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Title:

Exploring the use of User-Centred Design methods to inform the development of impact measurement practices: Lessons learnt in the environmental volunteering sector

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Abstract

This article reports on the findings of a research project delivered in collaboration with the UK environmental charity, The Conservation Volunteers (TCV), which evaluated the applicability and effectiveness of User-Centred Design (UCD) methods to assist voluntary organisations designing impact measurement tools. The findings indicate that there is scope for these methods to be applied more broadly within the voluntary sector, in particular by organisations wanting to critically examine their existing impact measurement practices, or by those seeking to develop and implement approaches to monitoring and evaluation that are more user-centred.

Keywords

Environmental volunteering; User-centred design, Impact measurement; Monitoring and evaluation

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Introduction

Since the 1980s, a user focused design strategy termed User-Centred Design (UCD) has been used increasingly widely. UCD is a design process concerned with understanding the requirements, skills, background information and values of individual users or organisations with a view to improving the design of existing work practices or tools (Haklay and Nivala, 2010).

A user focused design strategy is particularly useful when researchers are less familiar with the work practices of an organisation, putting organisations and their involvement at the heart of the design process. The strategy is also pragmatic, using a host of methods which can be adapted to meet a project's scope, organisational needs, time and resource availability (Holtzblatt and Beyer, 2015).

The UCD process has been applied across a wide range of disciplines, including the development of impact measurement tools, which are intended to evaluate the performance of voluntary organisations and their impact (both direct and indirect) on those who engage in their activities as well as other related stakeholders (Harlock, 2013). Previous studies have sought to understand how people engage with monitoring programmes to improve data collection methods (Boakes et al, 2016), develop impact measurement tools tailored to user needs (Kim et al, 2011), as well as identifying measurement indicators through focus group activities (Cane et al, 2012). Across these studies researchers have highlighted UCD's effectiveness in identifying the requirements of a measurement tool and tool users' skills and providing background information about organisations

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from existing or potential future users of the tool.

The central purpose of impact measurement tools is to provide an evidence-base to support claims made about the effectiveness of a project, ensuring that these are transparent, valid and robust (Rochester et al, 2012). . Measurement tools also provide data that can be used to assist organisational development and improvement and identify issues that need to be brought to the attention of policy makers and the wider public (Metcalf, 2013).

There has been a trend within the UK voluntary sector over the past 10-15 years to enhance impact measurement practice through evidence based monitoring and evaluation (Harlock, 2013). This is connected to a number of factors including funder requirements, project management (e.g. resources), improvement of work practices as well as voluntary organisations' own internal motivations to understand and demonstrate the impacts of their work (Ógáin et al, 2012; Harlock, 2013). As a result voluntary organisations now implement a variety of tools, frameworks and evaluation methods shaped by the diversity of values, motivations and work practices of the sector itself (Ógáin et al, 2012). For instance, a study by social research cooperative 'Substance' identified over 130 different evaluation tools used across the UK voluntary sector (Arvidson, 2009; Metcalf, 2013).

A number of authors (Metcalf, 2013; Harlock, 2013) have highlighted a series of challenges that can inhibit the selection and development of an impact measurement tool by voluntary sector organisations. First, there is the support, guidance and other resources provided by consultancies, infrastructure bodies and other specialist organisations in numerous fields which has led to a wealth of grey literature but also created conceptual confusion and a fragmented evidence base (Harlock, 2013). Second, the type of impact measurement tools

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used to measure the impact of services can be dependent on the initiative and the technical skills, knowledge and expertise of individual employees and volunteers (Haklay, 2010). This has resulted in the time limited and sporadic development impact measurement activities across the voluntary sector, and has meant that multiple evaluation tools are in use, even within individual organisations (Vaida et al, 2011). Finally, voluntary organisations often face the challenge of selecting an approach to impact measurement that is compatible with their budget, expertise, time, organisational size and values. Despite the growing availability of publications and online guidance on impact measurement practice (Metcalf, 2013) this can add further complexity to decisions faced by these organisations (Ógáin et al, 2012).

Thus, the fragmented and challenging nature of the impact measurement field means that there could be a role for UCD strategies to develop approaches to impact measurement that are better suited the requirements, skills and values of voluntary organisations themselves. For instance, UCD methods can be used to explore a voluntary organisation's approach to engagement and the characteristics of its service users, which could provide important insights into the appropriateness of their existing impact measurement tools and practices. Alternatively, UCD can involve analysis of existing quantitative data or qualitative methods such as focus groups to aid the design of an impact measurement tool that better reflects the needs and circumstances of service users or volunteers (Jansen, 2009; George, 2013).

To date there has been very little research into the feasibility and effectiveness of using UCD methods to assist voluntary organisations in developing impact measurement tools. This article aims to begin addressing that gap by presenting the practical implications of findings from a 4-year research project that explored the applicability of UCD methods to voluntary

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organisations wanting to take a more user-centred approach to the design and implementation of impact measurement tools and practices.

The article begins by outlining the research project and methodological approaches used before discussing findings from three separate studies nested within the project. It concludes by discussing the lessons learnt from these studies for both TCV and the wider voluntary sector.

Research project

The research project discussed in this article was undertaken in collaboration with the UK environmental charity, The Conservation Volunteers (TCV) whose goals, like many other UK voluntary organisations, centre on engaging people in a range of volunteering programmes. The research gathered information on the requirements, skills, background information and values of TCV. It was anticipated that TCV would be able to use the research findings to further develop their existing health-related impact measurement tool, outlined below. To note, the research did not develop a new tool, rather it provided recommendations for the development of TCV's approach to impact measurement in the future.

Green Exercise is a self-reported questionnaire used at selected TCV Green Gym® programmes that has been designed to capture longitudinal data about the health and wellbeing of volunteers. It comprised of two parts: a single-item physical activity measure and short version Warwick Edinburgh Mental Well Being Scale (SWEMWBS). The single-item physical activity measure was created by Milton et al (2011) and has been used to detect changes in daily physical activity. SWEMWBS was developed by NHS Health Scotland, University of Warwick and University of Edinburgh in 2007. It is comprised of 7 positively

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worded statements which measure people's level of mental wellbeing using a 5-point Likert scale (Stewart-Brown et al, 2009).

The project comprised of three phases undertaken between 2013 and 2017. Each phase corresponded with one of three research questions, each of which used a different design method. The project explored three research questions which are summarised in table 1 along with the UCD methods used.

Each study phase used a mixed method approach to collect data. Specific UCD methods were selected to meet the research questions, the project scope, organisational needs, time and resource availability (Holtzblatt and Beyer, 2015).

Table 1: Overview of research questions and UCD methods used

Research question	UCD method
1. How do the characteristics of environmental volunteering organisations shape their impact measurement tools and volunteer data collection?	<ul style="list-style-type: none"> <li data-bbox="858 1464 1410 1975">Semi-structured interviews and observation sessions: Staff were interviewed and observed in their workplace environments. These UCD methods focused on TCV's work practices, their communications and the interactions that occurred.

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	<ul style="list-style-type: none"> • Descriptive data analysis: Staff's electronically recorded interactions with the impact measurement tool was analysed, exploring the relationships and differences in staff's activities.
<p>2. How do volunteers engage in programmes delivered by environmental volunteering organisations?</p>	<ul style="list-style-type: none"> • Descriptive data analysis: Volunteers' engagement with TCV programmes and contributor activity was explored. Cluster analysis: Behavioural profiles of volunteers who exhibited similar engagement characteristics.
<p>3. How to build a health-related impact measurement tool that incorporates volunteers' needs and skills?</p>	<ul style="list-style-type: none"> • Focus group interviews: Volunteers were asked how they define the term health using group discussions and card sorting activities. • General inductive approach: Used to build a conceptual understanding of volunteers' perception of health. and

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	<p>a quantitative content analysis was applied to characterise and measure patterns in volunteers' words, expressions and communications using descriptive methods</p> <ul style="list-style-type: none"> • Quantitative content analysis: Used to characterise and measure patterns in volunteers' words, expressions and communications using descriptive methods.
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The first study focussed on research question one and gathered a contextual understanding of how TCV staff and volunteers engaged with existing impact measurement practices to ensure that future impact measurement tools would be compatible with TCV's requirements, skills and work practices (Haklay and Nivala, 2010). The study explored which characteristics shaped TCV's existing impact measurement tool and volunteer data collection including: staff roles and responsibilities, communication and coordination, types and objectives of volunteer data collected, processes and artefacts used to collect volunteer data, as well as internal and external influences on TCV's work. 15 TCV staff members were selected through discussions with various TCV projects which ensured sufficiently broad and representative coverage of workplace environments, employee positions and their associated tasks (Holtzblatt and Beyer, 2015). Three triangulating techniques were applied: analysis of

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electronically recorded interactions, one-to-one semi-structured interviews and observation sessions. Semi-structured interviews and observation sessions were conducted at staff's working environments. Observation sessions focussed on staff's work practices, their communications and the interactions that occurred. Data collected from interviews and observational sessions were analysed using a general inductive analytical approach (Thomas, 2006). From this, a diagram was created to visually capture the key characteristics shaping TCV's impact measurement tool (Holtzblatt and Beyer, 2015). Electronically recorded interactions (online database log files) were also accessed for each staff member and included a list of their activities whilst using the impact measurement tool. Using a descriptive analytical approach, relationships and differences in staff's activities were examined (Jansen, 2009).

The second study addressed research question two by exploring volunteers' engagement with TCV programmes. Full details of this study and methods used are reported in Seymour and Haklay (2018). The information generated provided the basis for recommendations for developing future impact measurement tools and data collection frameworks that better account for how volunteers engaged with TCV programmes. This was achieved by examining the following engagement characteristics of volunteering: longevity, frequency, and distance travelled. These characteristics were selected owing to their importance to the management and design of environmental volunteering programmes. Following this, behavioural profiles of volunteers who exhibited similar engagement characteristics were identified using a clustering analytical approach.

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The third study addressed research question three by exploring TCV volunteers' perceptions and understandings of the term 'health' in comparison to the World Health Organization (WHO) 1948's definition of health (Huber et al, 2011). The WHO defines 'health' simply as the physical, social and mental wellbeing of humanity, in which 'health' was widened beyond those biomedical aspects (e.g. disease and illness) to encompass the socioeconomic and psychological domains (Huber et al, 2011). Findings from this third study were used to provide recommendations for developing future health impact measurement tools, ensuring they incorporate volunteers' needs and understandings of health information. Volunteers were selected to participate in the study through discussions with various TCV projects to ensure sufficiently broad and representative coverage. Five focus group interviews took place at TCV sites in Greater London (UK) and were comprised of three parts: icebreakers, group discussions and card sorting activity. Ice breaker sessions were used at the start of the focus group discussions as a pre-intervention strategy to engage TCV volunteers in understanding the objectives of the study and to increase the groups' interpersonal interactions (Kilanowski, 2012). Focus group discussions then asked volunteers to define health in their own words exploring their perceptions on health (George, 2013). This provided further insight into volunteers' conceptual understanding of health and the terminology that could be used to improve the way future tools are worded. A card sorting session was then conducted which asked volunteers to describe what they saw on the card before ranking them in order of importance based on a group decision. Information on the cards was based on the Measuring National Well-being framework, developed by the Office of National Statistics UK in 2014 (See <https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing>). The method has

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previously been used in UCD to select measurement indicators based on how people perceived different attributes that make up a subject or concept in terms of their importance (Cane et al, 2012). Data was analysed using two methods: a general inductive approach was used to build a conceptual understanding of volunteers' perception of health (Thomas, 2006) and a quantitative content analysis was applied to characterise and measure patterns in volunteers' words, expressions and communications using descriptive methods (Hsieh and Shannon, 2005).

Findings

Study 1: How do the characteristics of voluntary organisations influence their impact measurement tools and volunteer data collection?

The study revealed the social, cultural and organisational aspects of TCV. It identified the relationships between TCV and characteristics which shaped the development of their impact measurement tool and the volunteer data they collected. Staff differed in how they coordinated and managed their responsibilities to support TCV's activities (e.g. regional and localised levels). Variability in staff roles and responsibilities were reflected in the types and scale of volunteer data collected (e.g. type and number of tasks volunteers engaged in). All staff collected volunteer and associated data using paper forms, before manually uploading the data to an online database, enhancing the consistency and quality of data.

The study identified how TCV staff engaged with the impact measurement tool. There were clear distinctions between staff's use of the tool, with operational staff (e.g. project and community officers) contributing more activity than managerial staff. There were variable trends between staff's total amount of activity and number of days active on the tool which

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were not role specific. Staff varied as to the types of forms they accessed, with only slight differences in the types of activities recorded (e.g. add or edit form) on forms accessed.

Study 2: How do volunteers engage in programmes delivered by environmental volunteering organisations?

The findings revealed differences in net annual volunteer numbers and the length of their engagement with TCV projects. Urban regions had more volunteers who engage with TCV for longer periods of time than more rural regions. Factors associated with this difference included population density, social factors and project organisation. The findings also showed that most TCV volunteers lived within a 20-mile distance of the TCV volunteering sites they had attended, with fewer travelling from further distances. Reasons for this included access to public transport, vehicle ownership, population density, and financial resources.

Three types of volunteer engagement profiles were identified: One-Session, Short-Term, and Long-Term. 'One-Session' volunteers mostly engaged for one session and travel the least distance. 'Long-Term' volunteers were active over longer periods of up to ~3 years and travelled the furthest distance. 'Short-Term' volunteers had a profile type mid-way between the two other profiles. One-Session volunteers accounted for the largest proportion of the volunteer numbers (94%). Long-Term volunteers represented the smallest proportion (<1.5%).

Study 3: How to build a health-related impact measurement tool that incorporates volunteers' needs and skills?

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Most volunteers defined the term health in terms which closely resembled those of the World Health Organization (WHO) 1948 definition (Huber et al, 2011). Some explanations included improved health literacy, promotion, and education. However, a number of differences between this definition and volunteers’ perceptions of the term health were identified. For instance, some volunteers described mental health as the presence or absence of physical pain (e.g. a subjective view of physical pain). Instead, the term ‘presence or absence of physical pain’ is used as a self-reported measure of physical health and is more generally associated with physical health than mental health (Westerterp, 2009). This suggests that there are small but appreciable misconceptions in volunteers’ perceptions of the terms used to describe mental health defined by WHO as described as the positive state of wellbeing and the capacity of a person to cope with life stresses as well as contribute to community engagement activities (Huber et al, 2011). However, as these differences had no significant effect on how volunteers perceived health, these would not influence how volunteer data has been collected.

Volunteers also presented variations in terminology and phrases used to describe different components of health. They often combined general descriptive language (e.g. mind and body) and technical terminology (e.g. lung capacity). These findings may relate to personal experiences and medical encounters, as well as contextual, societal and cultural associations. The findings also provided some valuable insights into how terminology is defined and its overall usage. For instance, measuring the diversity and frequency of words used is said to be a useful indicator of those concepts or attributes which are most important to people.

‘Happiness’ was identified as the highest recurring word used by volunteers followed by ‘mental health’, ‘wellbeing’ and ‘physical health’, suggesting those terms to describe

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attributes of mental health were used slightly more than those physical health attributes.

There were also variations in recurring words and their frequency between volunteer groups.

Further variations were identified in how volunteers perceived attributes associated with health (e.g. where we live) in terms of their degree of importance and relationship to another. 'Individual wellbeing', 'health' and 'relationships' were viewed by most volunteer groups as highly important attributes. National 'economy' and 'governance' were ranked of lower importance by most volunteer groups.

Discussion: lessons learned for the design of impact measurement tools in the voluntary sector

The following lessons were identified from this research which have implications for the wider voluntary sector.

Understanding the characteristics which can shape organisations' impact measurement tools

Study one explored which characteristics shaped TCV's impact measurement tools and the volunteer data they collected. Using this information, TCV's future impact measurement tools can be designed to meet their requirements, skills, contextual background and values. For example, this information can also be used when planning a data collection framework such as the type, frequency and spatial distribution of volunteer data needed. This could enhance data collection in areas where there appears to be little or no data as well as taking account for any biases or skewness when evaluating datasets. Findings can also be used to

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identify additions or alterations to existing tools to increase their usability, improving the nature, veracity and meaning of volunteer data collected.

Using the above UCD methods could be considerably valuable in helping voluntary sector practitioners in areas of system design and application. For instance, knowledge of how and in what ways other voluntary organisations use their resources to collect volunteer data helps them to evaluate strengths and weaknesses in their existing work practices as well as suggest recommendations for future development. Such knowledge can also be used to identify which resources are available and their applicability in supporting similar activities.

Understanding volunteers' engagement behaviours

Study two enabled a deeper understanding of the *delivery of* and volunteers' *engagement in* TCV programmes. It suggests there is scope for these approaches to be applied to other volunteering organisations who collect similar volunteer data and wish to explore the impact of volunteer engagement through their activities. By understanding volunteers' engagement profiles, voluntary organisations can tailor their impact measurement tools to meet the structure of their sampling population. For instance, study two identified that 94.4% of TCV volunteers only attended one session. Currently, TCV's Green Exercise questionnaire survey is based on a longitudinal approach to data collection so there is a need to design a health impact measurement tool that better reflects the engagement behaviours of different volunteer types, including those whose engagement is one-off or limited to a shorter period. Otherwise, a large proportion of volunteers will be under-represented or even missing from evaluation findings. One example of an alternative approach might be an experience survey, which are

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designed to measure people's feelings about an experience, and can be used both as a one-off measure and longitudinally (McLean et al, 2017).

The analytical approach could also be valuable in assisting voluntary sector practitioners in their understanding, recruitment, and retention of individuals who engage in their activities. For example, it could help to improve the design of volunteering projects and bring them in alignment with volunteer's engagement patterns. It could also be useful when planning the frequency of the data collection process and the type or geographical distribution of volunteer data needed (e.g. regional or localised level) to meet their requirements.

Building a volunteer-focused impact measurement tool

Study three used various elicitation methods to examine volunteers' conceptual understanding, language used and priorities associated with health and related-attributes. Using this information, tools can be designed to match volunteers' knowledge of a given subject to enable a better understanding of the type of information that is needed. It can also help tool developers select key measurement indicators. For example, volunteers identified 'relationships' to be one of the key attributes describing health but this attribute is not currently measured by TCV's existing tool. This suggests that whilst TCV are capturing some of the health-related impacts (e.g. wellbeing) viewed by volunteers to be important attributes they may wish to consider including a measure of 'relationships' in the future.

These eliciting methods might be valuable for others in the voluntary sector when designing an impact measurement tool to improve how they are understood by those who use it.

Information gathered can also be used to help improve the internal reliability of volunteer data. This is because how a person interprets concepts and terminology used in a

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measurement impact tool (e.g. questionnaire survey) has the potential to influence the responses they provide and thus the extent to which the data can be relied upon to produce valid evidence.

Importance of using User-Centred Design methods when designing tools

The purpose of User-Centred Design methods is to enhance the design of existing work practices or tools used by individual users or organisations (Haklay and Nivala, 2010).

Methods used in this research focused primarily on the needs, requirements and skills of staff and volunteers that engage with TCV's impact measurement practices and it is hoped that the recommendations will enable TCV to develop measures that are better tailored to their needs. This suggests there is scope for these methods to be applied to other voluntary organisations to ensure impact measurement tools developed are tailored to the existing needs, requirements and skills of tool users.

Feasibility of User-Centred Design methods

UCD methods used in this research were pragmatic in their approach. Pragmatism is a philosophical approach where our understandings of the world are grounded in the outcomes of exploratory inquiry and has been widely applied in the design field. Pragmatist researchers identify flexibility when selecting methods as a particular strength of their approach and advocate the integration of methods that are best placed to address their research questions (Onwuegbuzie and Leech, 2005). This flexibility enabled this study to adapt its scope, methods, researcher and TCV needs, and resource availability. It also enabled researchers and TCV personnel to learn from each of the three studies in turn, providing valuable information

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for the next study conducted. The methods were also straightforward to apply, with a wealth of accessible literature detailing how to implement them.

Using mixed methods

This research identified the use of mixed methods (e.g. qualitative and quantitative) as a particular strength of UCD approaches as this enabled a wider range of perspectives to be incorporated. Others note (e.g. Thurmond, 2001; Onwuegbuzie and Leech, 2005), this approach enables one to view findings through a bi-focal lens, combining micro (e.g. qualitative) and macro-levels (quantitative) insights into a given issue. It can also enhance the reliability and quality of the findings as well as provide an in-depth understanding of the requirements, skills, background information about an organisation and values necessary to develop an impact measurement tool.

Flexibility, time and resource availability

One challenge identified whilst using mixed methods was the pressures associated with the additional time, research effort and resources necessary for implementing them (Onwuegbuzie and Leech, 2005). For instance, the first study used three methods which required significant amounts of time to collect, analyse and interpret data using several different resources (e.g. analytical software packages, research equipment and expenses). . A further challenge is the costs associated with implementing these methods, such as analytical software packages, research equipment and staff expenses. Again, this challenge has also been noted by others exploring impact measurement in the voluntary sector (e.g. Harlock, 2013; Metcalf, 2013).

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Building partnerships between researchers, voluntary sector and volunteers

A key strength of the research was the collaborative partnership between researchers, TCV staff and volunteers. This provided a number of benefits for the research process including accessibility to TCV staff, volunteers and resources. Specific examples include:

- conducting quarterly meetings with TCV personnel to reflect on what had been attained, agree forthcoming actions, and review the progress of the project plan.
- working closely with gatekeepers at TCV to access sampling populations and foster trust between researchers and study participants.
- changes in TCV personnel who acted as gatekeepers during the research process. This widened research directions and enhanced research visibility. For example, collaborating with TCV's data analyst team provided further insight into the organisations' various impact measurement tools used.

As these examples show, building collaborative partnerships between researchers, voluntary organisations and volunteers not only strengthens the research process but can also enthuse people's involvement, support and empowerment. It is therefore recommended that more collaborative partnerships are encouraged between researchers, the voluntary sector and volunteers in the future, both in the development of impact measurement tools and more broadly

Networking with various stakeholders

Networking with various stakeholders underpinned the research process, providing opportunities for guidance and support. Examples included: attending a variety of networking

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events and engaging with key researchers and practitioners in the field throughout the research process: these groups were invaluable for giving advice on existing impact measurement practices in the voluntary sector as well as delivering UCD methods and forming collaborative partnerships.

Others in the voluntary sector are encouraged to network and engage with various stakeholders which would help to maximise the exposure and impact of their research, strengthen ongoing and future methodological designs as well as enhance their overall sense of empowerment.

Conclusion

The research explored the applicability and effectiveness of using User-Centred Design methods (UCD) to assist voluntary organisations in designing impact measurement tools through a collaboration with UK environmental charity, The Conservation Volunteers (TCV). The findings have demonstrated the potential for UCD to be applied to other voluntary organisations wanting to critically examine their existing impact measurement practices, or by those seeking to develop and implement more user-centred approaches to monitoring and evaluation. The research has highlighted the importance of developing an in-depth understanding of the context in which voluntary organisations operate, including the characteristics, knowledge and perceptions of their beneficiaries and volunteers; and the type and length of their engagement with a project; to ensure that the tools and approaches developed are suitable. Taking a UCD approach has the potential to increase the veracity and meaning of the data that is collected and analysed as well as enhancing the evidence-base

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underpinning the claims made by voluntary organisations to promote the importance of their work.

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Conflict of interest statement

The author declares that is no conflict of interest.

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