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Towards a Taxonomy for Neighborhood Volunteering Management Platforms

Research in Progress

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Abstract. The management and organization of volunteering in the social sector have been strongly influenced by technological progress over the last two decades. New proposals for IT-based volunteering management platforms that draw on many elements of social media are appearing with increasing frequency. In this article, we analyzed the current state of the art and use a methodological approach to develop a taxonomy for classifying existing and emerging developments in the field. The taxonomy is intended to assist practitioners in selecting appropriate systems for their respective purposes as well as support researchers in identifying research gaps. The resulting research artifact has undergone an initial evaluation and can support maintaining a better overview in a growing subject area.

Keywords: Volunteer Management, Information and Communication System, Volunteer Platform, Taxonomy, Social Engagement

1 Introduction

Civil volunteer support has become an important cornerstone of our society and can be found in many areas of our lives. Social commitment is practiced, e.g., in areas of sport, culture, teaching, refugee, or youth welfare by a steadily growing number of people (Simonson et al. 2019). In 2018, the World's Volunteerism Report of the United Nations Volunteers program (UNV 2018) identified more than one billion volunteers worldwide providing their workforce to face challenges in their home countries or international contexts.

The advent of mobile devices and social media has impacted volunteer help in many ways (Eimhjellen et al. 2018) and recent events like the COVID-19 pandemic further increased the relevance of digital solutions in volunteering (Lachance 2020). Information and communication technologies are increasingly being used in the mediation of those seeking and offering help in neighborhood assistance (Pereira et al. 2018). Whereas in the past advertisements were rather placed decentrally, e.g., on websites or

offline on 'bulletin boards', today approaches are being discussed in research to bring the players together via social platforms (e.g. Kapsammer et al. 2021, Betke 2018).

There are two main use cases discussed in the literature regarding IT-assisted volunteer coordination. The first is approaches from the field of disaster management, which mostly aim at bringing together physical or digital spontaneous volunteers with the work of official first responders (e.g. Fuchs-Kittowski et al. 2018, Neubauer et al. 2013). These approaches are subject to the special conditions of a disaster situation and are not considered in this work. In contrast, the focus of this paper is on the second use case of volunteering in everyday situations. Approaches in this area often address voluntary help in the residential environment on topics such as education, helping the elderly, socializing, etc. (e.g. Akin et al. 2019, Neubauer et al. 2021). Currently, several approaches already exist, and many more research projects are underway.

To enable practitioners to better classify existing solutions and to support researchers in identifying research gaps, we started to develop a taxonomy for the classification of volunteer management systems for everyday life situations. In this paper, we present the current development status of the taxonomy, which was developed considering the method of Nickerson et al. (2013) and based on a structured literature review. Following iterations of the development process will also include the opinions and experiences of the affected user groups and practitioners.

In the next section, we provide insight into the methodological approach before presenting the taxonomy in the third chapter. The results of an initial evaluation indicate the usefulness of the taxonomy. The paper closes with a critical conclusion.

2 Methodological Approach

The first step of the taxonomy development method of Nickerson et al. (2013) is to define a meta-characteristic for the subsequent selection of dimensions. In our case, this is: "characteristics of IT platforms for the allocation of everyday volunteering and neighborhood assistance". Since the method is iterative, we must define objective and subjective ending conditions. We used the same ending conditions as suggested by Nickerson et al. (2013) and did not define any specific ones. The method offers a conceptual-to-empirical and an empirical-to-conceptual approach. As the research is still in progress, we only present the results of an initial iteration of the empirical-to-conceptual approach in this paper. All elements of the taxonomy were derived from objects of study, in our case volunteer platforms, which were discussed in the literature. The completed research will also include conceptual-to-empirical iterations, e.g., based on the knowledge of experts.

To identify the objects of investigation we conducted a literature analysis according to the method of vom Brocke et al. (2009). The following scientific databases were searched: ACM Digital Library, IEEE Xplore, JSTOR, Science Direct, and SpringerLink. To identify as many relevant dimensions and characteristics as possible, the overarching search terms "civic engagement" and "volunteer management" were used. The search resulted in 2,730 hits in all searched databases. To refine the search of objects, only recent articles (publication date: 01/01/2016 and beyond) were considered. Since many of the publications found did not fall within the scope of our study,

we defined exclusion criteria (EC) to filter out irrelevant articles. As already mentioned in the introduction, we excluded papers that address “disaster management” (EC1), as this falls outside the scope of our study. The same applies to the terms "e-government" (EC2) and "e-participation" (EC3), as they focus on government affairs. Due to the focus of our study on platforms, we also defined an inclusion criterion (IC) by including only those contributions that could clearly relate to IT platforms in the context of everyday volunteering and neighborhood assistance (IC1). Finally, there were 32 relevant works (objects of study) that could be used for taxonomy development (see Figure 1).

Search string	„civic engagement“ OR „volunteer management“				
Search fields	title & abstract				
Databases	ACM Digital Library	IEEE Xplore	JSTOR	Science Direct	SpringerLink
Database hits	167	61	875	716	911
Total hits	2730				
Hits after title selection	88		Hits after abstract selection	55	
Hits after fulltext selection (final hits)	32				

Figure 1. Structured literature search process

3 An Initial Taxonomy for Neighborhood Volunteering Management Platforms

In this section, we present the taxonomy (Figure 2) build from the abovementioned objects of study from the literature search and explain their 12 dimensions and 33 characteristics. For the purpose of clarity, the 12 identified dimensions have been assigned to four categories. At this stage, the taxonomy only includes non-exclusive characteristics. This is because our taxonomy is not to be interpreted from a dimension-oriented but from a platform-oriented point of view. From a dimension-oriented point of view, one could believe that, e.g., a communication type cannot be 1:1 and m:n at the same time. However, from a platform-oriented perspective, both communication types can be implemented and used. Please note that most dimensions and characteristics have been derived from more than one source, but for better legibility and clarity, we mostly list only one relevant reference at a time.

The category "System Design" describes the type of medium for which the platform is designed. The *application* dimension determines whether a platform provides its user interfaces as a mobile application (Angarita et al. 2019) for smartphones, tablets, smart-watches, etc., and/or as a desktop application for laptops, PC, etc. (Lindberg et al. 2019). In terms of the *user interface*, the literature discusses implementation in the form of social networks (similar to Twitter, and Facebook) or games, following the model of other massively multiplayer online games (Dumrewal et al. 2018; Lindberg et al. 2019).

The category "Tasks" comprises five dimensions. Regarding the *organization* of tasks, these can be commissioned centrally by a single organization (NGO, company, municipality) (e.g., garbage disposal in the neighborhood) or decentralized by individual users (e.g., an elderly person asks for shopping help) (Kapsammer et al. 2017). The *matching* addresses the allocation of tasks to a specific user. In the manual method, the user who has an intention to help must identify and select suitable tasks from the pool

using filters (pull principle). Automatic matching uses an algorithm to match profiles and task data for the automatic assignment of a specific user to tasks (push principle) (Schönböck et al. 2016). The semi-automatic methods add a coordination supervisor to the process who assigns users to tasks aided by decision support functions (Mazlan et al. 2018). The *execution* dimension indicates whether the tasks are to be done physically (e.g., interpreting for a refugee during an official visit) or could also take place online (e.g., tutoring a student in mathematics via video chat). Online tasks are not tied to one location and can be done from anywhere (Chen 2017). In terms of *frequency*, we distinguish whether the volunteering is a one-time task (e.g., helping a neighbor carry up a heavy piece of furniture) or a recurring/ongoing task (e.g., doing weekly grocery shopping for a user) (Rehm et al. 2018). The purpose of the tasks and thus of the entire platform forms another dimension. Typical purposes can be social (Tong 2020) (e.g., the user seeks a conversation partner due to loneliness), educational (Silva et al. 2018) (e.g., find language tandem partners), or emergency-driven (Cerioli and Ribaudo 2019) (e.g., collective clean-up in the neighborhood after a storm).

Category	Dimension	Characteristics				
System design	application	mobile		desktop		
	user interface	social network			game	
Tasks	organization	central		decentral		
	matching	manual	semi-automatic		automatic	
	execution	online			physical	
	frequency	one-time			recurring	
	purpose	social		education		emergency
Communication	feature	chat	comment	post	sharing	
	input	text		picture		video
	type	1:1		1:n		m:n
Reward system	game design elements	score	badges	leader-board	level-up	none
	incentives	monetary			non-monetary	

Figure 2: Taxonomy for neighborhood volunteering management platforms

In the category of “Communication”, three dimensions are distinguished. Communication *features* for user interaction on volunteer platforms include chats (i.e., individual and group messages) and posts (in various media formats), which may also be commented on and shared with other users (Brandtzaeg et al. 2016). The *input* dimension describes the media formats that users can handle on the platform. These can be text (e.g., SMS, in-app chat, email), video (e.g., instruction videos as part of an online help service), or images (e.g., photos of trash lying around that needs to be cleaned up in the neighborhood) (Angarita et al. 2019). The *type* dimension refers to the number of people communicating with each other. The characteristic 1:1 means communication takes place exclusively between two users (e.g., in a private chat) (Mazlan et al. 2018), 1:n means the ability of one user to reach several other users (e.g., serial messaging or posting) (Schönböck et al. 2016). The n:m communication allows many users to communicate together at the same time (e.g., via group chat) (Mazlan et al. 2018).

The last category includes the reward systems that a platform offers to influence user motivation away from intrinsic factors. *Game design elements* can serve to maintain and build extrinsic motivation by awarding points and badges for completing tasks and

challenges or interactions (Hassan and Hamari 2020). By earning points or badges, users can reach certain levels (and possibly unlock new features in the app) (Rehm et al. 2018). Leaderboards are a way to motivate by comparing with other users (Todtenhausen and Fuchs-Kittowski 2020). The last dimension *incentives* considers the presence of monetary reward systems (e.g., discounts on certain products or gifts from sponsors) on the platform (Tong 2020). Non-monetary incentives arise mainly from community recognition, such as simple gratitude from a user, or awards as part of Gamification (Brandtzaeg et al. 2016).

4 Evaluation

Following the notes on ex-ante evaluations by Pries-Heje et al. (2008), the 8 objective ending conditions were already considered as part of the first iteration. In addition, we conducted an expert survey using a questionnaire, in which we addressed two issues (Damarowsky et al. 2022): First, we wanted to determine if the experts believe that the subjective ending conditions (SEC) defined by Nickerson et al. (2013) were met. Second, perceived usefulness (PU) was assessed using the scale items proposed by Davis (1989). All items were adapted to the context of our study and are listed in Figure 3.

#	Scale items for subjective ending conditions (SEC)
SEC 1	The number of dimensions allows the taxonomy to be meaningful yet not cluttered or overwhelming.
SEC 2	The dimensions and characteristics allow sufficient differentiation between the objects of interest.
SEC 3	All objects or a (random) sample of objects within the area of interest can be classified.
SEC 4	A new dimension or a new characteristic of an existing can easily be added.
SEC 5	Dimensions and characteristics of objects are sufficiently explained.
#	Scale items for perceived usefulness (PU)
PU 1	The taxonomy enables me to accomplish tasks more quickly (e.g., fast detection of suitable matching methods).
PU 2	The taxonomy improves my job performance (e.g., identifying the most suitable platform characteristics).
PU 3	The taxonomy improves my productivity (e.g., better/simpler selection of most suitable platform characteristics).
PU 4	The taxonomy enhances my effectiveness on the job (e.g., identifying required or most relevant platform features).
PU 5	The taxonomy makes it easier to do my job (e.g., selecting the most suitable platform characteristics is facilitated).
PU 6	Overall, I find the taxonomy useful in my job.

Figure 3: Items of the questionnaire

The questionnaire was introduced with a brief description of the project as well as a possible scenario in the context of software development in which the taxonomy is used. In choosing the sample size, we followed the so-called "10±2 rule" (Hwang and Salvendy 2010), which states that 8 to 12 respondents are sufficient for the evaluation of the usefulness of an artifact or technology. The questionnaire was completed by 8 people, all of whom had good technical understanding and knowledge related to volunteer coordination (4 basic knowledge, 4 extensive knowledge). Respondents rated the statements using a 7-point verbal-numerical Likert scale (1=disagree, ..., 7=agree).

The results of the evaluation are shown in Figure 4. Despite a different scattering of the agreements to the individual SEC items, it is striking that they all have the same median $m=6$. Based on this positive assessment, we consider the SEC of our initial taxonomy to be fulfilled. A more broadly spread picture emerges for the items of perceived usefulness. While PU2, PU3, and PU5 have a high median of $m=6$, PU1 scores

with a comparatively low median of $m=4$. The median of $m=4$ indicates a neutral attitude towards the "speed of use" of the taxonomy. Although one respondent consistently rated all statements with a value of 3, the median responses indicate an overall positive perception of the usefulness of the taxonomy, although there is room for improvement.

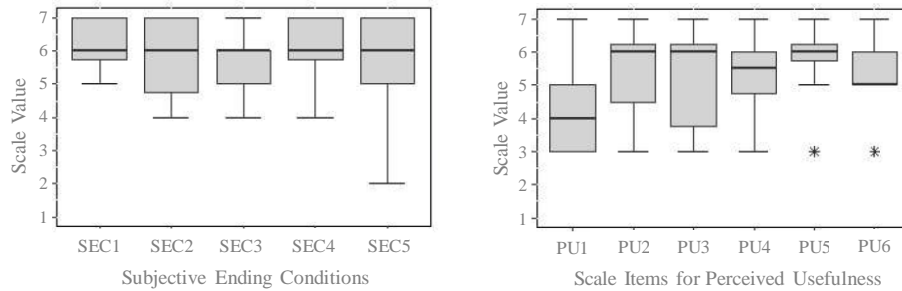


Figure 4: Evaluation results

5 Conclusion

In this paper, we introduced an initial version of a taxonomy for the classification of neighborhood volunteering management platforms. The taxonomy was created based on the empirical-to-conceptual approach of Nickerson et al (2013) and includes 4 categories, 12 dimensions, and 33 characteristics. First evaluation results show that the taxonomy has the potential to become a useful tool for users and researchers in the field.

However, the results are also subject to limitations that need to be addressed in further research. One limitation is the subjectivity of the taxonomy resulting from the individual construction steps. Despite the methodological foundation, already the selection of suitable sources in the literature analysis, i.e., the selection of the objects of study, is already influenced by the authors' understanding of the topic and their expertise. This also applies to the derivation of suitable characteristics and dimensions, which could be influenced, e.g., by the authors' target visions. Furthermore, the relevant literature found is limited by the search terms and the databases used. However, since extensibility is one of the SEC considered when creating a taxonomy, the subsequent addition of further dimensions and characteristics is possible, so this limitation is not permanent. In conducting our evaluation, the sample size and respondent selection affect the results. To keep bias effects as low as possible in this setting, we at least surveyed a heterogeneous group of experts.

In the next step of this research, we want to improve the taxonomy in further iterations that follow the conceptual-to-empirical approach, incorporating interviews with practitioners and analysis of ready-to-use platforms, and then re-test for all ending conditions. Future research efforts may also aim to test the taxonomy with users of existing volunteer management systems to gain insights into their experiences and perspectives, providing additional information on existing approaches. This would create a tool in which practitioners could directly identify approaches suitable for their purposes and provide researchers with the existing best-practices.

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