υ	Υ	Υ	N	Υ	N	z	Υ	Y	
	Discovery Wall	Y	Z	Y	Ь	N	Υ	Υ	N	Υ	Υ	Ч	Y	Y	
	Recollect: Upper Hutt city libraries heritage collections	Y	Z	Y	Ν	Y	Y	Υ	Υ	Υ	Υ	Y	Ь	Y	
	Online Cenotaph	Υ	Υ	Υ	Υ	Υ	Υ	Ч	Υ	Ν	Υ	Y	Υ	Y	
	Manawatū Heritage	Z	Y	Y Y	Ь	N	Υ	Y	Ν	Р	Υ	Ч	N N	Y	
Table 2. Assessment of sample platforms against derived design recommendations		Promote ease of use 1. Provide clear, concise and	sufficient task instruction 2. Clearly identify	tasks 3. Simplify the task 4. Minimise effort to	contribute 5. Provide mobile friendly /	Responsive design 6. Prioritise key	nuormauon 7. Minimise user error	Sustain user interest 8. Design is	attractive to users 9. Display project	progress 10. Convey a sense	of tun 11. Provide task	options 12. Keep content current	Foster a community of 1 13. Convey a sense	or community 14. Support community interaction	

	Manawatū Heritage	Online Cenotaph	Recollect: Upper Hutt city libraries heritage collections	Discovery Wall	Digital NZ stories	Measuring the Anzacs	William Ockleford Oldman archive rresearch materials	Hudson registers	Scattered seeds, He Purapura Marara	G.R. Macdonald dictionary of Canterbury biographies	Kete Horowhenua	Kete New Plymouth
15. Support content	Υ	Υ	Υ	Υ	Υ	Р	Y	Υ	Υ	Y	Υ	Y
sharing 16. Convey a commitment to	Υ	Ч	N	N	Ь	Ν	N	Ν	N	N	Ν	Ν
biculturalism 17. Enable users to review	N	Υ	N	Υ	N	N	Υ	N	Ν	Ν	Υ	Y
contributions 18. Support offline interaction	N	Y	Υ	Y	N	Υ	N	Z	Y	N	Z	Z
Show users that their 1 19. Present reasons	work is contributi P	ing to the institu Y	ution and wider socie N	ety Y	Z	Y	γ	Y	Y	Y	Y	Y
to contribute 20. Encourage users to engage with the institutions	Υ	Υ	Y	Y	Y	പ	Y	Y	γ	Υ	Y	Y
collection 21. Acknowledge	Υ	Y	Υ	Υ	N	N	Υ	Υ	N	Ν	N	Ν
participation 22. Show how project output is	Y	Y	Υ	Y	Y	Y	Υ	Y	Y	Υ	Y	Y
the public 23. Convey the credibility of the	Υ	Y	Υ	Y	Y	Υ	Υ	Y	Υ	Υ	Y	Y
project 24. Publicly recognise contributions	N	Y	Ν	Υ	Y	N	Υ	Υ	Υ	Z	Υ	Y

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OIR 44,4	Crowdsourcing project	Institution type	Year launched	Y	N	Р	Overall score
	Online Cenotaph (Auckland War Memorial	Museum	2015	21	1	2	21.5
896	Discovery Wall (Christchurch City Libraries) William Ockleford Oldman Archive Research Materials (Te Papa Tongarewa, National Museum of the American Indian, The Smithsonian Institution)	Library Museum	2018 2018	18 18	4 5	2 1	19.0 18.5
	Scattered Seeds, He Purapura Marara (Dunedin Public Libraries)	Library	2011	18	6		18.0
	Recollect: Upper Hutt City Libraries Heritage Collections (Upper Hutt City Library)	Library	2012	17	6	1	17.5
	Measuring the Anzacs (Auckland War Memorial Museum, Archives New Zealand, University of Minnesota)	Museum /Archives	2015	14	5	5	16.5
	Digital NZ Stories (Digital NZ–National Library of New Zealand)	Library	2017	15	7	2	16.0
	G.R. Macdonald Dictionary of Canterbury Biographies (Canterbury Museum, University of Canterbury)	Museum	2019	16	8		16.0
	Kete New Plymouth (Puke Ariki)	Museum /Library	2009	15	7	2	16.0
Table 3.	Manawatū Heritage (Palmerston North City Library)	Library	2016	13	7	4	15.0
platforms: Overall scores	Kete Horowhenua (Horowhenua Public Libraries) Hudson Registers (Te Papa Tongarewa)	Library Museum	2007 2018	14 11	9 10	1 3	14.5 12.5

6.1 Projects with high levels of compliance with design recommendations

Online Cenotaph was the only project to comply with all the recommendations under the categories "Foster a community of users" and "Show users that their work is contributing to the institution and wider society". The only recommendation that Online Cenotaph received a score of Not Achieved for was recommendation 10 "Convey a sense of fun". It was however noted that a sense of fun would not have been an appropriate recommendation for this crowdsourcing project. Online Cenotaph serves as a digital memorial for New Zealanders who served in international conflict and the project deals with information about people's family members and sensitive information taken from military files.

The Discovery Wall project was found to comply with 18 of the 24 requirements, and partially comply with 2 of the requirements. Discovery Wall is an innovative project developed by Christchurch City Libraries that is available to the public online, onsite in the Christchurch Central Library (CCL) as well as in the community via a smaller "mobile discovery wall" that travels to local libraries, schools and rest homes in the community. The crowdsourcing platform was simple to engage with and provided multiple task options. It conveyed a sense of fun with playful graphics, animation and video messages that could be added to the database via a large touch screen located in CCL. Though the project scored well for its attractive visual appearance and did particularly well at "Foster a community of users" and "Show users that their work is contributing to the institution and wider society", the platform failed to clearly present crowdsourcing tasks which could impact on the number of user submissions the site receives.

The William Ockleford Oldman Archive Research Materials project was hosted on the Smithsonian Institution's Transcription Centre, and as such, seemingly followed the format prescribed by the hosting institution. In comparison to the Discovery Wall project, the style

William ed Ockleford ed Oldman He archive tra research a materials	4.5 4	9	18.5
city Scatter seeds, I Purrapu Marar	4 4	J.	18
Recollect: Upper Hutt c libraries heritage collections	3.5 3.5	4	17.5
Online cenotaph	6.5 3.5 5.5	9	21.5
Measuring the Anzacs	6 3.5 3.5	3.5	16.5
Manawatu heritage	4.5 3	4.5	15
Kete New Plymouth	3.5 4	IJ	16
Kete Horowhenu	2.5 4	IJ	14.5
d Hudson registers	3 2.5 1	9	12.5
G.R. Macdonal dictionary of Canterbury biographies	r 0 0	4	16
Discovery wall	4.5 3.5 5	9	19
Digital NZ stories	6.5 3.5 3.5	4	16
	Promote ease of use Sustain user interest Foster a community	Show users that their work is contributing to the institution and wider	society Total

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Table 4.Crowdsourcingplatforms: Scores bycategories

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was simple. However, crowdsourcing tasks and key information were clearly laid out, featuring progress updates and clear step-by-step instructions for contributors.

6.2 Projects with low levels of compliance with design recommendations

The project that complied with the least number of recommendations was Te Papa's Hudson Registers project. While Te Papa's William Ockleford Oldman Archive Research Materials project received a score of 18.5, placing it as one of the top three most compliant projects, the Hudson Registers project developed by the same museum received a score of 12.5. Although both of Te Papa's transcription projects had similar goals, similar subject matter and both were launched in 2018, the difference in their compliance scores may have been because they were made available on different platforms. The William Ockleford Oldman Archive project was hosted on the Smithsonian Transcription Centre and had the support of the National Museum of the American Indian (NMAI) and the Smithsonian Institution. The Smithsonian's transcription centre has hosted over 3,000 projects from 15 participating museums, archives and libraries. In contrast, the Hudson Registers project was a small-scale project developed by Te Papa staff that was accessed via blog posts and a Google Sheets spreadsheet. Project information was available on Te Papa's blog, and interested users were required to email the project coordinator for further information. Once users received the instructions and project spreadsheet via email, they could begin to contribute to the transcription. The blog post format was useful in conveying key information about the project and the project complied with all of the recommendations in category 4 "Show users that their work is contributing to the institution and wider society". However, there were several issues that contributed to the low level of compliance. Users had to wait for an email response from the administrator to get started on the project. The transcription task was complex and required the user to comply with a number of standards. The spreadsheet format did not allow for customisation or community interaction.

Horowhenua Library's Kete Horowhenua project received the second lowest score of 14.5. The project was launched in 2007 when crowdsourcing was still a relatively new concept in the NZ GLAM sector. As one of the first projects of its kind, the longevity of the project indicates that aspects of the project had been successful. However, the project did not score well in the category "Promote ease of use". Kete New Plymouth was another project that used the Kete software and Kete New Plymouth complied with recommendation "Prioritise key information while Kete Horowhenua did not, and the project received a slightly higher score of 16".

6.3 Category: promote ease of use

There was relatively high compliance of the study sample with this category. Six of the 7 recommendations were complied with by at least two-thirds of the projects (See Figure 1).

(1) Provide clear, concise and sufficient task instruction

About 8 of the 12 projects complied with this recommendation. They provided concise, stepby-step instructions and/or training modules to support new users (Digital NZ Stories, Measuring the Anzacs, William Ockleford Oldman Archive Research Materials, Scattered Seeds, G.R. Macdonald Dictionary of Canterbury Biographies). Projects that featured clear Help pages and/or provided Frequently Asked Questions pages also displayed compliance. Both Kete projects received a score of Not Achieved for this recommendation as task instructions were long and overly complicated, spanning multiple pages with poor readability. (2) Clearly identify tasks

Nine projects complied with this recommendation and featured a clear call to action. Tasks were displayed prominently. The platforms that received a score of Not Achieved for this recommendation lacked contextual information and/or task information was not easily accessible (Discovery Wall, Recollect: Upper Hutt City Libraries, Hudson Registers). These projects required more effort on the user's part to search out crowdsourcing tasks, potentially discouraging users from contributing.

(3) Simplify the task

Eight projects complied and 1 project partially complied with this recommendation. The projects that complied with this recommendation did so by dividing tasks into smaller steps, providing easy-to-manage data entry fields, and providing drop down options for repetitive fields. Projects that did not simplify the crowdsourcing task, such as the William Ockleford Oldman Archive Research Materials (Plate 1), risked discouraging users from contributing.

Smithsonian Transcription Centre, William Ockleford Oldman Archive Research Materials – Sales Register, 1903, available at https://transcription.si.edu/project/14993

(4) Minimise effort to contribute

Eight projects complied (an example in Plate 2) and three projects partially complied with this recommendation.

Zooniverse, Macdonald Dictionary, available at: https://www.zooniverse.org/projects/ christopherthomson/macdonald-dictionary

The Hudson Registers was the only project to receive a rating of Not Achieved for this recommendation. Users were required to email the project administrator for more information about how to contribute to the project and had to wait for an email response from the administrator to get started. This had the potential to discourage users from contributing.

(5) Mobile friendly/responsive design

Only four of the projects fully complied with this recommendation. This recommendation had the lowest level of compliance of all seven recommendations in Category 1. Many of the projects



NZ public CHIs crowdsourcing platforms

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Figure 1.

could be viewed on mobile devices but were not fully functional. These were assessed as Partially Achieved. The projects that fully complied with this recommendation included the Online Cenotaph (Plate 3), Hudson Registers and Measuring the Anzacs. When viewed on a mobile device, the project sites were clearly presented, easy to use and fully functional. It was noted that all of these projects were launched within the last five years, perhaps reflecting the increased awareness of the importance of accessibility and usability in mobile technologies.

Online Cenotaph, Auckland Museum, available at: http://www.aucklandmuseum.com/ war-memorial/online-cenotaph

(6) Prioritise key information

Nine projects complied with this recommendation. Most of the projects reviewed prioritised key information such as task instruction, project statistics and information about the background of the project, and placed this information prominently on the front page of their crowdsourcing platforms. The three projects that did not comply with this recommendation (Discovery Wall, Kete Horowhenua, Manawatū Heritage) had issues with the placement of key information. Links to information such as the "about" and "using the site" pages were placed at the bottom of the homepage or on secondary pages that were not immediately visible.

(7) Minimise user error

Eight projects complied and four projects partially complied with this recommendation. User errors were minimised using processes such as error messages and highlighting missing

RANSCRIPTION FORM	INSTRUCTION
ranscription	
[[preprinted]] 88 [[/preprinted]]	
[[7 column table]] 6651 -/S New Guinea Ear Pendant small [[image - drawing]] [[?]]22 C11/30.4 07 2- 6 6652 -/C New Guinea Belt bark B29/ 10-05-07 13- 0	
6653 -/C New Guinea Belt bark B29/10-05-07 4	7
6654 G/. New Guinea Nose Pin shell L12/24-5-6 3 0)6
6655 ./Y New Guinea Fibre Ear ring P16/7-6-1	3

Plate 1.

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The William Ockleford Oldman Archive Research Materials project requires users to comply with a number of complex transcription standards

Plate 2.

The G. R. Macdonald Dictionary of Canterbury Biographies project minimises effort to contribute by asking users to transcribe key pieces of information rather than the entire text





Looking for a New Zealand service person? Begin your search with their full name, or their service number.



NZ public CHIs crowdsourcing platforms

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Plate 3. Online Cenotaph's mobile user interface, displaying a simplified design suitable for a smaller screen

Results

Export

fields. In most cases, incorrectly spelt words were underlined in red to alert users. However, Māori words were marked as incorrect in all cases where a spell check functionality was used.

6.4 Category: promote ease of use

The Upper Hutt City Library's Recollect project was the only project to display compliance with all five recommendations in this category. Digital NZ Stories and the G.R. Macdonald Dictionary of Canterbury Biographies received the lowest scores for this category. Both complied with only two of the five recommendations (See Figure 2).

(8) Design is attractive to users

Five projects complied with this recommendation and three projects partially complied. Though it is acknowledged that this recommendation can be subjective, there are some general Web design principles that were used to assess the projects. Projects that achieved compliance with this recommendation generally displayed: Clean and uncluttered design, judicious use of space, cohesive colour scheme and appropriate use of images. Some of the older projects featured design that was somewhat dated. The Scattered Seeds Project received a rating of Not Achieved as many of the images on the site were not properly formatted giving them a warped appearance. The layout of the platform lacked balance and the combination of colour scheme, graphics and font choice appeared dated and unattractive. Kete Horowhenua's site was also given a rating of Not Achieved due to poor use of colours and multiple typefaces, giving the site a disorganized feel. (9) Display project progress

Eight projects complied with this recommendation, displaying progress bars, user statistics and charts to document and display project progress (an example in Plate 4). The projects that did not comply with this recommendation did not provide indication of progress (Digital NZ Stories, Discovery Wall, Hudson Registers, Manawatū Heritage). Some project such as Discovery Wall and Digital NZ stories may not have a fixed project goal to reach. Therefore, it is acknowledged that progress bars are not expected in these sites. Reporting of project statistics is recommended as it provides evidence of activity and progress and contributes to an expectation of project success, as well as contributing to a sense of achievement, potentially encouraging participants to continue to contribute to the project.

Online Cenotaph, Auckland Museum, available at: http://www.aucklandmuseum.com/ war-memorial/online-cenotaph

(10) Convey a sense of fun

Eight projects complied with this recommendation and one project partially complied. The projects that successfully conveyed a sense of fun used language, colour and imagery to do so. CCL Discovery Wall (Plate 5) project made use of a number of techniques to convey a sense of fun with its colourful animated scrapbook style imagery and use of animation to communicate information. While half of the projects in the study sample did not comply with this recommendation, it was acknowledged that a sense of fun was not always appropriate in certain contexts. For instance the Measuring the Anzacs and Online Cenotaph projects.

Discovery Wall, Christchurch City Libraries, available at: discoverywall.nz

(11) Provide task options

Ten projects complied with this recommendation. Some volunteers like to be able to choose tasks to contribute to while others prefer to be directed to specific tasks. Providing options can support both types of volunteers. The majority of the projects allowed users to contribute in various formats. Some of the transcription projects allowed users the option to transcribe information or to review other's transcriptions (i.e. Measuring the Anzacs).

(12) Keep content current

Seven projects complied with this recommendation and two projects partially complied. Projects that complied with this recommendation generally published content online





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Figure 2. Compliance with "Sustain use interest"

immediately after it was contributed (Online Cenotaph, William Ockleford Oldman Archive NZ public CHIs Research Materials, Kete Horowhenua and Kete New Plymouth). Projects that allowed content to be sorted by date uploaded and date created also scored highly in this recommendation (Manawatū Heritage, Recollect: Upper Hutt City Libraries, Discovery Wall, Scattered Seeds, He Purapura Marara, Kete New Plymouth). Frequent project updates were also examples of compliance with this recommendation. In projects that received a score of Not Achieved, contributions were not immediately accessible, and it was not clear where users may find recently contributed content.

6.5 Category: foster a community of users

This was the least complied with of the four categories. Recommendations 16, 17 and 18 had the lowest scores of compliance of all 24 recommendations. Online Cenotaph was the only project to displayed compliance with five recommendations in this category (See Figure 3).

(13) Convey a sense of community

Nine projects complied and one project partially complied with this recommendation. A sense of community was created through a broad range of approaches. Measuring the Anzacs conveyed a sense of community through progress updates and community announcements that were frequently posted on the project's social media accounts and discussion boards. Digital NZ's crowdsourcing site featured a series of examples of public contributions by local artists and performers titled "Creative People Make Creative Stories". Using other contributors as exemplars can be an effective means to encourage others to contribute rich information. Online Cenotaph presents content by and about participants in articles called "Cenotaph Stories".

(14) Support community interaction

All but one project complied with this recommendation. Fostering a strong sense of community amongst volunteers can help to build a dynamic, supportive team environment, which in turn promotes user engagement and contributions. Most of the projects surveyed



Plate 4. Progress statistics are visible on the homepage of Online Cenotaph listing the number of images and notes and details added to the site as well as digital poppies laid



Plate 5. The interactive banner on the homepage of Discovery Wall

crowdsourcing platforms



did this through providing comment functionality or providing forums where users could discuss the project. A few projects (Digital NZ Stories, William Ockleford Oldman Archive and Measuring the Anzacs) encouraged contributors to interact using social media.

(15) Support content sharing

Again, all but one project complied with this recommendation and one project partially complied. Making collections and project outcomes shareable can encourage wider engagement with institution's collections, as well as encourage new users to contribute. The majority of the projects examined complied with this recommendation by integrating social sharing buttons into their crowdsourcing sites. Links to email and social media sites were made available below or alongside content to encourage content sharing. Half of the projects also supplied copyright information for each record (Manawatū Heritage, Discovery Wall, Scattered Seeds, He Purapura Marara, G.R. Macdonald Dictionary of Canterbury Biographies, Kete New Plymouth (Plate 6), Kete Horowhenua).



Plate 6. Creative Commons details displayed alongside a record on the Kete New Plymouth site Kete New Plymouth, Puke Ariki, available at: http://ketenewplymouth. NZ public CHIs peoplesnetworknz.info/

(16) Convey a commitment to biculturalism

Only one project was found to have complied with this recommendation and two projects partially complied. This recommendation was the least complied with of all 24 recommendations. The only project that successfully conveyed a commitment to biculturalism was Manawatū Heritage (Plate 7). The site can be accessed in English and te reo Māori and content can be uploaded by the public in either language. Online Cenotaph and Digital NZ stories received a rating of partially complied as they featured Māori content, and encouraged contributions of Māori material but could have improved by allowing users to navigate the using te reo Māori menus, providing links to Māori resources and information about Māori focused collections (Lilley, 2013).

Manawatū Heritage, Palmerston North City Library, available at: http://ketenewplymouth.peoplesnetworknz.info/

(17) Enable users to review contributions

Five projects complied with this recommendation. McKinley (2016) suggests that allowing participants to review other contributors' work promotes a sense of community, and contributors who are concerned about the accuracy of their contributions are assured that their work will be reviewed by others. Online Cenotaph and Discovery Wall allow users to "report" incorrect material once it has been published, and the William Ockleford Oldman Archive invites participants to review transcriptions for errors before they are passed on to the project team. The Kete projects give users an even higher level of control over contributions by allowing topic pages to be edited by any registered users.

(18) Support offline interaction

Five projects complied with this recommendation. Opening up projects to offline use should enable and encourage further contributions. The Online Cenotaph and Scattered seeds projects provided face-to-face support for contributors and Online Cenotaph's He Pou Aroha project brought the Online Cenotaph database out into public spaces such as community events, libraries and rest homes. Similarly the Discovery Wall and Recollect: Upper Hutt projects involved onsite, online and satellite projects.



Plate 7. The Manawatū Heritage website can be accessed in English or Te Reo Māori

platforms

OIR 44,4 6.6 Category: show users that their work is contributing to the institution and wider society Overall the 12 projects scored well against the recommendations in this category. The recommendations that were consistently complied with by all projects were "Show how project output is freely accessible to the public" and "Convey the credibility of the project". Auckland Museum's Online Cenotaph project and both of Te Papa's projects complied with all six of the recommendations in this category (See Figure 4).

(19) Present reasons to contribute

Nine projects complied and one project partially complied with this recommendation. Projects conveyed the value of participating by listing project goals on the crowdsourcing site, as well as communicating potential benefits of the project. When providing reasons to contribute, institutions focused on expressing how the project could improve their collections and benefit the community.

(20) Encourage users to engage with the institution's collection

All but one project complied with this recommendation. A key part of CHIs mandate is promoting their collections and making them accessible to users. A number of the projects did this by featuring images of collection items on their homepages, encouraging users to engage with different parts of the collection. The Measuring the Anzacs partially complied with this recommendation, as users could access partial records but could not browse collection items in their entirety in the current iteration of the site design.

(21) Acknowledge participation

Six projects complied with this recommendation, providing messages of acknowledgement to contributors by including a "Thank you" or similar appreciative messages as an automatic response to contributions (Manawatu Heritage (Plate 8), Online Cenotaph, Recollect: Upper Hutt City Libraries Heritage Collections, Discovery Wall, William Ockleford Oldman Archive Research Materials). The Hudson Registers project team informed users that they would be named and thanked at the end of the project. Acknowledging participation is a simple gesture on behalf of the institution that lets contributors know that they are valued, thereby potentially motivating them to continue to contribute. This recommendation was only

Partiially achieved Achieved 12 10 8 2 0 Present reasons Publicly Encourage users Acknowledge Show how Convey the to engage with the institutions project output is credibility of the freely accessible project to contribute participation recognise contributions collection to the public

Show users that their work is contributing to the institution and wider society

Figure 4.

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Compliance with "Show users that their work is contributing to the institution and wider society" Number of institutions in compliance

Recommendations

employed by half of the projects surveyed, indicating that this is an area that could be NZ public CHIs developed.

Manawatū Heritage, Palmerston North City Library, available at: http:// platforms

(22) Show how project output is freely accessible to the public

All the projects in the study sample were found to have complied with this recommendation. Each project site explicitly stated that user-contributed content would be made public. Some of the sites also made it clear that this information would be made public under a Creative Commons licence (Kete Horowhenua, Kete New Plymouth, Hudson Registers). Conveying the public benefits of a project can encourage users motivated by altruistic or collective motivations to contribute to a meaningful cause (Liew, 2015).

(23) Convey the credibility of the project

Similarly, all projects surveyed complied with this recommendation. Providing information about the aims, purposes and policies of the project supports the credibility of the project and allows potential contributors to see the value in participating in the project. All of the platforms provided this information alongside evidence of institutional support.

(24) Publicly recognise contributions

Eight projects complied with this recommendation by acknowledging contributions on their sites. Examples of public recognition can be as simple as publishing names of contributors alongside the content they have contributed to. Online Cenotaph recognised high performing contributors in blog posts that were published on the Auckland Museum website. Public recognition can be used not only as a way to reward high achievers but also to encourage healthy competition amongst contributors.

7. Discussion

This study set out to investigate the ways crowdsourcing platforms of NZ public CHIs had been designed to encourage engagement and sustain participation and to attract meaningful contributions to their collections. Following a review of related works, a set of design recommendations were derived as a starting point to investigate the engagement-oriented features of NZ crowdsourcing websites. After a scoping review, a sample of 12 crowdsourcing platforms overseen by public CHIs were selected for the investigation. The sample included websites associated with libraries, museums and one archive. The higher number of libraries identified for inclusion in the study supports previous research that suggests that libraries have been relatively quick to adopt new technologies to engage with their users. In general archives have been slow to adopt an interactive approach online and this was reflected in the results of this study. Only one of the crowdsourcing projects had an association with an archive. It was anticipated that public art galleries would have been represented in the sample and that a comparative analysis of institution types would have

Thanks for your contribution to Manawatū Heritage!

Although you can see and review your contribution right away, please note that it may not be visible to others until it has been moderated by staff during normal library opening hours. Plate 8. Automatic appreciative response for contributions to the Manawatū Heritage project

View my story Add something else

Browse the site

been possible. However, there were no identifiable, considerable crowdsourcing projects associated with NZ public art galleries.

While the study sample is small, the findings indicate that crowdsourcing projects associated with libraries and museums are at a relatively similar level of compliance. Overall, the projects displayed particularly high levels of compliance with the category "Show users that their work is contributing to the institution and wider society", particularly, with the recommendations of "Show how project output is freely accessible to the public", "Convey the credibility of the project" and "Encourage users to engage with the institution's collection" under this category. These results suggest that NZ public CHIs are generally good at displaying the credibility and significance of their projects and promoting their crowdsourcing projects and collections. This in turn could lead to sustained engagement.

The recommendations "Acknowledge participation" and "Publicly recognise contributions" were not observed by all projects. These recommendations have been suggested to motivate contributions and require limited effort on the part of the institution. Hence, it is somewhat surprising that not all projects have these in place. Recommendation "Enable users to review contributions" also had low levels of compliance.

The least complied with recommendation was "Convey a commitment to biculturalism". Considering the importance of biculturalism for NZ CHIs, this was again somewhat unexpected. Cairns (2018) described the importance of authentic engagement with biculturalism, stating, "if an institution has adopted biculturalism as its driving framework, it is not enough to only wear it as a temporary face of makeup, it should be carved into its structure, as an irrefutable and undeniable statement". Although achieving authentic biculturalism is not a simple task, engaging and co-developing heritage contents with Māori communities and perhaps, with other minority communities in the near future that include and reflect their voices should be a priority for NZ public CHIs.

8. Conclusion

CHIs have much to gain from crowdsourcing, whether it be encouraging public engagement, enriching documentary heritage resources or developing new resources through public contributions. This research provides suggestions of some of the ways that institutions can design their crowdsourcing platforms as to increase online sociability and to optimise technological affordances to increase and sustain participation and contributions to documentary heritage crowdsourcing projects. Some of the findings and recommendations would be applicable to similar crowdsourcing initiatives beyond the NZ GLAM sector.

As previously alluded to, even though the derived design recommendations are a useful place to start, they do not include consideration of any unique requirements of specific projects and institutions. The recommendations are based on concepts taken from the literature review and will need to be tested and validated through further work and in a broader context. Future research could employ a case study approach to assess crowdsourcing projects on case-by-case basis. An ethnographic design could, for instance, enable situational and contextual in-depth investigation into the motivations and collecting policies of the institutions concerned, as well as conduct interviews with project managers and contributors to these crowdsourcing projects.

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Appen	dix 1												NZ public CHIs
Year launch	2017	2018	2019	2018	2007	2009	2016	2015	2015	2011	2012	2018	platforms
Platform used	Purpose built	Website Purpose built	website Zooniverse	Te Papa website and Google	Purpose built	website Kete open source software	Purpose built	Scribe/ Zooniverse	Purpose built	website Recollect (NZMS)	Recollect (NZMS)	Smithsonian Transcription Centre	911
Crowdsourcing type	Remixing	Contribution of	Transcription and tagging	Transcription	Contribution of	content Contribution of content	Contribution of	Transcription	Contribution of	Transcription	Contribution of content	Transcription	
Website	https://digitalnz.org/stonies/	opacticshow.ccoacoor.uap https://discoverywall.nz/	https://www.zooniverse.org/projects/ christopherthomson/macdonald- dictionary	https://blog.tepapa.govt.nz/2018/08/ 15/help-crack-the-insect-code/	http://horowhenua.kete.net.nz/	http://www.kete.net.nz/showcase	https://manawatuheritage.pncc.govt.	https://www.measuringtheanzacs.org/	http://www.aucklandmuseum.com/	war-memorian of the second purple of the second purple of the second	https://uhcl.recollect.co.nz/	https://blog.tepapa.govt.nz/2018/12/ 22/help-reconnect-taonga-with-their- communities-and-history/	
Institution type	Library	Library	Museum, Tertiary Institution	Museum	Library	Library/ Museum	Library	Museum, Archive, Tertiary	Museum	Library	Library	Museums	
Institution/key stakeholders	Digital NZ (National	Christchurch City	Land artes Canterbury Museum, The University of Canterbury	Te Papa Tongarewa	Horowhenua Public	Puke Ariki, APNK Aotearoa People's	Palmerston North City	Archives New Zealand, Auckland War Memorial Museum and University	Auckland War Memorial	Dunedin Public Library	Upper Hutt City Libraries	Te Papa Tongarewa, National Museum of the American Indian, The Smithsonian Institution	
Project title	Digital NZ stories	Discovery Wall	G.R. Macdonald Dictionary of Canterbury	Diographics Hudson Registers	Kete Horowhenua	Kete New Plymouth	Manawatū Heritage	Measuring the Anzacs	Online Cenotaph	Scattered Seeds, He	Furapura Marara Upper Hutt City Library RECOLLECT	database William Ockleford Oldman Archive Research Materials	Table A1. Details on crowdsourcing platforms in the study sample

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Appendix 2

	Promote ease of use	
912	 Provide clear, concise and sufficient task instruction Clearly identify tasks Simplify the task Minimise effort to contribute Mobile friendly / Responsive design Prioritise key information Minimise user error 	Cox <i>et al.</i> (2015), Gunther <i>et al.</i> (2016), Liew (2015), McKinley, 2012, Simperl (2015) Gunther <i>et al.</i> (2016), McKinley (2012) Cox <i>et al.</i> (2015), Liew (2015), McKinley, 2012 Gunther <i>et al.</i> (2016), Causer and Terras (2014), McKinley, 2012 Brandtner <i>et al.</i> (2014) McKinley, 2012 Causer and Terras (2014), McKinley, 2012
	Sustain user interest 8. Design is attractive to users 9. Display project progress	McKinley, 2012 Alam and Campbell (2017), Causer and Terras (2014), McKinley, 2012
	 10. Convey a sense of fun 11. Provide task options 12. Keep content current 	Brandtner <i>et al.</i> (2014), Liew (2015), McKinley, 2012 Gunther <i>et al.</i> (2016), McKinley, 2012 Alam and Campbell (2017), McKinley, 2012
	<i>Foster a community of users</i> 13. Convey a sense of community 14. Support community interaction	Alam and Campbell (2017), Cox <i>et al.</i> (2015), McKinley, 2012 Alam and Campbell (2017), Brandtner <i>et al.</i> (2014), Cox <i>et al.</i> (2015), McKinley, 2012
	 Support content sharing Convey a commitment to biculturalism 	Alam and Campbell (2017), Gunther <i>et al.</i> (2016), McKinley, 2012 Lilley (2013)
	17. Enable users to review contributions18. Support offline interaction	Alam and Campbell (2017), Gunther $et\ al.$ (2016), McKinley (2012) Cox $et\ al.$ (2015), Liew (2015)
	Show users that their work is contributing to 19. Present reasons to contribute 20. Encourage users to engage with the institutions collection	to the institution and wider society Liew (2015), McKinley (2012) McKinley (2012)
Table A2. Related works	21. Acknowledge participation	Alam and Campbell (2017), Cox <i>et al.</i> (2015), Liew (2015), McKinley (2012), Passau, O'Donovan (2015), Causer and Terras (2014)
consulted in the derivation of the design recommendations (As discussed in Section 4)	22. Show how project output is freely accessible to the public23. Convey the credibility of the project24. Publicly recognise contributions	Alam and Campbell (2017), Gunther <i>et al.</i> (2016), Liew (2015), McKinley (2012) McKinley (2012) Alam and Campbell (2017), McKinley (2012)

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