COBACORE

Community Based Comprehensive Recovery

Grant Agreement Nº 313308

D5.2 Evaluation report on the intermediate evaluation

WP5 Experimentation and Evaluation

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Authors: Kees van Dongen (TNO), Jan Willem Streefkerk (TNO), Kim Anema (NLRC), Kenny Meesters (UT), Reinout Pieneman (TNO)
Internal reviewers: Matthias Max (GRC), David McIlhatton (UU)

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Deliverable Title: Evaluation report on the intermediate evaluation

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Executive Summary:

Deliverable 5.2 is the result of Task 5.3: evaluation of the intermediate platform. Before performance assessment indicators were defined (Deliverable 5.1) in Task 5.1 and aspects of the COBACORE platform we assessed in feedback sessions in Task 5.2. This deliverable describes the intermediate evaluation of the COBACORE platform. This evaluation was held on the 11th and 12th of June 2014 in Rotterdam. Thirty-seven individuals participated in this evaluation. Representatives from the Safety Region of Rotterdam Rijnmond, the Municipality of Rotterdam and the Netherlands and German Red Cross participated as professional users of the COBACORE platform. Students of the Hague University of Applied Sciences, UNESCO – IHE and Tilburg University participated as both affected and responding community members. This deliverable provides an introduction to the evaluation of the intermediate platform with the research questions and hypotheses in Chapter 1, an extensive description of the method and simulation environment that was used in Chapter 2, followed by a chapter on the outcome of the experiment, conclusions and recommendations in chapter 3. The Appendices provide additional/ background information on the Belfast Flood operational scenario used for the evaluation of the intermediate platform and a profile of a participating affected community member. Recommendations for further development of the COBACORE platform is provided to guide design efforts.

Objective evaluation

The purpose of the intermediate evaluation is to:

- act as a performance assessment of the COBACORE concept and platform
- observe, interpret and evaluate experiences of end-users, experts and stakeholders with the intermediate COBACORE platform,
- draw preliminary conclusions about operational value of COBACORE in practice,
- define refinement advice for further development, and
- guide the further design efforts toward next partial evaluations and final evaluation.

COBACORE platform

The objective of the COBACORE platform is to support recovery planning by supporting continuous needs assessment and needs-capacity matching. A community-based approach is followed in which affected community, responding community and professional responders collaborate and share information about needs, capacities, recovery activities and the actors involved. The platform intends to support comprehensive recovery whereby all types of needs are assessed and all types of recovery activities are undertaken to meet all kinds of needs related to ensuring and enhancing the safety, security and wellbeing of citizens in the aftermath of emergencies.

The COBACORE platform intends to support:

- shared situation understanding of all kinds of needs, capacities and recovery activities,
- information sharing and collaboration between the communities,
- re-directing to high priority needs and empowerment to meet gaps
- matching between needs and capacities of all responding groups

Research questions

To test the COBACORE concept as developed in WP1 and to test the functionalities, features and information as developed in WP3 and WP2 using the Performance Assessment Indicators in D 5.1 research questions are formulated. To draw preliminary conclusions about operational value of COBACORE in practice the following research questions are investigated:

- Do end-users perceive that the COBACORE platform has a positive effect on community-based needs assessment and recovery planning?
- Does the COBACORE platform close gaps in information exchange and collaboration between the communities?
- Does the COBACORE platform enable the sharing of the right kind of information?
- Is COBACORE functionality and information useful and usable for supporting: shared situation understanding; information sharing and collaboration; re-directing and empowerment and need-capacity matching?
- Does the COBACORE platform fit with processes, procedures and practices of all user groups?

Based on the COBACORE concept we have the following hypotheses:

We expect that high priority unmet needs of the affected community are met faster and by more appropriate capacities and recovery activities of both responding community and professionals as a result of using COBACORE.

Method

A platform to support information sharing and collaboration between affected community, responding community and responding professionals should conform to performance criteria as specified in D5.1: 1) Closing Information and collaboration gaps, 2) Fit with operational processes, 3) Perceived operational value and 4) Usefulness and usability. A two day evaluation exercise was organized in Rotterdam to test and investigate the above research questions and hypotheses. On the first day, background information about the COBACORE project and concept was provided to end-users, experts and stakeholders. Participants received a demonstration of the COBACORE platform and instructions to use its functionality. They performed a training session to familiarise themselves with the Belfast flooding scenario and their roles. On the second day participants used the COBACORE platform to perform the tasks associated with their roles. End-users and experts performed their tasks and experienced the COBACORE platform in a simulated environment: the COBAgame. The COBAGAME is a desk-top simulation consisting of a post-crisis scenario; workflows between professionals, affected and responding community members; profiles describing the situation to participants; task descriptions; action forms for responding community members and professionals and game management. The COBAGAME enabled end-users, experts and stakeholders to personally experience information exchange and collaboration in a post-crisis situation using the intermediate COBACORE platform. The semi-controlled environment enabled observation, performance measurement and discussion about operational value and needs for improvement. In the afternoon participants used a mix of social media (e.g. Twitter, Facebook) to be able to compare experiences. The location in Rotterdam provided room for five affected communities, three responding communities, three responding professionals and a group of coordinating professionals. Thirty-seven individuals participated in the evaluation. A mix of professionals from municipality and safety region, trained volunteers of NLRC and GRC and students participated in the evaluation. The behaviour of participants was observed and logged in the COBACORE platform and their opinions concerning collaboration, operational value, fit with procedures and usefulness and usability were gathered using questionnaires and focus group sessions. After both scenarios, discussion sessions were held to pinpoint which current functionalities and features of the platform needed improvement and how

they could be improved.

Findings and conclusions

Observations and questionnaires show a mixed picture with regards to usefulness and usability. Participants were overall quite positive on the usefulness of the platform. However, each user group indicated that they needed slightly different support and tailor-made interfaces, something which the provided generic interface did not yet provide. A more user-tailored interface would improve the operational value greatly and align the platform better with existing processes. The various features that the platform provided to the affected community were helpful to help them indicate their needs, but the platform lacked feedback functionality that shows the progress of meeting these needs. Members of the responding community and responding professionals indicated that they missed an interface that helped them organize and manage the life cycle of needs and capacities. Coordinating professionals stated that they lacked a proper overview of categorized needs and capacities that clearly indicates coverage and gaps. Responding community members, responding professionals and coordinating professionals lacked an overview on who is doing what and where that would enable them to coordinate needs assessment and recovery activities. Coordination and collaboration building through group formation and actor activity and capacity awareness on the platform should receive more attention. Refinement for further system, and guidance for further design efforts is provided by design recommendations. With regards to the setup, the COBAgame provided a relevant, albeit simplified operational environment to allow participants to interact with COBACORE in a meaningful way. For the final evaluation, care should be taken to construct an operational environment that provides a richer and (especially for professionals and responding community) more relevant circumstances.

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1 Introduction

This document describes how the intermediate COBACORE platform was evaluated. This intermediate evaluation is done to assess the operational value of the intermediate COBACORE platform for end-users performing a community-based post-crisis needs assessment. The task consisted of the following activities:

- Assessment of operational value of integrated parts of COBACORE
- Organisation, execution and assessment of intermediate platform
- Defining end-users, tasks, scenario, prepared environment, selected evaluation measures, assessment of operational value, provision of feedback and advice for refinement

1.1 Evaluation goal

The purpose of the intermediate evaluation was to test whether the COBACORE platform has the right functionality for the COBACORE concept. This test was performed to determine how the COBACORE platform can be further refined and improved. To assess the operational value of integrated parts of the COBACORE platform we need evidence that:

- parts of the COBACORE platform have operational value for end-users
- integration of these parts provide additional operational value

Goal of intermediate (Deliverable 5.1)

- To act as a performance assessment of the COBACORE concept and platform
- To observe, interpret and evaluate experiences of end-users, experts and stakeholders
- To draw preliminary conclusions about operational value of the COBACORE platform features in practice
- To define refinement advice for further development, and
- To guide the further design efforts toward next partial evaluations and final evaluation

1.2 Research questions

This section describes the research about the COBACORE platform we sought to investigate in this intermediate evaluation. In order to draw conclusions about the operational value of each part of the platform, in addition to the value of its integrated parts, we addressed each of the following research questions:

Closing gaps in information exchange and collaboration

- Q1: Does the COBACORE platform close gaps in information exchange and collaboration between the communities?

By providing end-users, experts and stakeholders with practical experience with the intermediate COBACORE platform we tested whether the integrated parts of the COBACORE platform efficiently and effectively support:

1) The situation awareness required by each user-group, and the shared situation awareness developed between user-groups
2) The required information exchange between the identified user-groups
3) Collaboration between user-groups (aligning priorities, sharing resources, synchronisation of activities, supporting each other)
4) Matching of needed and available capacities

Usefulness and usability of functions and features

- Q2: Is the functionality of the COBACORE platform and the information it provides useful and usable for creating 1) a shared situation understanding, 2) information sharing and collaboration, 3) re-directing and empowerment and 4) needs-capacity matching?

Each user-group indicates whether functions and features of the COBACORE platform (i.e. graphical interface, support functionality, information modelled) is perceived to be sufficiently useful and usable.

Perceived operational value

- Q3: Do end-users perceive that the COBACORE platform has a positive effect on community-based needs assessment and recovery planning?

In workshop sessions with end-users, experts and stakeholders we test these assumptions. Each user-group is asked to indicate what is required to meet these expectations.

Fit with current needs assessment and recovery practices

- Q4: Does the COBACORE platform fit with processes, procedures and practices of all user groups?

We test whether the integrated parts of the COBACORE platform sufficiently fit with current processes of the user-groups participating in the intermediate evaluation:

1) Coordinating professionals
2) Responding professionals
3) Affected community
4) Responding community

1.3 Hypotheses

This section describes our expectations about the COBACORE platform. We test these whether these expectations were met during the intermediate evaluation. The objective of COBACORE is to improve recovery planning by supporting continuous needs assessment and capacities matching. A community-based approach is followed: the affected community, the responding community and professional responders share information about needs, capacities, recovery activities and the actors involved. The COBACORE platform intends to support information sharing and collaboration between these communities. The platform also intends to support comprehensive recovery in that all types of needs are assessed and all recovery activities are undertaken to meet those needs. A number of hypotheses are formulated to test whether the COBACORE platform in its current state meets these objectives:

- Users in all user-groups perceive the added operational value of the COBACORE platform
- All users are aware of information relevant for their tasks as a result of COBACORE
- Awareness about needs, capacities, activities and actors is in agreement between users within and between user-groups as a result of COBACORE
- Users experience improved information exchange and collaboration by COBACORE as a result of COBACORE
- Users in one user-group are able to re-direct and empower users in other user-groups as a result of COBACORE
- Users are able to match needs with capacities and activities as a result of COBACORE
- All users perceive the developed functions and features to be useful and usable for the above

- All users perceive COBACORE functions and features to match with their working strategies and procedures

These hypotheses formulated based on results of analyses in the various work packages:

- the identified issues, required functions and user-requirements (WP1)
- the information models and data models (WP2)
- graphical interfaces and support functionality (WP3, WP4)
- feedback from user-groups in partial evaluations (WP5)

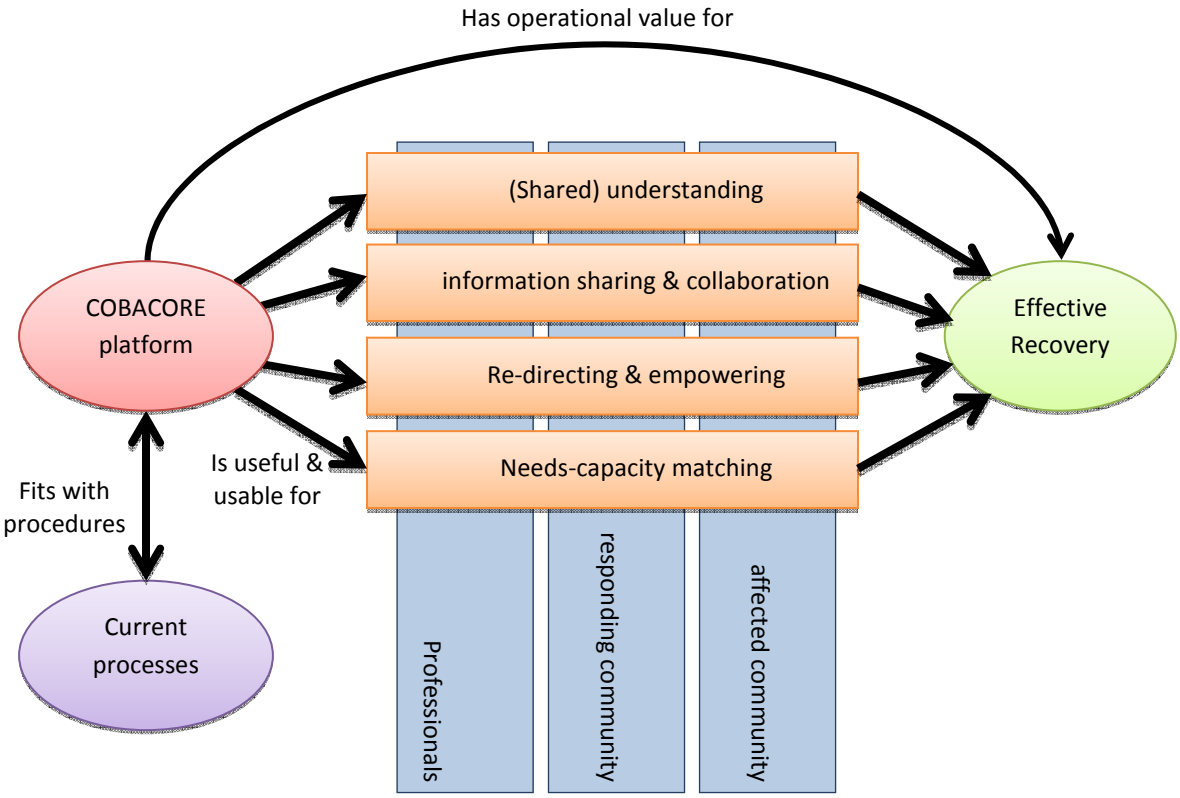


Figure 1: Relations between hypotheses

For each user group we expect the following:

Hypothesis recovery effectiveness: We expect that high priority unmet needs of the affected community are met faster and by more appropriate capacities and recovery activities of both responding community and professionals as a result of using the COBACORE platform.

We expect hypothesis 1 to be true because the COBACORE **platform supports the affected community**:

1) It sufficiently supports information sharing by the affected community with both professionals and responding community about needs, capacities and recovery activities.
2) It supports needs communication by the affected community with responding community and professionals.

3) It supports awareness of affected community about the capacities and recovery activities of both responding community and professionals.
4) It supports matching of needs with capacities and activities of the responding community and professionals.

We expect hypothesis 1 to be true because the COBACORE **platform supports the responding community**

1) It sufficiently supports information sharing by the responding community with both professionals and affected community about capacities and recovery activities.
2) It sufficiently supports awareness of responding community about the unmet needs of the affected community.
3) It sufficiently supports matching of capacities and activities of the responding community to the unmet needs of the affected community
4) It sufficiently supports awareness of responding community about the recovery activities of professionals they can participate in.
5) It sufficiently supports access to and use of instruction and training by professionals for effective execution of and participation in recovery activities.

We expect hypothesis 1 to be true because the COBACORE **platform supports the professional community**

1) It sufficiently supports information sharing by professionals with both affected and responding community about capacities and recovery activities.
2) It sufficiently supports awareness of professionals about the unmet needs of the affected community.
3) It sufficiently supports awareness of professionals about the available capacities and planned, running and finished recovery activities of the responding community.
4) It sufficiently supports matching capacities and activities of professionals with unmet needs of the affected community
5) It sufficiently supports re-direction and empowerment of responding community by knowledge sharing by the professionals

2 Method

2.1 Evaluation Approach

This section describes the evaluation approach we have followed in assessing the performance of the COBACORE tool/platform . Below we provide a summary.

Agenda: In order to test the operational value of the COBACORE platform and to determine how it can be further improved, a two day evaluation was organised to test the questions and hypotheses mentioned in Chapter 1. On the first day background information about the COBACORE project and concept was provided to end-users, experts and stakeholders. Participants received a demonstration of the COBACORE platform and instructions to use its functionality. They performed a training session to familiarise themselves with the scenario and their roles. On the second day participants used the COBACORE platform to perform the tasks associated with their roles. In the afternoon participants used a mix of social media (e.g. Twitter, Facebook) for the tasks. This enabled participants to compare the use of the COBACORE platform both with their own experience and with a situation in which *social media* is used.

COBAgame: To provide end-users, experts and stakeholders with the experiences of working with the COBACORE platform a simulated environment was developed: COBAgame. The COBAgame is described in detail in Section 2.2 as it is important to understand the evaluation environment used to test the COBACORE platform. It is also described in detail for the purpose of replication and adjustment for the final evaluation. The COBAgame consisted of objectives for user groups; workflows and constraints; roles and profiles of needs and capacities and game management and is described in further detail in section 2.2.

Setting and participants: The location of the intermediate evaluation in Rotterdam provided room for 5 affected communities consisting of 20 persons; 3 responding communities consisting of 7 persons; 3 Responding professionals consisting of 7 persons and group of coordinating professionals of 3 persons. A mix of professionals from municipality and safety regions, trained volunteers and students participated in the COBAgame. Setting and participants are further described in section 2.3.

Tasks: Goals and activities of affected and responding communities and responding and coordinating professionals were provided to participants. Tasks and instructions are further described in section 2.4.

Tested platform: The functionality and interfaces of the intermediate COBACORE platform are described in section 2.5.

Performance criteria: to measure the operational value of the platforms and the usefulness and usability of features of the COBACORE platform and social media mix, performance criteria and measurement techniques were defined (section 2.6). The behaviour of participants was observed and logged within the COBACORE platform and their opinions concerning collaboration, operational value, fit with procedures and usefulness and usability were gathered using questionnaires and focus group sessions.

Method of analysis: The results of questionnaires, logs, observations and focus group sessions were used to answer research questions and hypotheses (section 2.7).

2.2 COBAgame

This section describes the COBAgame that was developed for and used in the evaluation of the COBACORE platform.

Evaluation sessions help to assess the operational value of novel products, the fit with users' requirements and the identification of improvements. However the options for conducting realistic evaluations of tools tailored for use in disaster contexts are limited. Real-life evaluations are unfeasible because of the disaster context, while full dedicated simulations are costly. Table-top exercises belong to the simulation spectrum, and combine the engagement and realism of a simulation with being cost effective. Because of this balance between resource efficiency and realism, the intermediate evaluation of the COBACORE was developed as a serious game, presented in a table-top exercise format.

The goal of the COBAgame from the evaluation perspective is to evaluate whether or not the COBACORE platform contributes to the mentioned objectives and to what extent. The results are used to further enhance the platform to facilitate these objectives. In order to facilitate this evaluation objective, the COBAgame is designed to emulate the post-crisis environment for which the COBACORE platform was designed, and to stimulate participants to use the COBACORE platform to achieve their goals in a realistic context. These goals are related to the main functions of the COBACORE Concepts and involve all three stakeholders groups identified in deliverable 1.1. The main objectives of the COBACORE platform and thus of the COBAgame are:

- Mapping needs of the affected community, capacities of the responding communities and organisations and responses undertaken by these groups.
- The alignment of these identified needs with the various capacities provided by responding organisations
- Finally, fostering collaboration by not only responding to needs using their own capacities, but also by facilitating the achievement of the highest possible result through efficient sharing of capacities and resources.

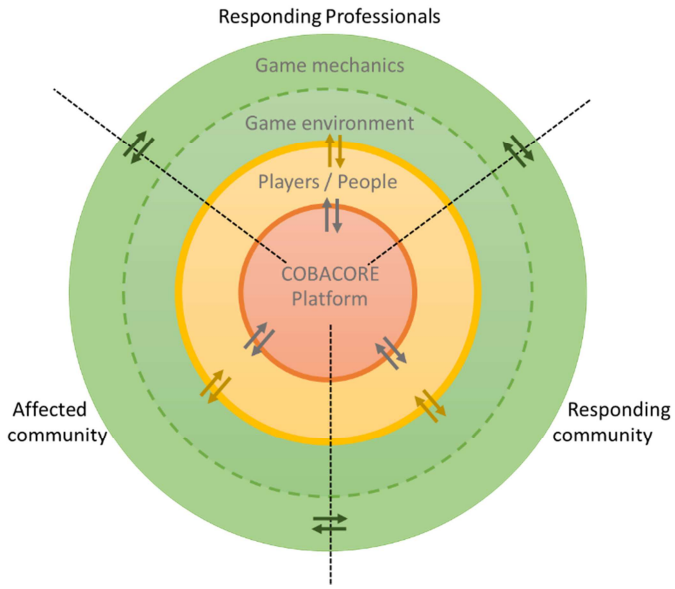


Figure 2: Interaction COBAgame, players and COBACORE platform

In practice, each participant is a member of one of the 'key-groups' of the COBACORE concept: a disaster affected community, a spontaneous responding community, or a professional organisation. Thus, the table top exercise is a comprehensive environment that provides the consortium with immediate feedback, and helps them determine how the platform aligns with the behaviour of users in a certain role. This table-top game is specifically comprised of the following elements:

1) **Game objectives, and of each group of users.**
   The goal of the game is such that participants will act out the role of certain user group according to their given, unique profile. For example the affected community will express needs, and the responding organisations will address those needs on individual and community level.
2) **Workflows and actions for each of the user groups.**
   The workflows and actions are such that members of participating groups are required to share information and collaborate within their group and with other groups so as to achieve their personal, and team goals.
3) **Game elements.**
   The game elements are such that they constrain workflows and actions, and also allow freedom of choice and room for creativity, improvisation, and prioritization.
4) **Profiles**
   The profiles are used to immerse participants in a certain role and provide them with the needed input for the game and background information. The profiles of user groups and group members are defined in such a way that groups and members have different types and amounts of needs, capacities and activities during the game stages.
5) **Scenario & Evolution of the scenario.**
   The description of the scenario includes for example the affected area. A scenario based on a real city, and on realistic events enables us to assess the completeness, and accuracy of the data model developed to support needs assessment. The evolution of the scenario enables participants to experience both the early and late recovery process, simulating the evaluation of the disaster environment over time as close as possible. This enables the testing of the COBACORE tool across different recovery phases in which the players are faced with a plethora of to-be-addressed needs.

6) **Game management.**
Finally the game management is designed and described, including the various tasks for the game managers. The main task of the game managers is to provide input to the players, such as their needs or inform them about actions undertaken. Furthermore the game managers keep track of the progress (time) of the game, provide guidance and log data where needed. Game managers also enforce the rules and ensure a proper experience for the participants.

2.2.1 Game objectives

The COBAgame is set up as a table top, turn-based simulation implementing a cooperative development game. The overall goal of every group and group member is to contribute towards an effective recovery and development process of a disaster affected area. This incentive is instilled in the players through the achieving their objectives which in turn are derived from their role and profile.

- **Affected communities:**
  The objective for members of the affected community is improve and speed-up the recovery and development process in for their personal situation and in their community. In other words, the objective is to have as much community, and individual needs matched as possible, through cooperation with the responding communities and the professional organisations. The performance can be measured by the number of individual and group needs that are matched by capacities. This requires for example the affected communities to jointly formulate and prioritize recovery goals and engage responders to get those goals addressed by recovery activities.

- **Responding communities**:
  The objective of a responding community is to ensure that their capacities and resources are utilised to the fullest and in such a way make a valuable contribution to the recovery and development process in the affected communities. The performance is measured by the deployed capacities are matched with needs of an affected community and its members. Specifically the number and contributions of the responding community to the activities deployed to address the needs of the affected community. This requires the responding communities to initiate, collaborate and participate in recovery activities.

- **Professional organisations:**
  The objective of the professional organisation is similar to the objectives of the responding community. To use their resources to most completely and effectively address the needs of the affected community. The specific measurements for the performance of the professional organisations are the level of capacities matched with the needs of an affected community member. Specifically the initiation and participation in recovery activities that are directed at recovery goals of the community will improve the game performance. This enables re-directing, empowering and coordinating with responding communities. Development is maximized when more capacities and activities are matched with the identified needs.

These goals are designed to create specific and individual incentives (motivations) for each group, related to their role in the COBACORE concept and COBAgame. However in order to reach their objectives, i.e. enact an effective recovery response, the various responding groups need to rely on each other's capacities and resources while determine in which area certain resources will be deployed. Practically, the majority of the needs that are included in the

profiles of the affected community members, and especially the most complex of them, cannot be addressed by any individual responding community and professional organisation. In addition the scarcity of resources and the simultaneous demand of the affected areas requires a joint decision. Thus, without exchanging information (using the COBACORE platform) the various group will most likely inhibit others of reaching their objectives as well as obstructing themselves. While it's not explicitly stated cooperation, facilitated by COBACORE, is the key to achieve the objectives at a personal, community, and overall level.

2.2.2 Workflows & Actions

The different groups playing the game (affected communities, responding communities and the professional organisations) have different actions they can undertake as depicted in the diagram below. The different groups have several actions available to them depending on their specific profile. These workflows, the various possible actions are described in more detail below.

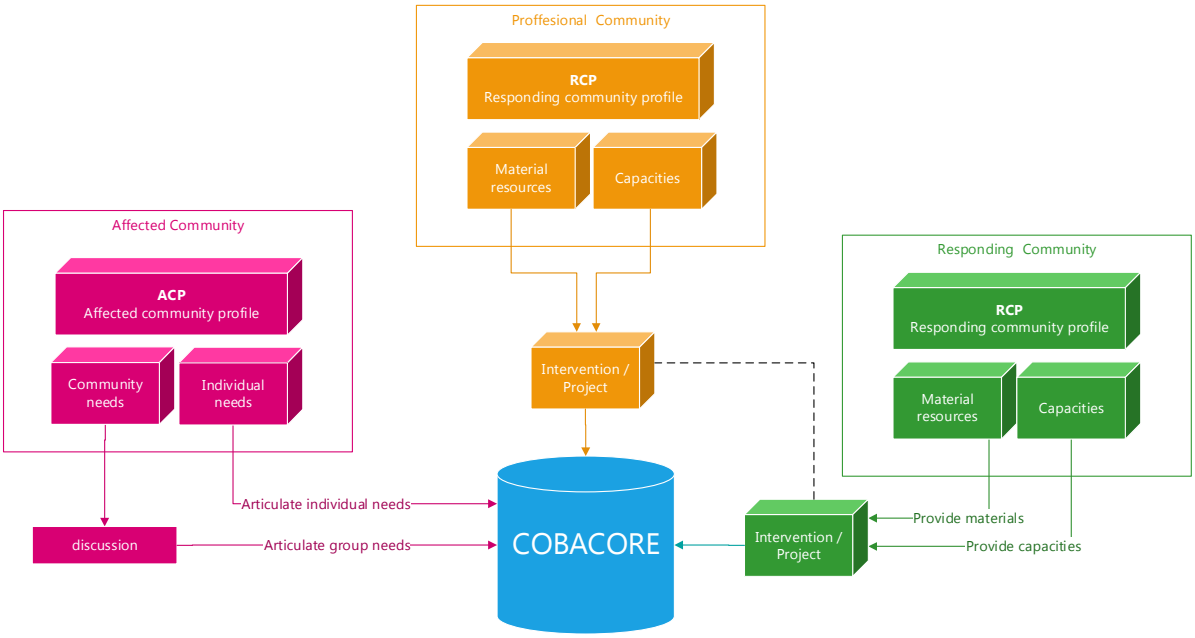


Figure 3: Game inserts that drive interaction of user groups with COBACORE platform

Affected community

Each affected community can enter different needs into the system. These needs can be broadly defined into two categories: the individual needs, which regard and affect only one person/profile of the game; and the community needs, that are expressed by each individual but their implementation affects more than one person. In the initial stages of the game these needs are related directly to basic supply and relief efforts such as rescue operations and supply of food. Over the course of the game these needs change towards more community rebuilding needs.

Game insert: The players in these groups receive a unique profile describing their personal situation, and the situation of their community per stage. Also, a list of needs that should be expressed via the COBACORE platform in a way deemed more effective is included.

COBACORE interaction: The players enter their needs directly into the COBACORE platform. Depending on the prioritization, efficiency of each player, and their synchronization, similar or identical needs can appear simultaneously in the system. This puts extra pressure on the responding communities and on the professional organisations, because they have to meet more needs than they can afford with their limited resources and skills capacity. Users are able to tracks their needs.

Game feedback: The players will be notified once their need has been successfully addressed by activities undertaken by either the professional responders, or the responding community. The player is responsible to mark the need as successfully resolved.

Responding community

Each responding community brings specific resources to the table. Depending on the stage and therefore the expressed needs of the affected communities, several actions can be undertaken. Each of these actions requires a certain number of resources and skills. The responding community therefore has to decide per round which actions they will undertake and how many resources they will commit to this action. In addition certain actions require a skillset, which a responding community probably will not have entirely in its possession. This fact inevitably leads the responding communities towards cooperation among them and with the professional organisations.

Game insert: The players in this group receive a unique, team profile and a certain set of resource and skill cards required to undertake specific actions.

COBACORE interaction: The players can choose to undertake certain projects by offering them in the COBACORE platform. These can be either projects addressing a specific need or offering support without a specific need present. Furthermore the teams can use all other facilities available in the COBACORE platform, for example collaboration.

Game feedback: Once the players committed to a project in the COBACORE platform, the cards with the required resources (materials) will be taken away permanently and the human resource cards temporarily. The game managers also check if the all the required skills for a certain action are present. Finally the responding community will be notified if a need has been successfully addressed via the platform.

Professional organisations

The professional organisations basically have the same options as the responding communities. However during the timeline of the game the release of actions, resources and skills available will be different between the two groups, encouraging collaboration. Also the professional organisations have the exclusive right to cooperate and communicate directly among them, via a coordination cell or direct radio-communications

Game insert: The players in this group receive a unique, team profile and a certain set of skills required to undertake certain action. In addition the group will have a set of resources at their disposal. These resources are either (once usable) materials, or (re-usable) human resources. As mentioned the professionals will have different resources available, for example less human resources but more specialized capacities.

COBACORE interaction: The players can choose to undertake certain projects by entering them in the COBACORE system. These can be either projects addressing a specific need or offering support without a specific need present. Furthermore the teams can use all the facilities available in the COBACORE platform, for example collaboration with the responding community and combine resources.

Game feedback: Once the players committed to a project in the COBACORE platform, the cards with the required resources (materials) will be taken away permanently and the human resource cards temporarily. The game managers will also check if the all the required skills for a certain action are present. Finally the responding community will be notified if a need has been successfully addressed via the platform.

2.2.3 Game elements

Various elements are included in the COBAgame. These elements either facilitate workflows within the game (game mechanics) or simulate certain aspect of the recovery process to replace certain aspects of a disaster recovery and development operation.

- **Profiles:** Each player participating in the game is given a profile that is created to outline their background, their incentive and motivation. More details on the profiles are provided below.
- **Resource cards:** Resource cards simulate resources available to responders (community and professionals). These cards can be materials, supplies and staff. Each card represents a bulk of resources. Cards are taken away by the game managers when used to execute a certain project.
- **Capabilities/skills cards:** These cards represent certain skills or capabilities available within the responding community or the professional organisation. These cards are taken away by the game controllers, but new cards can be added depending on the progress within the game and the desired level of difficulty that the game managers want to apply.
- **Action forms:** The cards represent the various actions that are undertaken by the responding community and the professional organisations. Each action form has to be delivered with the necessary materials, and skills. These actions forms are used to address the needs of the affected population.
- **Catalogue:** The 'Catalogue' is the roadmap of the COBAGame and is delivered to all the groups of players. According to the Catalogue, the responding communities and the professional organisations realize which specific resource and skill cards have to be delivered in order to meet a certain need. In addition, by consulting the Catalogue, the affected community members can understand the complexity level of the need that they will express.

2.2.4 Profiles

The setting of the COBAGame during the intermediate evaluation was a flooding disaster affected the city of the Belfast (see examples in appendices). As mentioned three types of groups were participated: the affected community, the responding communities and the professional responding organisations. Each of these groups was provided with an own profile, providing background information about their group, role and situation. All these profiles were derived and related to the flooding disaster in Belfast.

Affected communities

During the intermediate evaluation 5 affected communities were identified, each with 4 community members. The 5 communities were chosen in to provide a wide range of community profiles, with differences in for example social, economic and/or demographic status. These differences were also reflected in the needs listed in the profile that each member in a community would receive. The eventual profiles provided to players contained (1) a background of the neighbourhood (2) their personal situation, such as their family circumstances and (3) a list of their needs per stage. Players were also encouraged to –based

on this complete profile- to prioritize their needs and optional add own additional needs. In total 20 profiles were created, for 4 players per affected neighbourhood.

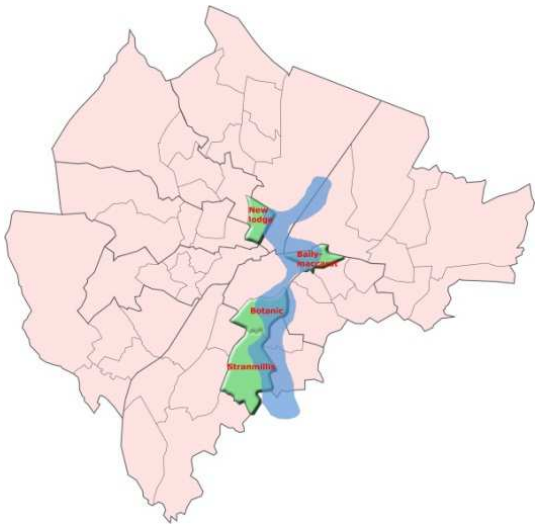


Figure 4: Flooded are in Belfast (Appendix B detail)

Responding and professional community

The profile for the responding community and the professional community describes the background, specialty (where applicable) and the mandate or motivation to respond to the disaster. Three responding communities (a local church, a Facebook group and a local scouts-troop) were created for the game, each consisting of two or three members who would be the representatives of these groups, deciding on the actions undertaken and the allocation of the resources.

In addition three professional organisations were added (the local municipality, the Red Cross and a NGO specialized in (shelter) construction). These groups were also provided with a profile describing their mandate. The profiles of the professionals specifically contain information about their specialties, and the resources they would have access over the course of the game. Finally the profiles provided information about the specific area (cluster) that the NGO focusses on based on their overall organisational strategy.

Both the profiles of the responding community groups and the professional organisations were used to determine and design what kind of actions and subsequent resources were available in the game, and which they would receive at what stage of the game timeline (see below). The profiles provided a guideline for the specific inserts during the game and ensured consistence with the overall setting of the game.

2.2.5 Evolution of scenario

The scenario is constructed to simulate the general disaster context and consist of the rescue & relief stage, to early recovery and eventual reconstruction and development of the community. In each stage the participants, depending on their group will receive different inserts as illustrated earlier. The advancement of the stages as well as the release of the inserts will be as close to reality as possible. This also implies that there will be discrepancy (out-of-sync) between the groups encouraging the responding organisations to be more pro-active.

Furthermore, since a turn-based system is used the game managers have more control over the pressure and speed of the game.

lvl	*Time*	*Stage*	*Affected community*	*Responding community*	*Professional organisations*
1	00:15	**Relief**	Direct individual needs	Not active - Monitoring	Not active - Monitoring
2	00:30		Direct individual needs requiring multiple resources	Initial resources and capacity	Initial resources and capacity
3	00:45				
4	01:00	**Recovery**	Simple group needs & individual needs	Additional resources and capacities released	Additional resources and capacities released
5	01:15				
6	01:30		Complicated group needs & individual needs	coordination required with other resp. communities	Coordination required with others professional organisations
7	01:45				
8	02:00	**Development**	Development needs requiring resources from both resp. community and professionals	Additional resources and capacities released coordination required with professional	Additional resources and capacities released coordination required with resp. community
9	02:15				
10	02:30				

Table 1: Evolution of scenario and activities of user groups

2.2.6 Game management

In the setup of the game, the game managers have several tasks/workflows to manage. All these tasks concern the management of the game environment either based on the development of the scenario or on the actions of the participants. These various tasks and game mechanics are described in more detail below and relate to the different actions the players can undertake. The key is to rely as much as possible on the COBACORE platform for workflows and information exchange as it would in a real deployment.

Game management for needs

Every affected community member receives a profile which contains a short bio, a situation update, and a list of needs per stage. The nature and the complexity of the needs change throughout the scenario as depicted above. The affected members prioritize and decide which needs to enter into the system. After the delivery of the action form accompanied with the required set of cards from the responding communities and/or the professional organisations, the game managers inform the affected community member of the actions that is undertaken. Afterwards, the player has the responsibility to mark the need as completed on the COBACORE platform.

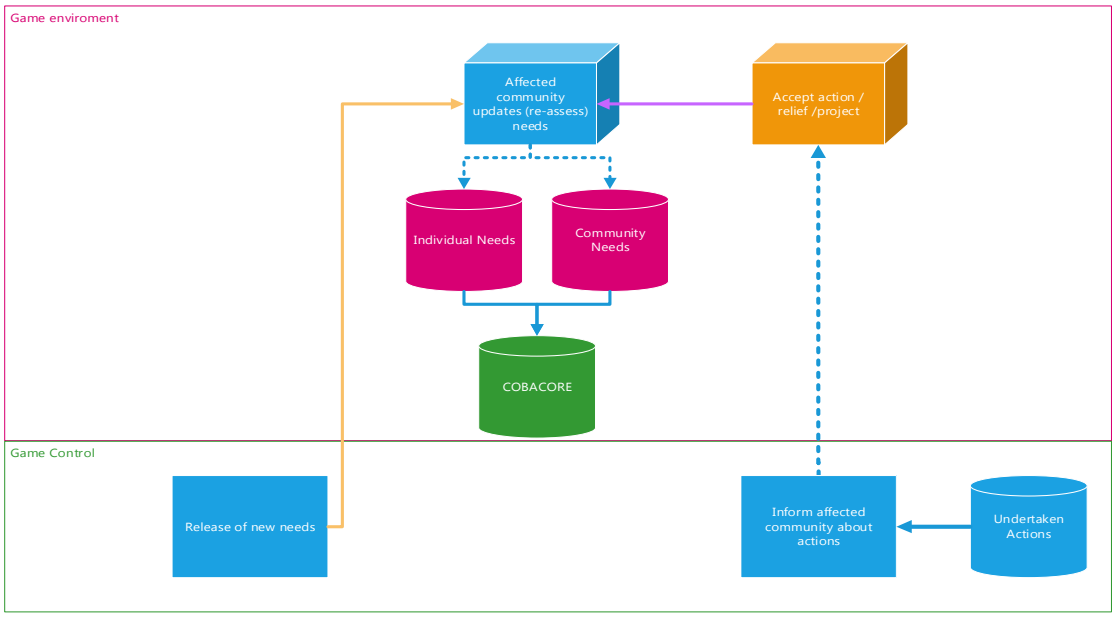


Figure 5: Actions by game management and actions affected community members

Game management for actions

When the various groups undertake certain actions, they will indicate to the game managers what action exactly they will undertake by delivering the action form and the set of cards which are needed. The game mangers check if the conditions are met, and will take away the resources. Next, the game managers inform the affected community about the actions undertaken and how that has affected their needs. This flow is depicted below.

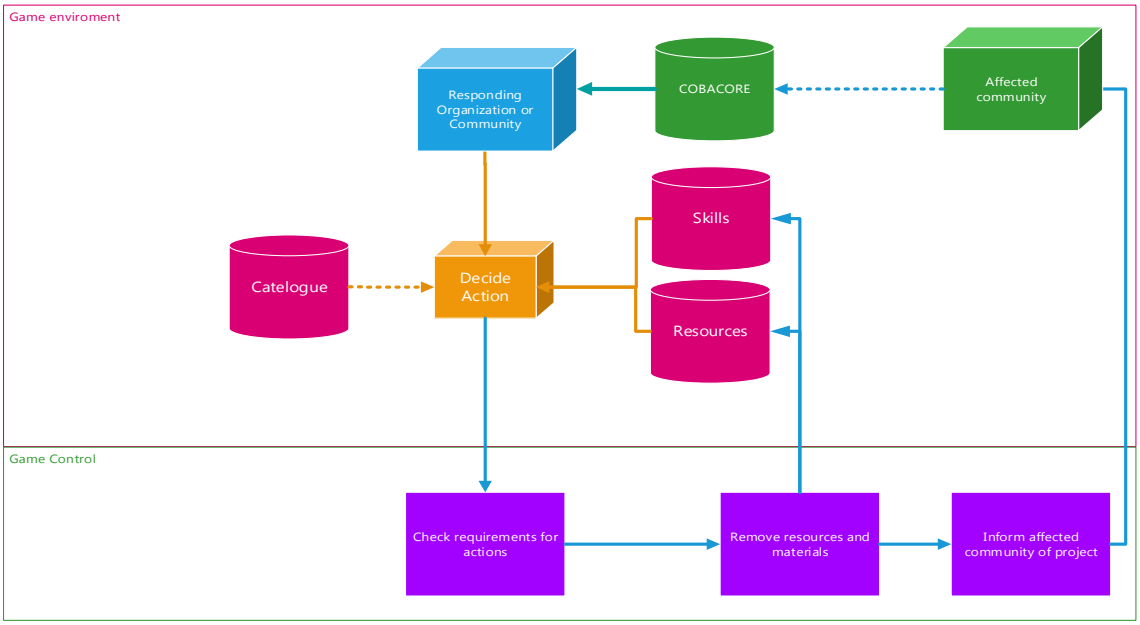


Figure 6: Actions by game management and actions responding communities and professionals

2.3 Setting and participants

This section describes the setting and the participants involved in evaluating the COBACORE platform.

2.3.1 Setting

In order to evaluate the capacity of the COBACORE platform to bridge collaboration and communication gaps, the setting and design of the intermediate experiment incorporated several separate communities or groups that do not interact directly with each other, except through the COBACORE platform.

Following the different roles that were defined, the setting of the intermediate evaluation encompassed a number of Affected Communities, a number of Responding Communities and a composite group of professional responders, the municipality, the safety region and a NGO such as the Red Cross, each with their own crew of field workers at their disposal.

Since all these groups were not able to communicate with each other than through the COBACORE platform, they were located in 11 separate rooms. This is not including the separate rooms needed for game management and observers of the experiment, as illustrated below in figure 7.

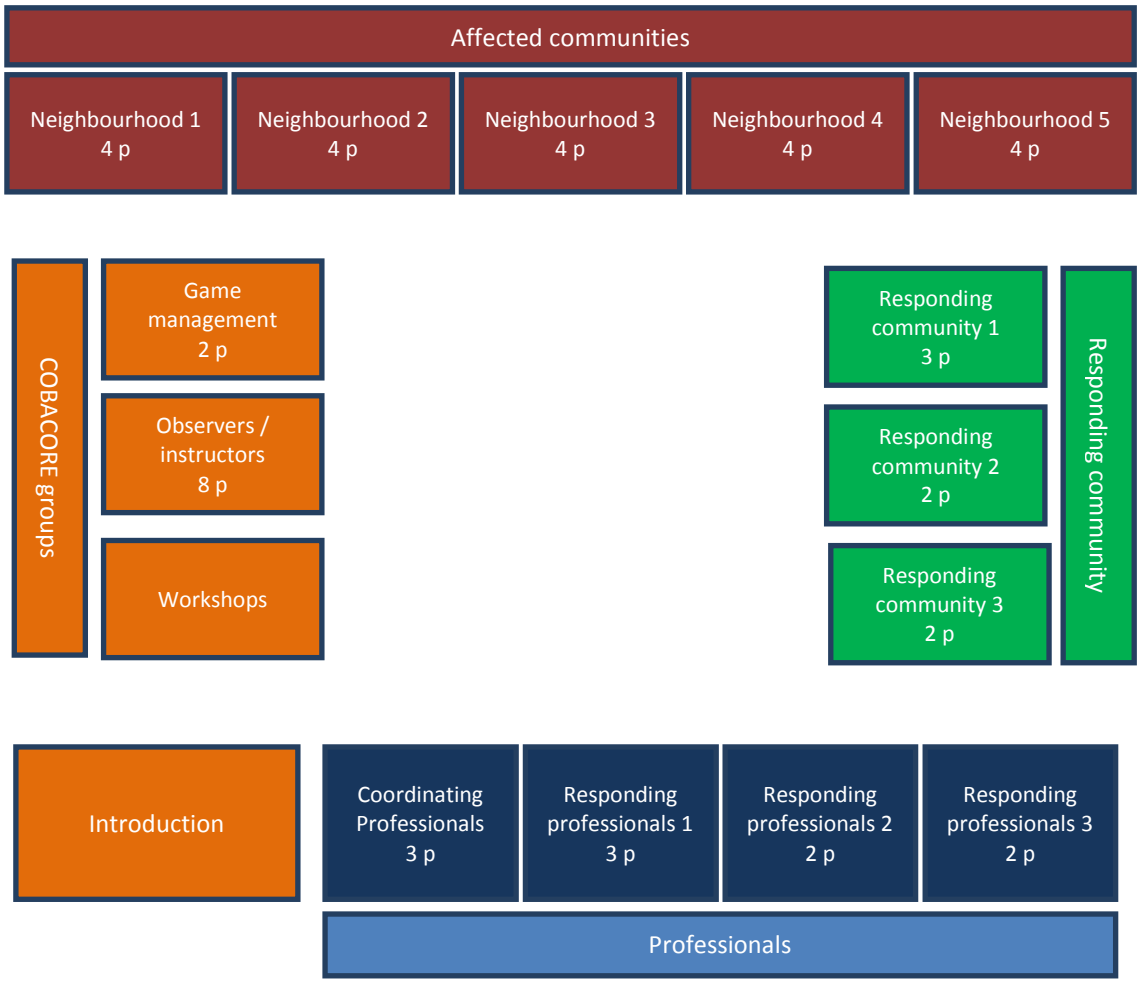


Figure 7: Rooms for communities, game management and evaluation

The choice to implement the intermediate evaluation as a table top experiment, with participants residing in office rooms instead of field locations, was made because of time constraints and the stage of development of the platform. In a table top-type setting it is easier to compress a timeline that in real life would entail multiple days. Additionally, in a table top experiment it is easier to control or monitor the actions taken and align them with the functionalities available on the COBACORE platform.

2.3.2 Location

The Intermediate experiment was held at the second floor of an office building at the Zuiderparkweg in Rotterdam (figure 8; floor plan in figure 9). This is a former office location of the municipality of Rotterdam made available to the COBACORE consortium for this evaluation. The floor plan shows enough small rooms and one connecting hallway to suit the requirements for the evaluation. All rooms were equipped with whiteboards and/or flipcharts with markers, notebooks, pens and post-it's to facilitate the dialogue within the room, both on the content of the scenario as on the findings for the evaluations.

Figure 8: location of intermediate evaluation in office building in Rotterdam

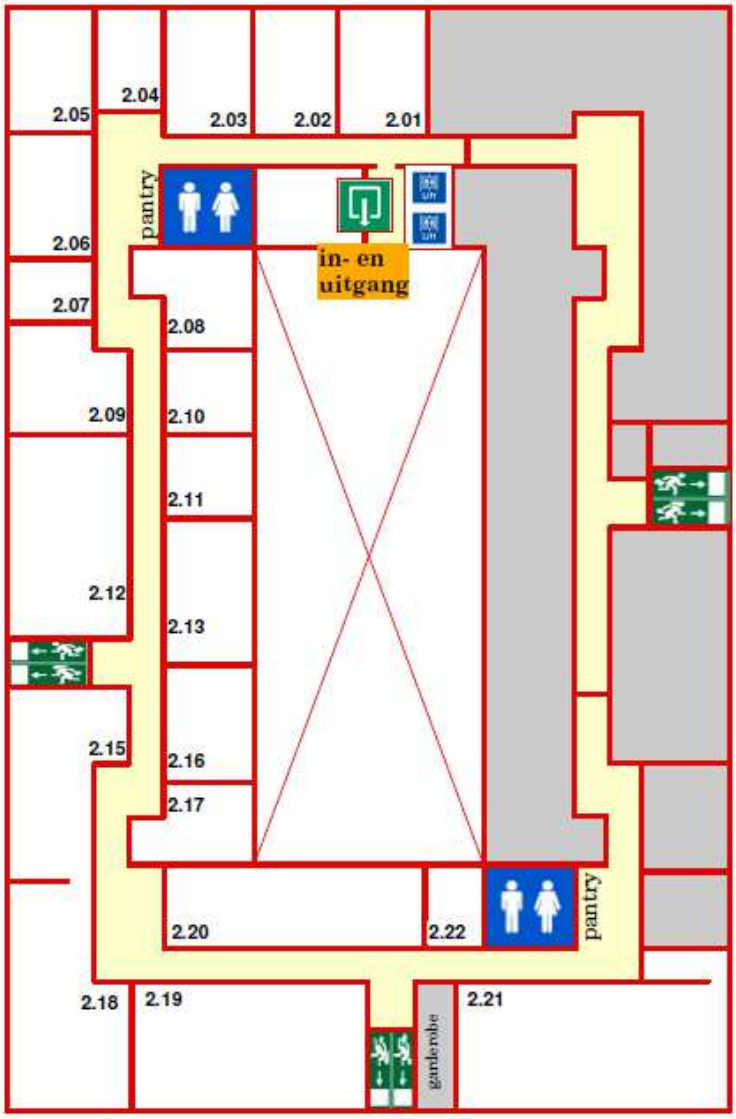


Figure 9: Room lay-out on second floor of office building in Rotterdam

2.3.3 Room lay-out

Game management

The COBAgame was led by two members of the COBACORE consortium from room 2.06 (figure 9). To avoid face-to-face contact and allow the assessment of the ability of the COBACORE platform to bridge communication gaps the room for game management was appointed between the affected neighbourhoods and the rest.

Observer and instruction

Eight members of the COBACORE consortium acted as observers and instructors. They were positioned at the rooms with participants as to observe the interactions between groups trough the COBACORE platform. Technical assistance was provided by consortium members from University of Ulster, Integrasys and Geopii.

Affected communities

The five rooms adjacent to each other and the first part of the hallway (rooms 2.01 till 2.05, figure 9) served as affected neighbourhoods; home ground for the five affected communities described in the scenario. Each community consisted of four participants.

Coordinating professionals

The large room on the corner (room 2.08, figure 9) was equipped as a 'coordination center', with three separate seatings (chairs and a table) all with a radio and one conference table, to host three professional coordinators and facilitate discussions between them. Three radios connected coordinating professionals to the three respective 'field teams' or 'responding professionals' in rooms. The radio allowed coordinators to communicate with their team in the field outside the COBACORE platform.

Responding communities

Three responding communities (local church, Facebook group, local scouts-troop) were in rooms 2.10, 2.11, 2.12 (figure 9) along the hallway. Every community or team was allocated to one room they could use as 'home ground' for the duration of the scenario.

Responding professionals

The three 'field teams' or 'responding professionals' were located in rooms 2.13 (Red Cross), 2.16 (local municipality) and 2.17 (NGO specialized in (shelter) construction).

Plenary room

Finally, the large room at the end (room 2.19) was used for the plenary sessions at the start and end of each day.

2.3.4 Participants

In total, 37 individuals participated in this intermediate evaluation. All participants filled out an informed consent form as is customary during scientific research. All participants were being compensated for their time and commitment with gift vouchers The participants were recruited along three different routes; through online social media channels such as Twitter and Facebook, through the existing network of volunteers of the Netherlands Red Cross and through three universities with topic-related courses. All participants were asked to join the evaluation for the full two days (on weekdays).

Affected community

In total 20 people (10 male, 10 female) participated as members of the affected communities. Participants consisted of self-selected students of the The Hague University of Applied Sciences, Unesco-IHE in Delft and Tilburg University, representing courses in Flood Risk Management, Safety Studies or other related topics, and of individuals that were triggered by the invitational posts on social media advertising for 'early adopters with affinity to disaster management' .

Coordinating professionals

For the three professionals (two males, one female) in the coordination centre, knowledge of current practice and some disaster related coordination skills were needed. For these roles in the scenario, real 'disaster professionals' from the municipality of Rotterdam and the Safety Region Rijnmond joined the evaluation. These people were not officially representing their

respective organisations but did however bring their knowledge and experience to the experiment for the COBACORE project to learn from.

Responding community

Seven people participated in the role of responding communities (three males, four females) consisted of self-selected students of the The Hague University of Applied Sciences, Unesco-IHE in Delft and Tilburg University, representing courses in Flood Risk Management, Safety Studies or other related topics, and of individuals that were triggered by the invitational posts on social media, advertising for 'early adopters with affinity to disaster management' .

Responding professionals

Seven people participated in the role of responding professional (six males, one female). These 'field teams' or 'professional responders, were composed of trained Red Cross volunteers of the NLRC. These people have experience with major incidents and are trained and experienced in working along the structures of the professional responders. Since COBACORE does not want to replace existing communication structures, this was an important characteristic for the people in the field teams. The participating NLRC volunteers were selected on their availability, their affinity with innovation and online social media and their experience.

2.4 Tasks

After the COBACORE demonstration, instructions and training session on day one, Participants were asked to use COBACORE platform or a mix of social media to perform the tasks associated with their role.

2.4.1 Instructions

All participants read a cover story about a disaster that had struck the city of Belfast and their neighbourhood. In their personal profile they read what had happened to them and what needs they had. All participants were asked to use the functions and features in the graphical interface and information provided by COBACORE to perform their tasks. All participants were asked to get as many needs resolved. Professional responders were asked to work via currently existing procedures.

Affected community

The goal of members of the affected communities were to have an up to date list of:

- needs at member and community level
- Status of these needs (not addressed, claimed, targeted, resolved)

Activities of members of affected communities:

- Look for general and location specific crisis information
- Assess own needs for each recovery phase
- Post needs in the COBACORE platform
- Assess status of posted needs
- Assess posted capacities
- Match posted capacities with posted needs
- React to e-mail of responders (responding community/responding professional)

Responding community and responding professional

The goal of members of the responding communities and professionals were to have an up to date list of:

- Needs that can be matched by capacities of responding community
- Status of the needs (not addressed, claimed, targeted, resolved)
- Status of the capacities used to address these needs (available, unavailable).
- Coordination of needs assessment with professionals responders

Activities of members of affected communities:

- Look for general and location specific crisis information
- Assess posted needs that can be matched with own capacities
- Match posted needs with own capacities
- Post capacities in the COBACORE platform
- Assess status of posted needs and status of used capacities
- Communicate with affected community members about addressing needs
- Communicate with responding professionals about coordination (who addressed what).
- Communicate with responding community about coordination (who addressed what).

Coordinating professionals

The goal of members of coordinating professionals was to have an up to date:

- overview of categorized needs and capacities & coverage and gaps
- overview of high priority needs and communities
- overview of high priority capacities and responders

Activities of members of coordinating professionals:

- Look for general and location specific crisis information
- Assess overview of categorized needs and capacities
- Assess coverage and gaps (missing capacities).
- Assess priority of needs and communities
- Assess priority of capacities and responders
- Search and find capacities and responders that fill gaps
- Re-direct responders and capacities to cover high priority needs
- Communicate with responding professionals about coordination (who addressed what).
- Communicate with responding community about coordination (who addressed what).

2.5 Tested platforms

The COBACORE platform was implemented for the evaluation to support the tasks mentioned in the previous section. To test the operational value of the platform and the usefulness and usability of features that are were implemented, participants carried out the scenario both with the COBACORE platform and after that with a mix of existing social media tools.

2.5.1 The COBACORE platform

For the intermediate evaluation, the COBACORE platform was implemented as a web service and is accessible through laptop or mobile device for each of the user groups. Below, a

description of primary functionalities and features is provided, combined with screenshots from the application. First, all participants logged in to the web service with the usernames and passwords provided by the test leaders (see Figure 10).

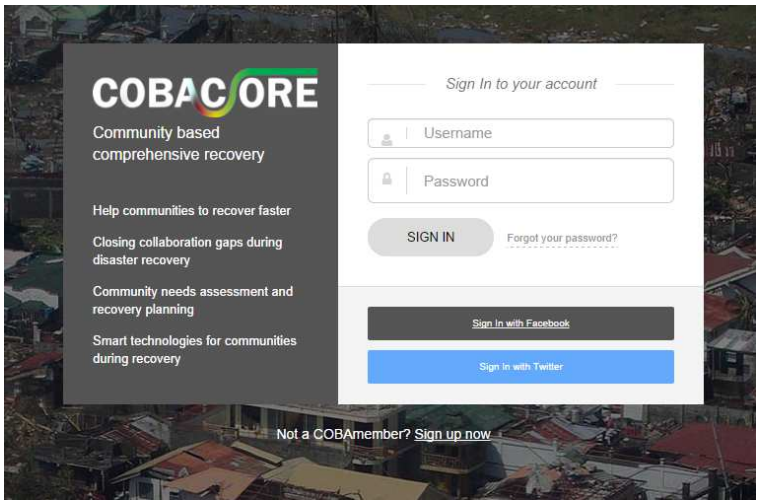


Figure 10 Screenshot of the log-in screen.

Next, participants saw the overview screen (see Figure 11) which consisted of two parts. On the left-hand side, the geographical overview was shown with icon overlays representing needs (in red) and capacities (in blue). When clicking an icon, a pop-up window over the map opened up to show details of the need or capacity as well as contact details for the person involved (see Figure 11).

At the start of the scenario, no needs and capacities were filled in yet. On the top-row above the geographical overview, filters (such as type, category, status, etc.) could be switched on and off to remove certain needs and capacities from the overview.

The right-hand side of the screen showed a row of different tab buttons, showing an overview of total needs and capacities (for professionals), personal profile information with uploaded needs and capacities and detailed lists of needs and capacities for other users.

Filling out needs or capacities was done with the two buttons on the bottom right-hand side “I need help” and “I can help”.

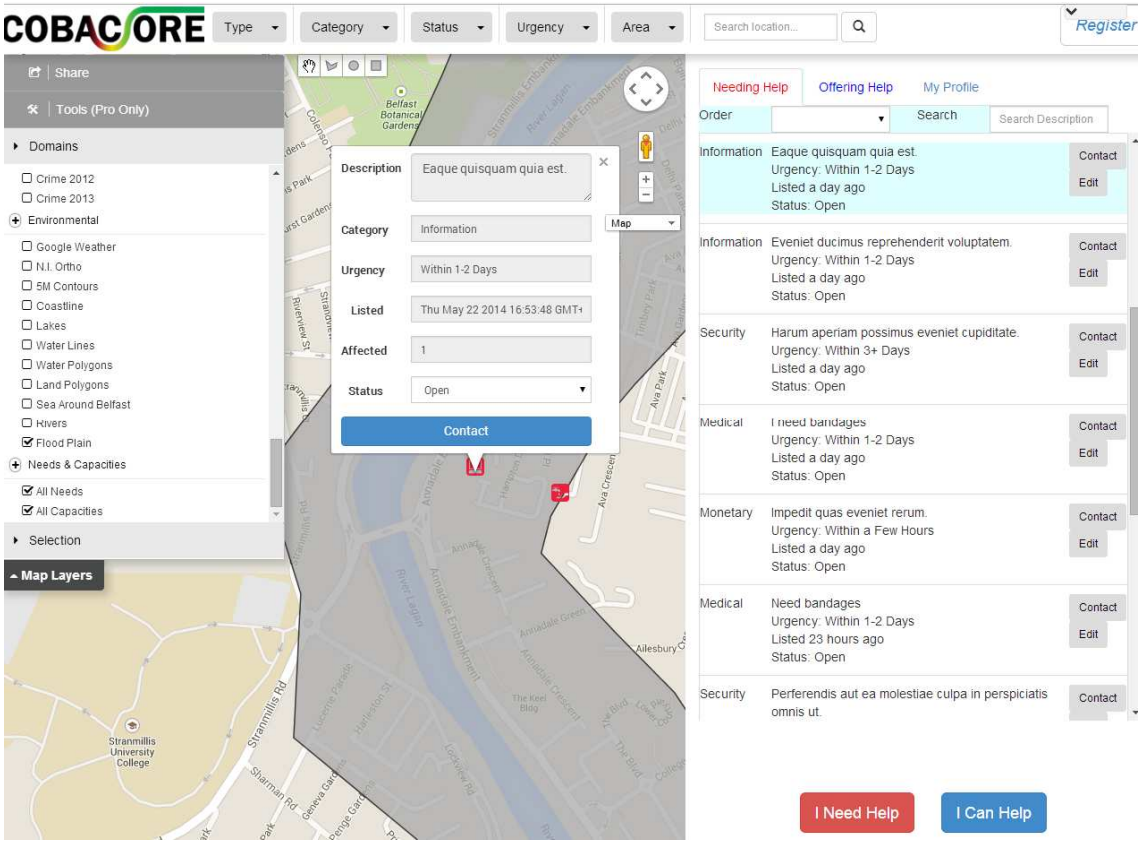


Figure 11: COBACORE platform main overview screen

The needs / capacity overviews could be shown as separate icons or as heat maps for groups of icons (see Figure 12). This was primarily used for professionals to get insight into how certain needs and capacities were geographically dispersed. Icons themselves represented the category to which the need or capacity belonged.

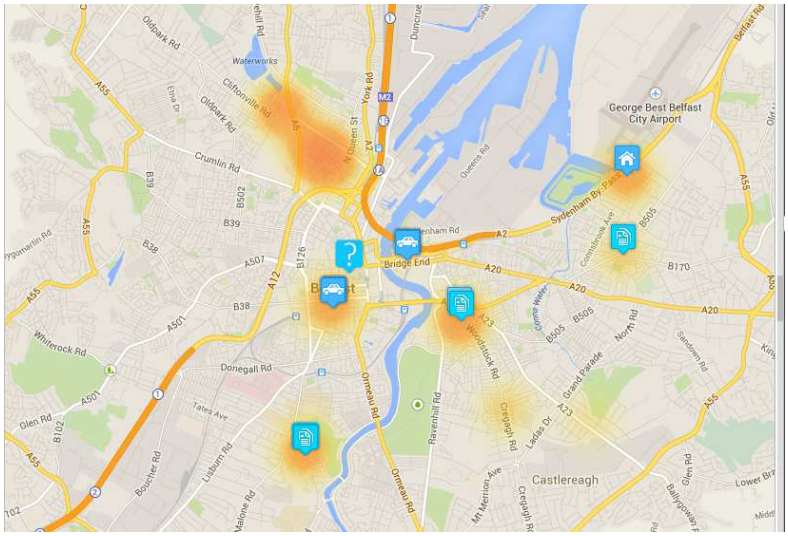


Figure 12: Icon and heat map overview over the map

In addition to filtering icons with the filters in the top-row, different map overlays could be switched on and off from the pull-down menu on the left-hand side (see Figure 13).

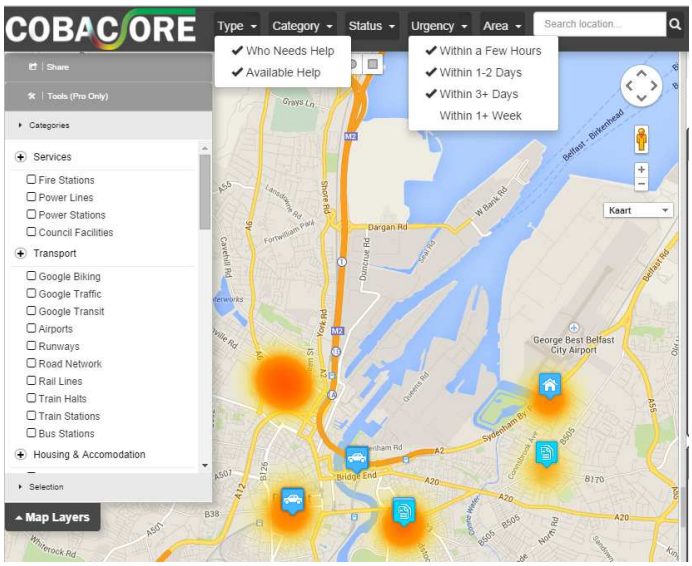


Figure 13: Screenshot of COBACORE filters and map overlays

Uploading needs or capacities to the platform was done by clicking the buttons “I need / can help”. This opened a pop-up screen over the map-overview with a number of questions (Who, what, when, where, etc.; Figure 14). Participants were encouraged to indicate the needs/capacities as elaborately as possible, while staying within their role description. Once a need/capacity was uploaded, it showed automatically as an icon on the map and it was displayed in the need/capacity list overview on the right-hand side. The status of a need could be “open”, “in progress” or “resolved”, based on whether a matching capacity was indeed found for that need. The most important feature of the platform was the Suggestions Tab (Figure 15), this tab showed a list of suggested needs or capacities based on the user’s needs/capacities and profile. This matching was done automatically based on type of need/capacity and geographical location.

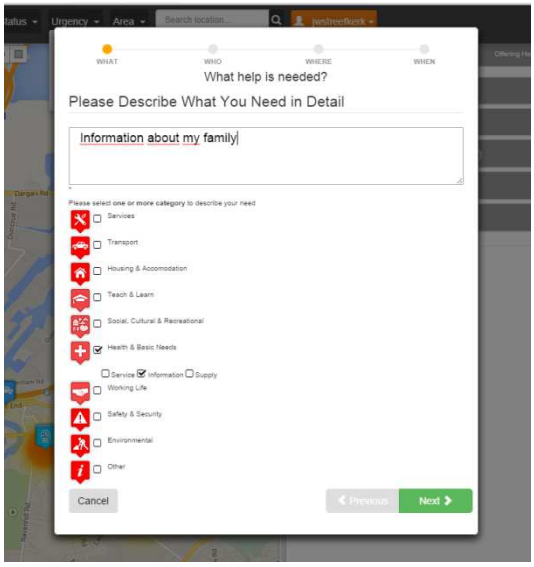


Figure 14: Screenshot of the needs / capacities upload screen

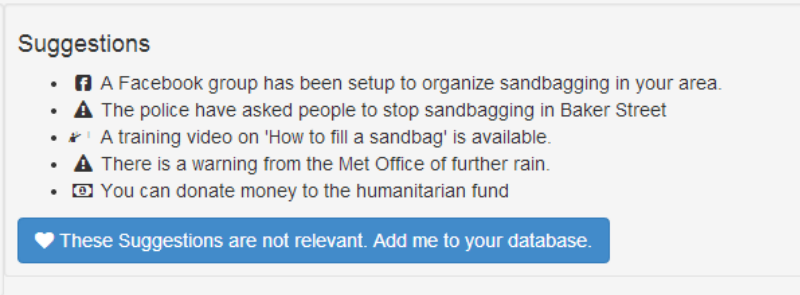


Figure 15: Screenshot of the suggestions screen

The COBACORE platform incorporated a number of tools for professionals. Professionals could upload their own map overlays (such as a floodplain overlay) using Google KML files or fusion tables. In addition, they could generate their own overview of needs and capacities based on areas indicated on the map (see the red circle in the map in Figure 16). Finally, they could aggregate needs and capacities for different categories in a variety of data representation formats (charts and graphs) in the right-hand side of the screen. These views were adapted to the current filtering of icons on the map (e.g. only icons were included that were within the selected geographical area).

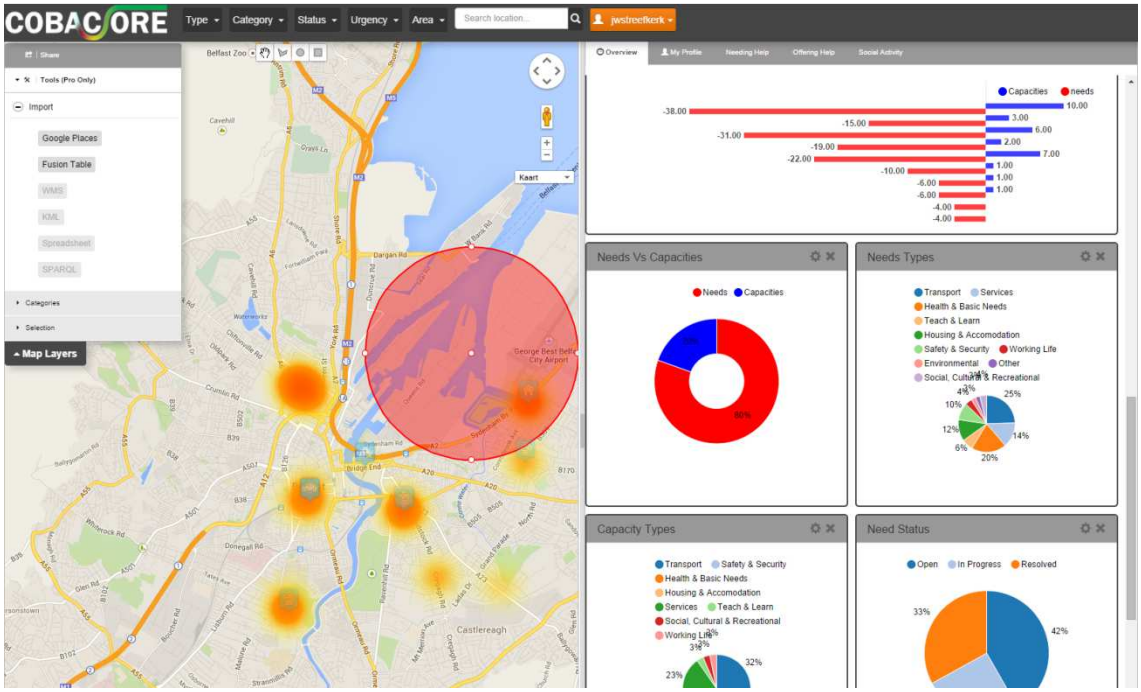


Figure 16: Screenshot showing tools for professionals

In total, the following tools are available for professionals:

- Dynamic situational metrics (e.g. number of needs and capacities)
- When the map is filtered using a map selection, the dynamic metrics change.
- Diverse map layers
- Import layers into the system using fusion tables/spreadsheets
- A quick view of the social activity explorer where a professional can get an overview of what is going on in the situation form across several different social media channels.

The features described above are intended to serve the three user groups in different ways. Below, we describe what features were available for which user group. In the intermediate experiment we test to what degree these features are useful and usable for creating situation awareness about needs and capacities for professionals and community members.

Affected community

The following features have the affected community as their prime user group:

Features	Corresponding views
1. Actor registration	Figure 10
2. Need registration	Figure 14
4. Needs and capacities overview	Figure 11
5. Needs and capacities matching	Figure 15
6. Actors and activities overview	*not implemented yet during IMEV*
9. Basic information exchange	Figure 11; Figure 13

Table 2: Functionalities for affected community members

Professional community

The COBACORE platform as a number features intended to be useful and usable for end-users. The following features have the professional community as their prime user group:

Features	Corresponding views
1. Actor registration	Figure 10
4. Needs and capacities overview	Figure 15
6. Actors and activities overview	*not implemented yet during IMEV*
7. Baseline situation overview	Figure 11; Figure 12
8. Basic recovery views	Figure 16
9. Basic information exchange	Figure 11; Figure 13
10. Activity registration	*not implemented yet during IMEV*

Table 3: Functionalities for professional community members

Responding community

The following features have the responding community as their prime user group

Features	Corresponding views
1. Actor registration	Figure 10
3. Capacity registration	Figure 14
4. Needs and capacities overview	Needs and capacities view
5. Needs and capacities matching	Figure 15
6. Actors and activities overview	*not implemented yet during IMEV*
9. Basic information exchange	Figure 11; Figure 13
10. Activity registration	*not implemented yet during IMEV*

Table 4: Functionalities for responding community members

Map Functionality

To support the activity to gather information about general and location specific crisis information the COBACORE platform provided information about the geolocation of needs and capacities and information on the map about the following categories (see also Figure 13, left-hand side):

- Preconditions (water, waste, power, telecom)
- Transportations
- Communications
- Proximity to services (health, education, food, water, sanitation)
- Vulnerable groups/objects (hospital, elderly homes, detention centers)
- Demographics (membership of civil groups)
- Livelihood (% employed)

2.5.2 Social media mix

For users to be able to compare functionality and added value of COBACORE with existing social media tools the following mix was used: Twitter, Facebook, Skype and Trello. Participants were provided with fake email addresses and IDs to create accounts on these social media tools.

2.6 Performance criteria

To measure the operational value of the platforms and the usefulness and usability of features of the COBACORE platform and social media mix, performance criteria and measurement techniques are defined.

In answering the research questions, for this evaluation a combination of objective and subjective measures has to be sought. Objective measures typically include measures of performance (how many needs and capacities were matched, how many accurate matches were made, how long did it take participants?). Subjective measures typically include opinions on perceived operational value and own experiences (what did participants think of the way the platform supported their activities, how understandable and intuitive was the interaction with the platform?).

By comparing a condition with and without the COBACORE platform, differences in performance and opinions can be identified, pointing to potential operational value in the way the COBACORE platform supports the needs assessment. There are a number of constraints to carrying out such a comparison: to avoid **order effects** in the results (i.e. doing something the second time is always easier), ideally the scenario is carried out multiple times and the order of conditions is counter-balanced across participants. However, this is not possible for the intermediate evaluation due to the amount of organisation and number of participants. The focus of this evaluation will therefore be on collecting detailed feedback to improve the current design of the platform (*formative evaluation)*, instead of conducting a rigorous empirical check of the platform (*summative evaluation; cf.* Streefkerk et al, 2009). In addition, the intermediate evaluation will first feature a scenario *with* the COBACORE platform and after that a scenario *without*. This way, participants' frame of reference can be created in the right way, to provide feedback on the functioning of the COBACORE platform. In the remainder of this chapter, the dependent variables are outlined, as well as the measures that will be

collected and their methods. These will be defined based on Deliverable 5.1 (performance criteria).

2.6.1 Performance assessment criteria

In Deliverable 5.1, we constructed a table with performance assessment criteria for COBACORE functionality. In this intermediate evaluation, we focus on the levels 3 (Functional level) and 4 (Usability level) due to the development stage of the COBACORE platform. Measures of performance at higher levels (1 – Whole of community recovery and 2 – Relief effectiveness) will be collected anecdotally, based on end-user estimations.

These performance criteria are used to answer research questions and to test hypotheses (numbers refer to Table 1 in Deliverable D5.1).

2.6.1.1 Closing Information and collaboration gaps

In Deliverable 5.1 Performance Assessment Indicators were defined. Below are the performance criteria from section 3.5: Collaboration effectiveness / sharing:

3.5. Collaboration effectiveness / sharing	• Number of actors that are jointly shaping, executing and evaluating collaborative damage, needs and capacity assessments. • Degree of awareness actors have of collaborators (the groups involved, their goals, tasks, needs and capacities) • Number of interactions between actors from different community/user-groups (e.g. citizen, NGO, government) • Degree to which the information shared between user-groups meets their information requirements. • Added value of these interactions for assessments for these user-groups

2.6.1.2 Fit with operational processes

Below indicators for organisational interoperability:

Organisational interoperability	*Capable of organisational collaboration* • Degree to which the use of COBACORE is aligned with standards, best practices and procedures of intended end-users. • Degree to which end-users and their organisations are willing and able to align their standards and procedures to effectively and efficiently use COBACORE.

2.6.1.3 Perceived operational value

In Deliverable 5.1 Performance Assessment Indicators were defined related to 3.1 Assessment indicators, 3.2. Information Gathering, 3.3. Decision making and 3.4. Action.

3.1. Assessment indicators	Evidence-based community-, situation-, needs-, capacity- and activity assessments: • Timelines of assessment • Accuracy of assessment

	• Completeness of assessment • Continuity of assessment • Prioritization of assessment • Overall quality of assessment

3.2. Information Gathering	• Speed of information gathering • Continuity of information gathering • Completeness of information gathering • Situational awareness i.e. the percentage of actual world representation by the information gathered. • Quality of information gathering • Quality of feedback of collated information from decision-makers back to local communities • Speed of feedback of collated information from decision-makers back to local communities
3.3. Decision making	• Number of community groups and actors involved in recovery goal setting • Degree of support for decisions • Fairness of decisions • Timelines of decisions • Number and types of errors in decision making
3.4. Action	• Number and diversity of (prioritized) needs that can be matched by capacities and funding • Number and diversity of (prioritized) damage that can be matched by capacities and funding • Number of projects (that can be monitored) directed at clearly articulated and prioritized community needs. • Percentage of needs met • Percentage of affected community reached • Timing match: speed/timing of resources arriving at desired endpoint • Quantity match: quantity of resources arriving at desired endpoint (% of total resources sent out for the target destination) • Quality match: do the resources delivered match the previously identified needs?

2.6.1.4 Usefulness and usability

In Deliverable 5.1 Performance Assessment Indicators were defined concerning 4.1 User acceptance, 4.2 Interaction and 4.3 Usability of functions.

4.1. User acceptance *(specific for different user groups)*	• Added value of COBACORE for intended user group / process / phases
	• Added value of information models, support functions and interfaces for
	  o Damage, needs and capacity assessment
	  o Prioritization
	  o Matching
	  o Progress monitoring
	• Trust in the COBACORE system as perceived user group
	  o Information models
	  o Support functions
	  o Interfaces

4.2. Interaction	• Number of interface actions needed • Speed of activities within tasks • Number of errors for activities *[to be made specific for each function / part-task]*
4.3. Usability of functions	• Ease of use of function for (team of) user(s) • Satisfaction with function

2.6.2 Method of assessment

To match the combination of measures, we employed a mix of research methods outlined below. In brackets is the measurement moment (either before, during or after the scenarios):

- Questionnaires (*after scenario with the COBACORE platform and after Social Media mix scenario)*
  - On usability and usefulness of the COBACORE platform and separate features for each user group
  - On the quality of information / situation awareness for each user group, resulting from interaction with the COBACORE platform.
  - On the quality of group collaboration and the extent to which the COBACORE platform supports or initiates these collaborations.
  - Comparison questionnaire: making a comparison between conditions with and without the COBACORE platform (*after both scenarios*).
- Observations (during both scenarios)
  - Focusing on observable behaviours by user group (representatives) interacting with the COBACORE platform: specifically user errors, moments of positive experiences or puzzlement, work processes.
  - Focusing on observable behaviours in interactions between user groups (collaborations supported or initiated by the COBACORE platform)
  - Following an observation protocol, trained observers will witness how activities are carried out, with and without the COBACORE platform.
- Performance measurements (*during scenario with the COBACORE platform*)
  - Number of needs and capacities indicated to the platform
  - Categories of needs and capacities

  - Number of (accurate / relevant) matches between needs & capacities
- Plenary feedback / discussion sessions (*after*)
  - Focusing on the usefulness of current COBACORE platform design features
  - Detailed discussion where user input serves to judge the features and draw out directions for features that are currently missing.

Manipulation: Because the intermediate evaluation was constructed as a game (COBAgame), care must be taken that participants do not choose the strategy of maximizing points in the game to be able to win. In that case, the focus of participants is more on winning the game than using, experiencing and judging the COBACORE platform. Furthermore, care must be taken that in the instructions to the participants the COBACORE platform is not presented as the ideal end-point or a high-quality tool. Instructors and observers must remain objective, also during the plenary feedback session, and to document the factual statements and observations they have made. Only this way, realistic and accurate end-user feedback can be collected on the functioning of the COBACORE prototype.

2.6.3 Operationalisation

Questionnaires were being administered digitally using Survalyzer (www.survalyzer.com). The observation protocols were defined beforehand and used to structure the observations. Eight observers were divided over the rooms, each focusing on a particular user group (affected, responding & professional). Data from the platform (number of needs and capacities) was acquired after the end of the COBACORE sessions by means of download to Excel format. Finally a structured protocol was used for the discussion session afterwards.

2.7 Method of analysis

The behaviour of participants was observed and logged in the COBACORE platform. Their opinions concerning collaboration, operational value, fit with procedures and usefulness and usability were gathered with questionnaires and focus group sessions. By comparing results in a condition with and a condition without the COBACORE platform, conclusions can be drawn as to answering the research questions. The table below describes how we will be able to draw intended kind of conclusions from the findings on performance assessment criteria from the various methods of assessment:

	Questionnaires	Observation protocol	In-game performance measures	Discussion sessions
Closing Information and collaboration gaps	x	x		
Fit with operational processes	x			
Perceived operational value		x	x	x
Usefulness and usability	x			x

Table 5: Mapping research questions and method of analysis

2.7.1 Refinement advice and design guidance

In workshop session with end-users, experts and stakeholders of each user group we determine what is required to refine existing and develop new functions and features. In collaboration with work package 3 we will outline which features and functions of the platform need refinement, particularly based on the discussion sessions.

3 Results and Conclusions

Section 4.1 presents the summary of results from the Intermediate Evaluation, as obtained from the questionnaires, observations and performance measures. Section 4.2 presents the results from the discussion sessions on the features as well as the main conclusions. Section 4.3 presents the design recommendations on the features, based on the results.

3.1 Summary of Results

3.1.1 Performance measures

From the log files we can get an impression how many needs and capacities were inputted into the platform, in which category, how many matches were made and how many went unsuccessful. In total, all participants inputted 107 needs and 25 capacities. It is important to remember that one capacity could be used multiple times and that sometimes a combination of capacities was needed to meet a single need. Please see Fig 17 for an overview of needs and capacities in different categories. Needs could fall in multiple categories. From the figure, it shows that most needs fell in the Transport category, followed by Health & Basic needs, Services, Housing & Accomodation and Safety and Security. In these categories, capacities were also available within the platform. In these categories, in total 17 capacities were used to meet 49 needs. Other categories went without matches. We cannot calculate a performance percentage, as every card in the COBAgame could be used in many different ways, and form different combinations to meet different needs. In addition, needs and capacities could be removed again, once they were no longer current. Thus, a specific number for the needs that the resource cards could have met during the game cannot be provided.

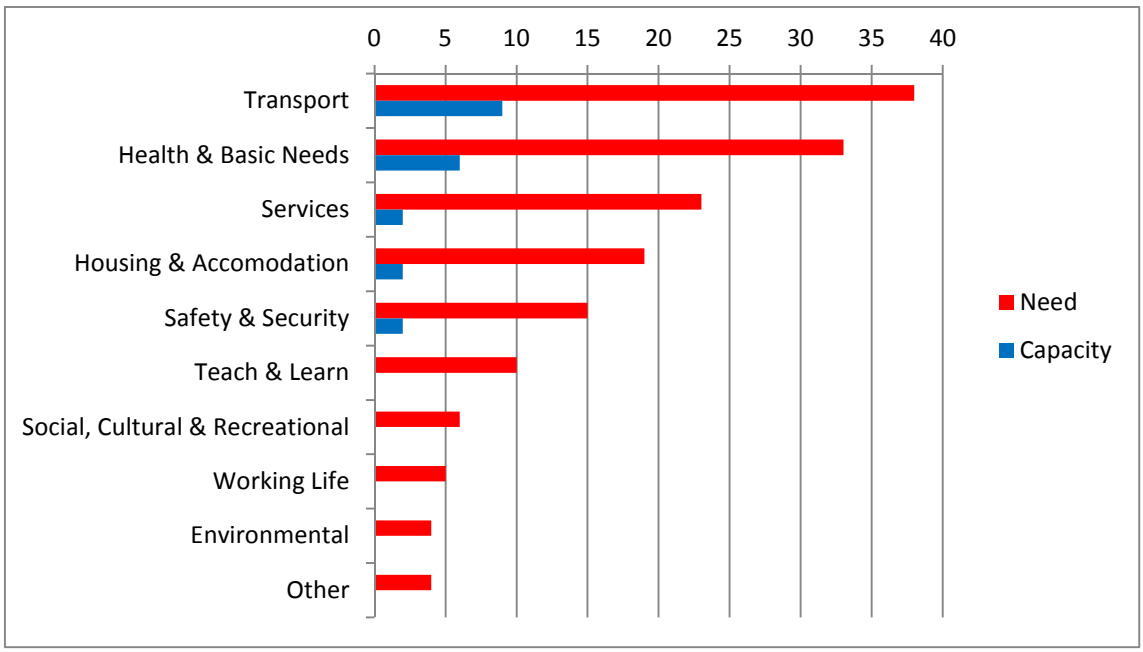


Figure 17: Number of needs and capacities inputted into the COBACORE platform, ordered by category

3.1.2 Questionnaires

The questionnaires asked about acceptance, usefulness, usability and intended usage of the COBACORE platform as well as effectivity of interactions between the groups. We were interested in answering two main questions, based on the questionnaire data:

1. What are the most important differences in responses between the COBACORE session and the session with Social Media mix?
2. What are the most important differences in responses between the three groups (i.e. responding, affected and professionals)?

3.1.2.1 Acceptance, usefulness and usability

In total, 70% of the participants found COBACORE useful for their tasks. According to 53% COBACORE enables users to accomplish assessment and matching tasks more quickly. 60% said it made assessment and matching more accurate. Compared to social media mix, only 21% preferred to work with social media instead of using COBACORE to accomplish their tasks. 54% said that COBACORE enabled them to accomplish assessment and matching tasks more quickly than social media. The social media mix did support feeling of connection with others; with COBACORE 40% felt connected to other users of the platform, while with social media 79% felt connected. 58% felt that with social media they could actively take control over their situation. Assuming the technical issues are solved, 79% indicated that they would use COBACORE.

3.1.2.2 Differences between COBACORE and Social Media Mix session

For a new platform like COBACORE, it is hard to compete with platforms that are already out there and millions of people are familiar with. This is demonstrated by how well users could understand the functioning of both platforms. After initial explanation of the COBACORE platform only 19% of participants were confident enough that they can work and use the platform in full potential. Compared to 58 % of participants that were very clear how to use a social media tools (even without any explanation). This points to a usability challenge that the user interface of COBACORE could be made more intuitive and similar to currently used platforms on internet.

	With COBACORE	**With Social Media mix**
It helped to get a quicker overview of the needs of the affected community	74% agree	66% agree
It helped to get a quicker overview of the capacities of the responding community	52% agree	76% agree
It helped to get a better idea of what the other communities were doing	45% agree	52% agree
It provided a better idea of what I could do to help others	65% agree	52% agree
It helped in matching needs with available capacities	45% agree	56% agree

Table 6: Percentage agreement on statements after COBACORE session and after Social Media Mix session.

Participants indicate that the COBACORE platform and social media mix can both be useful. The results do not show a consistent difference between COBACORE and the social media mix, but it is important to note that during the social media mix people were more experienced because was the second session. Comparing the universal platforms (social media) to the specialized (COBACORE) it is obvious that the overview and situation awareness about needs,

capacities and situation in various communities is improved when using specialized platforms as COBACORE. From the answers of participants it is clear that the information structure of needs and capacities provided better and quicker way for users to understand the current situation. On the other hand, social media provided functionality that was not yet incorporated into COBACORE, such as easy and direct lines of communication. This especially helped get a better overview of the capacities of the Responding Community and even helped to match needs to capacities (see Table 6).

In relation to this was the answer on effectivity of interactions. When using the COBACORE platform participants indicated that in most cases it was not helpful and effective in interactions between the groups. On the contrary in the second round of COBAGAME (social media tools) participants selected that the social media tools helped them to establish effective interactions within all groups. From this finding it is clear that currently COBACORE does not encourage users to interact with other users and/or does not provide them with the appropriate tools and functions to do so. So, here is room for improvement to extend the COBACORE platform with existing functionality commonly found in social media.

Differences between groups

We further analysed the questionnaire data on the acceptance and usability of COBACORE between the affected community (AC), responding community (RC) and professionals (PR). These detailed analyses are presented in Table 7.

Statement	Group	% YES	% NO	% NO OPINION	Total
S1. I find COBACORE useful for my task	AC	71,4	14,3	14,3	14
	RC	60,0	20,0	20,0	5
	PR	72,7	18,2	9,1	11
S2. Assuming the technical issues would be out, I would use COBACORE	AC	71,4	21,4	7,1	14
	RC	20,0	0,0	80,0	5
	PR	63,6	9,1	27,3	11
S3. I prefer to work with COBACORE instead of using existing systems	AC	7,1	64,3	28,6	14
	RC	16,7	50,0	33,3	6
	PR	9,1	18,2	72,7	11
S4. COBACORE enabled me to match the needs with available capacities	AC	42,9	50,0	7,1	14
	RC	33,3	66,7	0,0	6
	PR	54,5	36,4	9,1	11
S5. COBACORE helped me to get a quicker overview of what the needs of the affected community were	AC	42,9	50,0	7,1	14
	RC	33,3	66,7	0,0	6
	PR	63,6	36,4	0,0	11
S6. COBACORE helped me to get a quicker overview of what the capacities of the RC were	AC	71,4	28,6	0,0	14
	RC	16,7	83,3	0,0	6
	PR	46,2	53,8	0,0	13

Table 7: Answers to statements on COBACORE for three different groups (affected community or AC; responding community or RC; and professionals or PR).

It becomes apparent from the questionnaire data that there are no big differences in overall usefulness judgments between the groups; 60-70% of all groups indicate that they find COBACORE useful for their task. However, the affected communities mainly considers the COBACORE Platform useful, quick and accurate when assessing and matching needs and capacities, the other groups have slightly different opinions. Responding groups consider the

matching not quickly enough and not very accurate (66% disagrees with S4 & S5). The professionals approved the usefulness of the platform but had some doubts about accuracy and speed of the matching (S4). When asked about intended use (S2) 80% of the RC indicates they are not convinced they would actually use it. Furthermore, 72% of the professionals is not yet convinced they would prefer COBACORE compared to existing systems, only 9% agrees straightforward. Finally, questionnaire data show a mixed image as for the overview of the RC capacities (S6). 70% of the AC says the platform gave them a good overview while 83% of the RC says it did not. This was especially prominent when needing to find other capacities they required to fulfill a compound need. Professionals are almost evenly divided: half says it helped them, other half says it did not.

In the questionnaires, a number of statements asked about the usability and usefulness of specific features and functions of the COBACORE platform. Below in Table 8, we present the percentage of people who agreed to the statements. These results point to improvements that must be made in the features. On the positive side, login features were considered quick and useful and people felt confident that they could use the platform with their skills. There is room for improvement in how easy needs can be uploaded, finding the right need or capacity, intuitiveness of the features and matching of needs and capacities. Negative points were considered that the features currently do not facilitate to get a good understanding of what communities are doing and improve collaboration.

Statement	**% agree**
COBACORE login features are quick	73%
COBACORE login features are useful	70%
COBACORE asked the right questions when I was trying to upload a need	57%
COBACORE asked too many questions when I was trying to upload a need	50%
COBACORE asked too many questions when I was trying to upload a capacity	37%
The COBACORE map does not help me to get oversight of where the most urgent needs are	47%
COBACORE filters do not help me to find the right need/capacity	40%
COBACORE card layers are useful in creating oversight in the status of the disaster and the recovery	50%
The COBACORE interface is intuitive	47%
I had enough skills and abilities to easily use the COBACORE platform.	83%
The COBACORE interface supports me in quickly informing the other communities about my need/capacity	53%
The COBACORE interface supports me in quickly matching my need with a capacity (or vice versa)	47%
The involvement of professionals adds user value to the COBACORE platform.	40%
The COBACORE interface supports me in creating a good understanding of what the affected and responding communities are doing	17%
The COBACORE interface supports me in quickly finding out how I can help the affected or responding community	27%
COBACORE analytical tools are useful in creating additional oversight	23%

Table 8: Percentage agreement to statements on functionality of COBACORE.

3.1.3 Observations

3.1.3.1 COBACORE concept

The overall COBACORE concept of connecting the three user groups and knitting them closer together through a collaborative workspace is recognized by all three user groups. However, within and among these user groups different perspectives are present what the key issues and key solutions of the COBACORE concept and platform are. Professional responders for example show a tendency to use the platform in a way that suits their usual role during a crisis:

to coordinate and instruct affected people. The platform nor the concept of COBACORE however, explicitly states that it aims to support coordinating capacities of professional responders; rather, it is a tool to facilitate new ways of information sharing and optionally, coordination.

Furthermore, observations supported the view that affected and responding communities actually felt less dependent on the professional responders as they were empowered by the platform, similar to real life situations and in line with the vision of COBACORE. As one participant from the affected community responded: "*We are already doing a lot in helping other affected people and COBACORE shows us what people need. But we do not hear much from the professional community, they sometimes come here to ask what we need but then they disappear again without being heard from again.*"

It can be concluded that the overall COBACORE concept needs to be made more explicit in the interface and the system on 1) how information sharing leads to more effective recovery (NEC chain) and 2) how the COBACORE concept works in detail for each user group.

3.1.3.2 Perceived operational value

Affected and responding community members indicated that the platform contains valuable information that, when displayed correctly, can substantially help in their ways of working during a disaster recovery scenario. More specifically, participants indicated that the system must give an overview of the situation in an eye-blink, perhaps with the use of metaphors and graphical instructions (traffic light for progress of need, colour-changing bar to show the age and urgency of a need). Instead of a list of all posted needs, participants noted that they only would like to see an overview of their own needs/capacities and the replies they received. Based on this information, the system can give more tailored information back to the user on the status of certain needs/capacities.

For professionals the platform contains information that can be highly relevant during operational circumstances. Although the current version of the platform tricks members in the coordinating cell to micromanage (due to individual needs and capacities being displayed instead of general 'dashboard' overviews), the draft dashboard overview was perceived as a good step in the direction of creating an overview of aggregated information (e.g. needs vs. capacities and total number of needs and capacities per category)[1]. The micromanage tendency of professionals continued to exist during the social media round: when individual needs were uploaded, the coordinating cell steered scarce resources straight into the direction of the first aid 'requester' and thus used up valuable coordination time in online meetings.

Some participants indicated that the operational value can furthermore be improved by including an information feed on highly localized news sources pertaining to recovery events (e.g. when are buses running, when is the bridge to the shopping center repaired and when is the mayor coming?).

3.1.3.3 Usability / Usefulness

Each community – affected, responding and professionals – has its own goals to use COBACORE. Therefore, the overall usability will be greatly improved when each community group has its own user interface and interaction tools on the COBACORE platform.

[1] On strategic level for coordinating professionals statistics are deemed useful: How many people are in need of what? Where is help needed? How much help of what kind is provided? Where is it available? What capacities are most needed now?

More specifically, affected and responding communities indicated they require better needs/capacities management by tailoring the information stream on the individual needs and capacities of the user, based on their own location, preference, community, interests etc. This can be done by an automated needs/capacity matching algorithm. Usability can thus be greatly improved and information overload can be avoided if a simplified GUI support this personalized information flow.

In addition, participants from affected and responding communities felt no coordination was taking place on how needs and capacities were allocated and requested better needs management (e.g. case management, overview of all needs a person or household has, an overview of what needs are addressed by what capacities and by whom).

In order to improve usability for professionals, a high level dashboard is required that shows 1) mismatches of needs and capacities ('I can offer help' versus 'I need help' in different sectors: food, water etc.) and 2) to provide shared awareness on what partnering professionals are doing. This way, interfaces for professionals are better aligned with the working processes of responding professionals.

During the Social Media Mix session it was shown that setting up existing platforms such as Skype, Facebook or Trello for communication and coordination takes up valuable time and resources. It also leads to misalignment of information flows as different user groups used different coordination methods. Professionals indicated coordination features are needed in COBACORE to improve usefulness for coordination purposes (or even incorporate the platform into existing crisis coordination systems such as the Dutch LCMS). This is as much a scoping question as a design question still under review: to what extent does COBACORE support existing professional procedures?

3.1.3.4 Interactions between groups

Playing the COBAGAME should simulate the behaviour of different groups of people during and after a disaster, including interactions between these groups. Observations showed differences in the number and variety of interactions between groups. In both rounds all affected communities interacted highly with all kind of communities (including themselves) and the number of interactions was quite large. On the other hand responding groups were divided into different approaches, where one group interacted only within responding community itself (only with other responding community groups), second group coordinated with other responding groups but also interacted with affected communities and the last group interacted only with affected communities directly. In case of professionals their interactions focused mostly to coordination among professional groups and responding groups, however some interaction were directed towards affected community, too. From this type of behaviour is clear that the COBACORE platform should adapt and support each group (community) in different way in order to allow them to interact with preferable recipient.

From the questionnaires and observations, we see the greatest challenge in stimulating the members of responding communities more into using COBACORE as they seem to be mostly doubtful in functions and features of the COBACORE platform, but they are the most important group to be part of COBACORE in order to support the resilience of the communities (general public) after a disaster.

3.1.4 Limitations

Performance criteria were identified beforehand and based on the number of matches that could be made vs. the number of actual matches during the COBAgame. It should be noted

that a number of factors influenced the actual performance of the three communities in the game and thus limited the value of these performance criteria.

First, the learning effect. It took the participants quite some time to fully comprehend the COBAgame and the increasing complexity limited the expected improvement of performance. As the game was built up in increasing complexity (first round: one need=one capacity, third round: 1 need is multiple capacities plus scarcity of resources) the number of matches made was not significantly improved during the second round on Thursday morning. For both rounds, the number of matches made remained at approximately 30% of the total amount of potential matches.

Second, as this was still an experimental setup for both the platform and the game, these two were not 100% aligned and this was noted by the participants themselves as well. For example, the COBAgame gave professionals incentives to coordinate field responders, but the COBACORE platform did not give the coordinating professionals them any means that they could coordinate with. Thus, a lot of radio traffic was used for coordination. This is the result of the design decision of not focusing in COBACORE on building a coordination tool .

Third, in response to the previous point, interventions of the game development team influenced the type and quality of communication. In the example mentioned above, this led to a decision to hand out email addresses to individual participants within the three user groups on the second day. This supported the professionals in their means to steer certain professional field responders to improve means of coordination (professional responder groups were already in possession of portable radios) but this limits the basis for proper comparison.

Fourth, the social media round had particular factors of influence limiting a good comparison. For example, users were given instructions to work with imaginary Facebook accounts for the game. FB did however not accept these fake IDs when registering thus limiting the comparison with a real life situation. Therefore, during the final round, when the best performance result were to be expected as participants would know the game, their role and goals of the other groups, the number of matches made went down to 3% of total amount of potential matches.

In conclusion, participants (professionals in particular) indicated that the COBAGAME induced a certain pressure that is similar to a crisis or recovery situation, and the observation team has certainly noted that the three groups were increasingly improving their coordination and overall performance, but the number of total matches made comparing round 1, 2 and 3 did not show a significant improvement in performance: rather, performance went down considering the number of matches made.

It was furthermore noticed that participants started to perceive the COBACORE platform as being similar to the concept itself. While this is a small nuance, it implies that when people disapprove the COBACORE platform due to bugs, the COBACORE concept itself is also likely to be rejected. Although the project team explained that the project is not a software design project, responses show that this makes little difference to the user perception.

3.1.5 Discussion of results

First, the observations gave valuable input for the future development of the COBACORE platform as well as the COBAgame. A summary of these suggestions can be found below in the section 4.3.

Second, three noteworthy suggestions in particular will be explored further in preparation of the final evaluation:

- Other than the suggestions on improving needs/capacities management, future development could be inspired by applying concepts of social media 2.0 in which the COBACORE platform becomes more than just a means of communication and articulating needs/capacities. This implies that after a proper needs management has been designed, the COBACORE platform should stimulate proper account management in which a need/capacity is taken up via a more standardized process in which different responders take up standardized roles, similar to account management within companies. This requires further research from different WP's in the coming year.
- The platform facilitating self-regulation and actual community resilience is a key priority. From the responding professionals it would be useful when affected community members with the same need can be linked. You create a community of interest. This makes the efficiency of providing and receiving help a lot better. Further when you connect people with similar needs to people with appropriate capacities you stimulate community resilience and self-reliance.
- Integration of information from Twitter/Facebook/Linked in the platform is also desired. It helps community interaction because these are the tools and ways of working of people at this moment.

3.2 Conclusions

The objective of the COBACORE platform is to support continuous needs assessment for recovery planning. A community-based approach is followed in which affected community, responding community and professionals collaborate and share information about needs, capacities, recovery activities and the actors involved. The platform intends to support comprehensive recovery in that all kinds of needs are assessed, all kinds of recovery activities are undertaken and all kinds of capacities and actors used. The evaluation turns out that the community-based approach in which affected community, responding community and professionals collaborate and share information about needs, capacities, recovery activities and actors involved is accepted by end users.

The COBACORE concept is implemented in the COBACORE platform that intends to support:

- Closing information exchange and collaboration gaps between communities
- Creating shared situation understanding, information sharing and collaboration, re-directing and empowerment and needs-capacity matching
- Activities that are operationally valuable for the end-user groups
- Activities that fit with processes, procedures and practices of all user groups

The hypothesis is that the COBACORE platform improves recovery effectiveness: We expect that high priority unmet needs of the affected community are met faster and by more appropriate capacities and recovery activities of both responding community and professionals as a result of using the COBACORE platform. In the next section we evaluate to what degree the COBACORE platform effectively supports the above mentioned processes. The following research questions are addressed:

Q1: Does the COBACORE platform close gaps in information exchange and collaboration between the communities?

Q2: Is the functionality of the COBACORE platform and the information it provides useful and usable for creating 1) a shared situation understanding, 2) information sharing and collaboration, 3) re-directing and empowerment and 4) needs-capacity matching?

Q3: Do end-users perceive that the COBACORE platform has a positive effect on community-based needs assessment and recovery planning?

Q4: Does the COBACORE platform fit with processes, procedures and practices of all user groups?

3.2.1 Closing information and collaboration gaps

The COBACORE platform closes gaps in information exchange and collaboration between the communities to some degree (Q1). Each user-group was enabled to develop an awareness of different kinds of needs, different kind of capacities in different phase of the post-crisis disaster situation and to share this awareness with other community members. COBACORE supports information sharing by the affected community with both professionals and responding community about their needs in a post-crisis situation. The functionality of the COBACORE platform and the information it provides is useful, but the usability of the platform is suboptimal (Q2). Because of information overload due to the many needs in the interface of responding professionals and communities, information that was expressed by affected community members was not always reacted upon (seeing the performance measurements). The functionality of the COBACORE platform also does not optimally support the matching of needs and capacities (Q2). This created workload in this time-compressed evaluation environment. To better support this information exchange, needs-capacity matching and concurrent suggestions should be made more prominent in the interface. Although end-users perceive the COBACORE platform to have a positive effect on community-based needs assessment and recovery planning, this operational value is limited by present functionality and usability (Q3). We were unable to directly confirm or reject the hypothesis that high priority unmet needs of the affected community are met faster and by more appropriate capacities and recovery activities of both responding community and professionals as a result of using the COBACORE platform in this evaluation set up (hypothesis about recovery effectiveness). We do believe that functionality and usefulness of the COBACORE platform needs to be improved before the hypotheses about recovery effectiveness can be confirmed. It also seems that affected community members and responders had different ideas about priority. Priority for an affected community member was based on the importance and urgency of their personal needs. Responders on the other hand indicated that priority of needs for them was based on whether they had the capacities to respond to it. An important need was a need for which they had the capacity. Who keeps an eye on all the unmet needs that responders are not addressing (yet)? The difference in understanding of priorities can also lead to different interpretations concerning recovery effectiveness. When comparing the COBACORE platform with the Social Media mix, participants indicate that they can both be useful for sharing information about needs and capacities. Results and comments seem to indicate that COBACORE provides more task-oriented support and the social media mix provides more social-oriented support. Social media enabled person-to-person communication and relation management. The COBACORE platform has a focus on needs and capacities. As a design recommendation, it would be good to incorporate the social communication aspects from social media into the COBACORE platform (e.g. chat, easy access to contact details, status updates, etc.) as it supports dialogue about for instance priorities. COBACORE platform did not support re-direction and empowerment of responding community by allowing professionals to share information and knowledge (Q2). Collaboration support between professionals and responding community was currently lacking. This support is a part of the COBACORE concept,

but was not implemented in the intermediate COBACORE platform. The COBACORE platform did not support awareness of responding community about the recovery activities of professionals they could participate in. The COBACORE platform did not provide responding community members with access to instruction and training by professionals for the effective execution of and participation in recovery activities. It did not support professionals in re-directing the efforts of responding communities to high priority needs. An overview of what affected communities and what needs responding communities were addressing was lacking as well. Although contact between professionals and responding community was technologically enabled, effective collaboration between people requires more than that. It also seems that the formal, task-oriented and command-and-control style of working of the professionals did not optimally match with the informal, person-oriented and collaborative style of responding communities. Making members of different communities aware of such human factors affecting collaboration seems helpful. The effect of lacking functionalities on perceived operational value and expected recovery effectiveness should be further assessed in next round of design, implementation and evaluation. In addition a training could be developed for collaboration building between communities taking also human factors into account.

3.2.2 Perceived operational value

The COBACORE platform has potential operational value (Q3), as perceived by the participants (seeing results on observations and questionnaires). This value is not optimal for each user group. The affected and responding community and responding and coordinating professionals all have different operational tasks, goals and information needs. Operational value requires that information provided to each user groups matches these information needs.

Affected community

Affected community members recognized the operational value in that they could indicated their needs better to the responding community. Many affected community members recognized the added value of professionals on the COBACORE platform, and they also seemed to feel less dependent on professionals. It seems that the platform enabled affected and responding community members to help each other. Reliability and usability needs to be optimized and a mobile application seems more useful for affected community members.

Responding community

The operational value for responding community members was not convincingly demonstrated. Seeing their somewhat negative responses to the questionnaire items on how well overview could be gained and matches could be made, there is room for improvement to increase operational value of the platform for this user group. Responding community members felt flooded by the needs posted and they felt a strong need to organize needs.

Professionals

Professionals recognized the potential operational value of COBACORE, not only for large scale disasters but also for smaller incidents. However, the information provided by COBACORE was not optimally tuned to the information needs and working processes of coordinating and responding professionals. The map and list had too much information and was too detailed for them. Professionals felt flooded by the needs posted and they felt a strong need to organize needs. It was hard to get an overview of aggregated needs, prioritize them and avoid micro-management.

3.2.3 Usefulness and usability

Most users, primarily from the affected community, found COBACORE useful for their tasks: assessment and matching tasks are performed quicker and more accurate. Most found COBACORE more useful than the social media mix. Compared to COBACORE the social media provided a feeling of increased connectedness and associated feeling of control. Assuming the technical issues would be solved, 79% indicated that they would use COBACORE. In the questionnaires, usability judgments were given on the extent to which specific features and functionality were supported by the platform and which needed improvement (see Table…). Below, the usability experiences of the participants are outlined.

Affected community

Although the concept and prototype were explained, it was noted that the understandability of the COBACORE interface was not clear at a glance. Users questioned what service it provided and the 'express need and get help' function could not be easily found and was cluttered by other less relevant views. When defining needs, users found the wording of categories not intuitive and too abstract. For example 'basic need' is abstract and not very informative while 'food and drink' would be more concrete.

Members of the affected community missed a personal connection between 'people helping people' and didn't feel in control over their situation and relation with responders. For instance, they could not provide emotional content or context information when a need was expressed. They were not able to see whether others were addressing their needs. They experienced that others indicated that their needs were resolved when in fact they were not. They wanted to have final authority over whether a need was resolved or not.

They felt flooded by posted capacities and could not see which help offers were relevant for their need. They could not see whether offered help was accessible for them. Relevant offers, those addressing unclaimed and unmet needs, were not on top of the list and often out of sight in the list.

Responding community

Usability of features that could give a good overview of their own capacities and capacities of other groups around them can be improved. Also usability of features that helped them to match their capacities to existing needs need to be improved. In short, tooling and interaction for the responding community needs to receive more attention in the rest of the project.

Professionals

The needs-capacity overview display was useful for coordinating professionals. It helped identifying frequency of unmet needs per category and where capacities were missing. This supported in setting priorities. The view was not easily found as it was hidden and cluttered by other views. For coordination, professionals wanted to find what specific needs, capacities and actors were under each of the categories in the needs-capacity overview. For coordinating professionals statistics are needed. How many people are in need of what? Where is help needed? How much help of what kind is provided? Where is it available? What capacities are most needed now?

3.2.4 Fit with operational processes

COBACORE functionality did not optimally match with the usual command and control and coordination processes of professionals. This is however also not the aim of the COBACORE concept. The COBACORE platform and the underlying concept does not intend to support these processes directly. Rather, COBACORE supports community interaction. It seems that the

task of 'community interaction' needs to be integrated in the usual processes of professionals. Clear responsibilities, task, procedures and competencies fort professionals may need to be developed for an optimal integration.

Responding professionals felt flooded by the needs posted and they felt a strong need to organize needs. For example combining similar needs of different people; combining all needs of one person; or all needs on one location. Some professionals indicated that support for case management was needed. Professionals also noted that multiple responding professionals or communities were addressing the same need. By communicating who is claiming to address what needs, duplication can be avoided and effort can be directed at meeting unmet needs. Professionals indicated that they would like to be able to manage the status or life cycle of the needs they selected. For instance in categories like 1) need selected, 2) Needs claimed, 3) Needs targeted, 4) Needs resolved, 5) Needs to partner, 6) Needs unaddressed.

3.2.5 Limitations

The goal of this evaluation was to evaluate the integrated COBACORE platform in an intermediate state with end-users from the various user groups. The goal was to draw preliminary conclusions about operational value of the COBACORE platform and its features in practice and to get a clearer picture on how the COBACORE platform would help community interactions and what is needed in terms of improvement of usability, operational value and the avoidance of collaboration gaps. In this respect, the conclusions and recommendations above provide the necessary direction.

A number of limitations result from the evaluation goal and scope of the setup of the intermediate evaluation. First, this evaluation depended on creating a simulated game environment, that approximated a real life disaster recovery scenario on relevant dimensions for the goal of the evaluation. While care was taken to create tasks and activities that are part of disaster recovery, the matching of needs to capacities and the actions involved cost less effort than they would in real-life. Many problems encountered in reality were not encountered in the evaluation. Many questions concerning the applicability of COBACORE in real operational settings remain. The evaluation required a large number of participants. Participants had little experience with disaster recovery and reconstruction. While they were experienced in their role, they do not encounter these kind of scenarios every day. This limits the validity of their conclusions about operational value. Although the intermediate evaluation provided insights in how the platform worked and what needs to be improved the conclusions are preliminary. Additional evaluations are needed in more realistic situations and with more experienced end-users.

As for the evaluation setup, this evaluation setup was not aimed at getting an in-depth insight in the specific information needs of each of the user groups in post-disaster situations. To validate information models more focussed sessions are required. The setup was also not aimed to get insight in the robustness of the COBACORE platform in operationally demanding settings (e.g. limited internet). Further, the setup was also not optimized to compare the COBACORE platform with alternatives such as the use of a social media mix. The COBAgame and performance measures used can be used for this purpose. In this methodological set-up it was hard to make a valid and honest comparison of the COBACORE platform to something else. The scenario with Social Media mix was settled upon to give participants some form of benchmark, but it might not be a fair comparison (e.g. took a lot of time to set up the social media platforms, users are already familiar with them and not with COBACORE, social media was used for a shorter period of time, social media platforms are not designed for these needs capacity matching tasks). Also, as mentioned before, learning effects played a role as the

scenario with the COBACORE platform was played first and the Social Media mix second. This limits the comparability of the questionnaires after both scenarios. Also solutions to issues like privacy and misuse of information in the platform that are relevant when the COBACORE platform is operationally implemented have not been addressed in the intermediate evaluation.

3.3 Design recommendations

Recommendations for further development of the COBACORE platform are described below. To further guide the design efforts in the next round of design in WP3 and partial evaluations in WP5 ideas and implementations for new functions and features and refinements of existing functions are evaluated with end-users. In the final evaluation the final version of the integrated COBACORE platform will be evaluated.

New and improved features that addressed the above described issues are iterative developed and evaluated. In the final evaluation the first feature release set is demonstrated in its final form, the second in its second iteration and the third feature set in its first iteration. The purpose of the final evaluation is as such mixed: demonstration of final parts of the platform and evaluation of intermediate parts of the platform. The final part consists of a user-friendly implementation of functions and features for affected community in mobile applications. The second feature release set is evaluated in a partial evaluation and demonstrated in the final evaluation. This second set consists of new functions and features for professionals and responding communities. A third feature release set can be evaluated in the final evaluation.

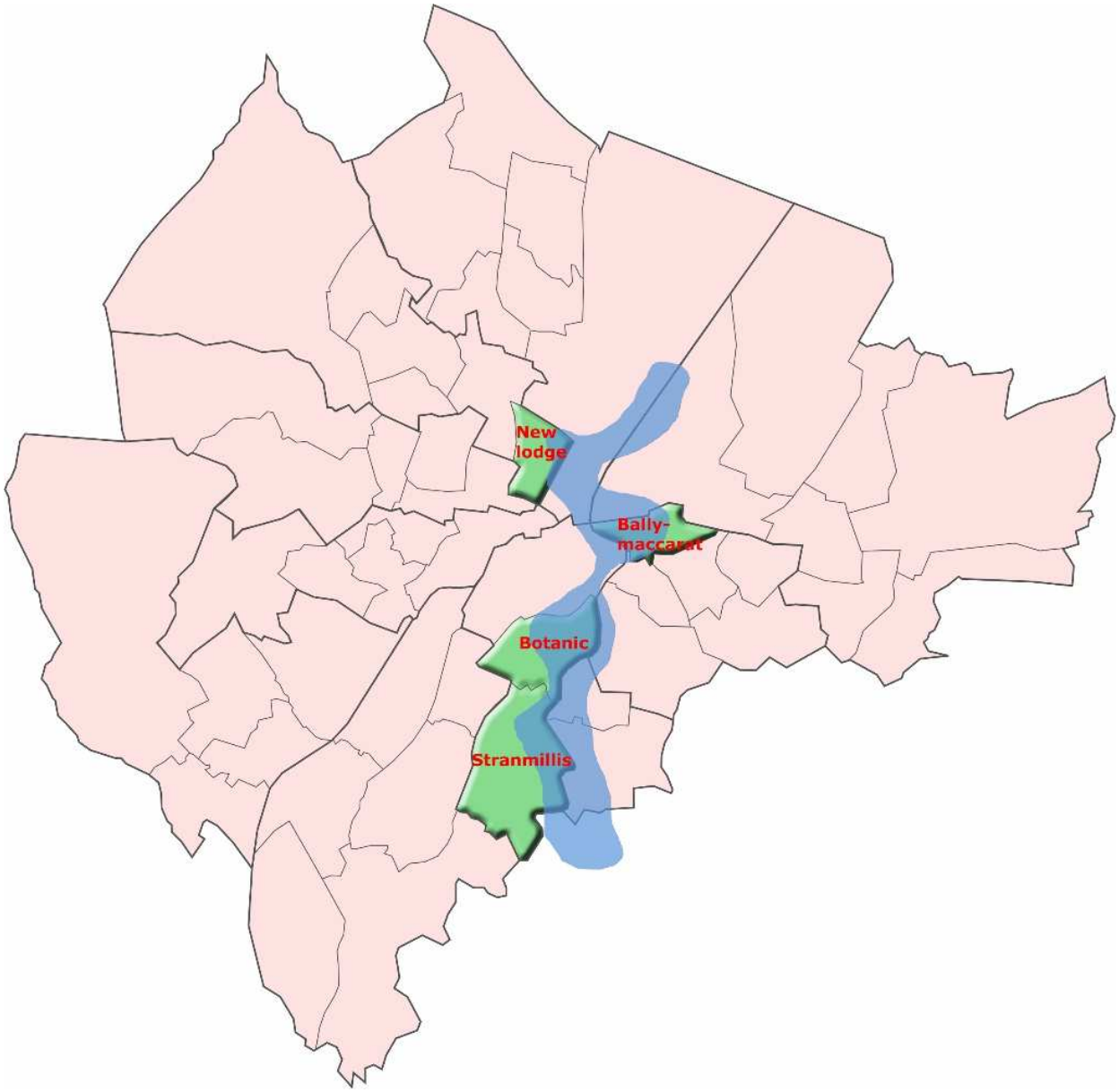
Based on the results of the intermediate evaluation of the COBACORE Platform, we can give the following high-level design recommendations for the further development of the platform:

- **Adaptation**: Different interfaces, interaction styles and tooling are needed for different user groups: affected community, responding professionals and coordinating professionals. The system should have one shared information database and multiple interfaces.
    - **Responding community**: Focus should be on to facilitate capacity – capacity matching and to provide a good overview of what needs are already being addressed.
    - **Professionals**: Focus should be to create an overview of 'white spots' where help is not yet provided and to facilitate finding capacities from other groups. Also, for responding professionals the needs/capacity management should include ordering and categorizing (groups of) needs.
- **Intuitive**: The interfaces needs to be as simple as possible to understand and show only what is relevant for users task. E.g. Ability to filter to only own needs.
- **Integration**: Align the COBACORE platform as much as possible information in systems already in use is needed for adoption and alignment with procedures and tools. Do not build a new tool for professionals.
- **Usability**: improve usability of needs / capacity management: who is helping when and how? Which needs are addressed? What is the progress and status of this?
- **Groups**: The platform should facilitate group formation, i.e. make it easy to form a group of supporting people around you.
- **Culture-sensitive**: Make it adaptable and scalable to local cultures in Europe

- **Collaboration**: Support communication, coordination & collaboration between responding community and professional responders better. Currently, the platform is too much targeted at only the affected community.
- **Security**: Keep privacy issues in mind and avoid misuse of data.

A. Flood Scenario Belfast

Multiple flooded areas, in our scenario 4 wards: New Lodge, Ballymacarrett, Stranmillis, Botanic gardens.



Ballymacarrett

Population: 4797 (2008)
Population density: 6,336 km2

Ballymacarrett or Ballymacarret (from Irish Baile Mhic Gearóid, meaning "MacGearóid's settlement") is the name of both a townland and electoral ward in Belfast. The townland is in County Down and the electoral ward is part of the Pottinger district electoral area of Belfast City Council.

The ward was created in 1973 with most of the population coming from the former Pottinger ward. The ward was slightly enlarged in 1985, taking in part of the Island ward. The ward consists of two distinct districts: Ballymacarrett itself, which is almost entirely Protestant, and the Short Strand which is almost entirely Catholic, with the two separated by a peace line. Consequently in the 2001 census, the Roman Catholic community background figure was 51%.

Set in the shadows of the Harland and Wolff cranes Samson & Goliath, large numbers of local men worked in the shipyard during its heyday. The area is also well known for 'Ulster's Freedom Corner', a series of loyalist murals.

In some ways the ward has been a microcosm of the Northern Ireland troubles. The June 1970 "Battle of Saint Matthew's" occupies an important place in Irish republican history after a gun battle between republicans and loyalists, who were accused of attacking the church. Loyalists counter this with claims that three Orange Order members were killed after returning from a parade. It is seen as one of the key developments in the rise to prominence of the Provisional IRA. Similarly on the Ballymacarrett side of the peace line, Protestant residents have claimed that Republicans are engaged in attacks on Protestant homes which amount to 'ethnic cleansing' – claims which Republicans dispute and deny.[2]

Ballymacarrett and the nearby Newtownards Road played a key part in what became the 2011 Northern Ireland riots. At first, the riots were only located in the area and were known as the 2011 East Belfast riots but by July, the riots had spread to other parts of the country. During the riots, the Protestants in the area were going against Short Strand Catholics.

A large railway junction existed at Ballymacarrett, serving the Belfast and County Down Railway from its Queens Quay terminus, to Bangor in the north, and the mainline running south to Comber, Downpatrick and Newcastle. There was also an interconnection over the river Lagan to the Great Northern Railway and on to Belfast Central railway station.

Ballymacarrett Junction was the scene of a serious railway accident which occurred at 7.50am on 10 January 1945 when the 7.40am rail motor Holywood to Belfast crashed into the rear of the 7.10am Bangor to Belfast train. 22 passengers were killed, and 23 injured. The darkness and local fog were a factor but the driver of the rail motor was held to blame.[3]

Ballymacarrett Halt railway station was located on the B&CDR route from Belfast to Bangor. It opened on 1 May 1905, but closed on 9 May 1977,[4] when the adjacent Bridge End railway station opened.

Stranmillis

Population: 7250 (2008)

Population density: 3,091 km2

Stranmillis (from Irish an Sruthán Milis, meaning "the sweet stream") is an area in south Belfast, Northern Ireland. It is also an electoral ward for Belfast City Council, part of the Laganbank district electoral area. As part of the Queen's Quarter, it is the location for prominent attractions such as the Ulster Museum and Botanic Gardens and is popular among tourists. The area is located on the Stranmillis Road, with the Malone Road to the west and the River Lagan to the east.

Stranmillis Road breaks away from the Malone Road at the Ulster Independent Clinic, arches round eastwards toward the Lagan before rejoining the Malone Road. The north of the road is the area most popular with students and young professionals, with many shops and restaurants, the south of the road is mainly housing.

The Malone and Stranmillis Historic Urban landscape was in 2010 added to the tentative list of sites proposed for addition to the List of World Heritage Sites of the United Kingdom as an area of architectural interest featuring examples of the Arts and Crafts Movement.[1]

In total the road is about 2.5 km (about 1.5 miles) long, forms part of the city's Queen's or University Quarter, and is popular among tourists with many restaurants and coffee shops. Several well-known Belfast landmarks are located in the area including the main gate to the Botanic Gardens, a 28 acres (110,000 m2) public park opened in 1828, including some rare species in the iconic Palm House. Northern Ireland's largest museum, the Ulster Museum is situated adjacent to the park and has been located in Stranmillis since 1929. The museum closed in 2007 for extensive renovation and reopened in October 2009, eighty years to the day since the original opening. Within a month over 100,000 people had visited the museum.[2]

Stranmillis is quite a popular place among students, and is seen as more "up-market" than the Holylands which are located on the other side of the Botanic Gardens, and have become infamous for anti-social behaviour among students and, in recent times, among full-time residents.

The northern end of the road is only seconds away from the main building of Queen's University, the Lanyon Building, while several other prominent university buildings are located on the road itself, including the dominating David Keir Building, the multi-story Ashby Building, while the University's Physical Education Centre is located close to the river and adjacent to the Botanic Gardens. Stranmillis University College, a constituent college of Queen's established in 1922, is located at the midway point of the road. Film actor Errol Flynn's family lived on the Stranmillis Road.

Other places of interest in the area include the Lyric Theatre and the Friar's Bush Graveyard, one of the oldest Christian sites in Belfast, with some graves dating to the early mediaeval period.[3] The site is marked on a map of 1570. In the 18th century when Catholics were forbidden to build a church in Belfast they met at Friar's Bush which was then outside the town boundary, for Holy Communion. Mass ceased in 1769.[4]

The Stranmillis Embankment is also popular among locals and tourists, and runs along the Lagan, while a towpath runs along the Lagan Valley from the area to the city of Lisburn south of Belfast. The QUB Boat Club is also based in the area.

New Lodge, Belfast

The New Lodge (Irish: Lóiste Nua) is an urban, working-class Catholic community in Belfast, Northern Ireland, immediately to the north of city centre. The landscape is dominated by several large tower blocks. The area has a number of murals, mostly sited along the New Lodge Road. The locality is demarcated by Duncairn Gardens, Antrim Road, Clifton Street, and dependent on opinion, York Street or North Queen Street. North Queen Street and Duncairn Gardens have often seen rioting between republican and loyalist gangs. The New Lodge is also an electoral ward of Belfast.

Figure 1: Top of the New Lodge Road near its junction with the Antrim Road

Local politics

The Dock Ward was one of 15 wards of Belfast City Council prior to 1973. Its boundaries were the Antrim Road, Clifton Street, North Queen St, Great George's Street and Brougham Street. From 1973–1985 the eastern boundary of the New Lodge ward was North Queen Street. The boundaries were extended to York Street and Clifton Park Avenue in 1985. In 1993 the Antrim Road boundary was restored with the Unity flats area added. These boundaries are used for census information.

The Dock Ward of Belfast City Council mainly returned Unionists with slim majorities in the pre-War years, with Nationalists winning from the 1940s and becoming more dominant as time moved on. In the post-War years, the New Lodge was historically the political stronghold of Gerry Fitt.

The co-terminous Stormont parliamentary constituency was the most marginal Stormont constituency changing hands at every election until 1965. It was won by the Ulster Unionist Party in 1929, Northern Ireland Labour Party in 1933, Unionists in 1938, NILP in 1945, Unionists in 1949, Irish Labour in 1953, Unionists in 1958, Irish Labour (Gerry Fitt) in 1962, and Republican Labour (Fitt again) in 1965 and 1969.

The Westminster parliamentary constituency was part of East Belfast until the 1974 elections and has formed part of North Belfast since then (although the areas east of North Queen Street were in West Belfast from 1983–1997).

Politically, Sinn Féin now dominate the area although previously parts of the area were, along with the Lower Falls, one of the strongest areas for Official Republicanism in Belfast – especially the areas around the Carlisle estate and Henry Street. Seamus Lynch was elected for the Republican Clubs and their successor parties between 1977 and 1993 and a social club for supporters of the Workers Party and Official IRA survived until the late 80s.

Social conditions

While the housing stock is now largely of a high standard, and the Belfast economy has improved dramatically from the nadir of the 1980s, the New Lodge remains an area of considerable social deprivation.

The Northern Ireland Index of Multiple Deprivation lists the New Lodge as the fifth most deprived of 581 wards in Northern Ireland, and the second most deprived in terms of income. The high score comes in spite of it being the least deprived of the 581 in terms of access to services, lying on the edge of the city centre and with major health and education facilities nearby. 70.8% of the local school population are entitled to free school meals.

Less than a quarter of households in the New Lodge own their own homes, with the vast majority renting from the Northern Ireland Housing Executive or other social landlords.

40.4% of local 16-year olds gained five or more good GCSEs in 2002, well below the Northern Ireland average, but higher than most similarly deprived areas in England. 27.7% of 18-year olds went on to further or higher education in the same year.

With increasing property prices in the Belfast area in recent years, a higher proportion of younger and better qualified people have stayed in the area with affordable property which is within walking distance of the city centre.

The graveyard in Henry Place houses the graves of many people prominent in Belfast's history, most notably United Irishman Henry Joy McCracken.

The area is quite close to all amenities including the City Centre, the Mater Hospital and Cityside (Yorkgate) Shopping Centre. A previous attempt was made to establish a local supermarket at the Ashton Centre however this failed after the opening of the Yorkgate complex in 1991.

The main primary schools are Star of the Sea (girls) and Edmund Rice Primary School (boys),formerly Archies Dam. The majority of boys then study at Edmund Rice College (Hightown) or St. Patrick's College (Bearnageeha or 'Barney') or girls at Little Flower or Our Lady of Mercy with those who have passed the selection test going to the closer grammar school St Malachy's College (boys) or to Dominican College (girls).

The seven tower blocks sited on the former Victoria Barracks, which dominate the skyline of the area, have been given names in Irish as some locals disliked the British connotations of the original names like 'Churchill House', although these remain in common use. However curiously, street names like Queens Parade, Victoria Barracks, Victoria Parade and Churchill Street have not been affected by this policy.

Culture

In common with similar areas, much local cultural and social life revolves around the pub scene, in the New Lodge itself and in the nearby Docks area. Live rock, blues, techno and Irish traditional music are regularly performed.

The New Lodge Festival was devised as an alternative to the traditional Internment Night bonfire, which often led to violence. The festival is linked to the West Belfast Festival and Ardoyne fleadh and sees a wide range of musical events, children's activities, amateur sport and historical and cultural discussions.

Many local people are passionate football fans. Gaelic football and boxing are also popular – Hugh Russell, who won a flyweight bronze medal in the 1980 Moscow Olympics came from the area and still lives nearby.

Census

The New Lodge is one of the 51 wards of Belfast City Council. On Census day (29 April 2001) there were 5,224 people living in New Lodge ward. Of these:

- 25.7% were under 16 years old and 18.4% were aged 60 and above;
- 46.6% of the population were male and 53.4% were female; and
- 97.3% were from a Catholic Community Background and 2.2% were from a 'Protestant and Other Christian (including Christian related)' Community Background.

B. Profile affected community member

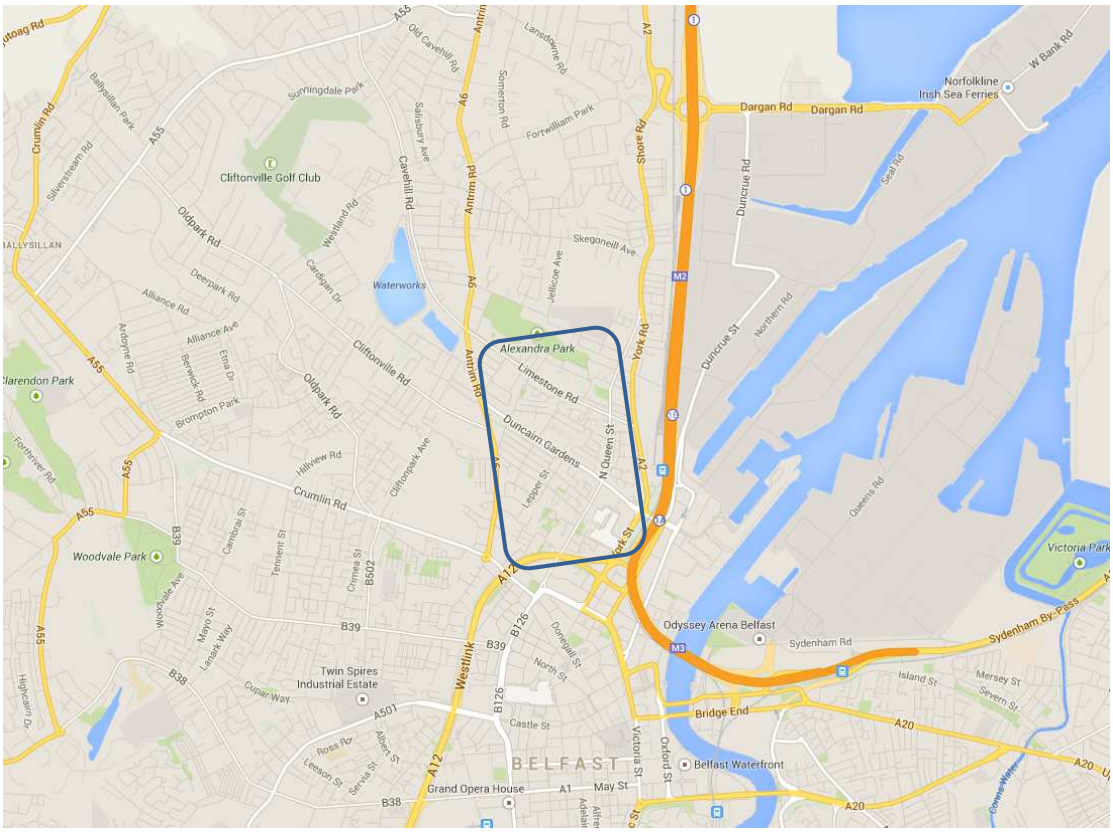
Bio

Your name is Brian Webster. You live in New Lodge in north west Belfast. You are 17 years old. When you were 14 you suffered a spinal cord injury by breaking your neck in a horse riding accident. You are now paralysed from the waist down and are unable to carry out many tasks without assistance. Your mother, Jane, is your primary carer. Jane has a 9-5 job which she works at five days a week. Money is tight and Jane's job is the only source of income for both of you. When Jane is at work you are cared for by Chris, a public health nurse, and Linda, a carer. You went through a long period of depression after your accident, and found it difficult to accept that you will never walk again. Recently, you joined a wheelchair basketball team. It has done wonders for your confidence and you have made a lot of friends, many of whom are also disabled. It's also important for building your upper body strength. You are feeling more positive now, and are learning to accept your condition.

Situation

Belfast has flooded and five neighbourhoods are under water. Your home in New Lodge has escaped the worst of the flooding and there has been no internal damage. However, there has been extensive damage to the Ballymacarett area, where both Chris and Linda live. They have not been in touch, but you have heard that a large number of Ballymacarett residents have had to be evacuated. The phone lines are also down. Your mum has taken some time off work to care for you in their absence, but she is now under pressure to return. You are growing quite anxious as you are entirely reliant on other people for assistance.

You are also running very low on medication which is essential for pain relief. Your mum has tried to get to a pharmacist to renew your medical supply, but public transport has also been severely disrupted and she does not drive. She does not want to leave you alone for too long, so she is reluctant to walk to the pharmacist, as it is too far away. Initially you had not been too worried about your medication; as you were due to attend a hospital appointment later in the week. But the hospital has just called to cancel your appointment due to extensive flood damage. You are now very worried.



Needs	1 week (Relief)	2Weeks (Recovery)	1 month (reconstruction)
The needs in this table are examples, you are free to derive other needs from the generic description, determine how specific you describe your needs, find alternatives and determine the priority of your needs.			
Mobility, Transport&	All roads surrounding your house are closed and public transport has been disrupted. Your needs: • Fully operational public transport.	Roads have re-opened, and buses are now operational. Train line remains closed. Your needs: • Fully operational transport	Your needs
Vital Infra-structures	The phone lines are down so you are unable to contact Chris and Linda, your nurse and carer. Your needs • You need an update	Phone lines have been repaired, and you have spoken to both Chris and Linda. But they are unable to return to work for some time. Your needs • You need to arrange	Your needs

	from Chris and Linda as to when they will return to work	alternative care assistance while Chris and Linda are off work.	
Built Environment 	The hospital is closed due to flood damage. The nearest pharmacy is also closed. Your needs • Essential medical supplies	The pharmacy has re-opened and you have been able to replenish your supply of medication. However, the hospital remains closed and you have no idea when your appointment will be rescheduled. Your needs: • Your hospital appointment is essential to your ongoing healthcare needs.	Repair work has commenced on the hospital unit. However, it will be some time before the hospital will be open for appointments. Your needs • You have made an appointment at another hospital on the other side of the city, but the earliest appointment you could get is 3 weeks away.
Social, cultural & educational 	Basketball is cancelled. This is your only social and recreational outlet so you are disappointed. Your needs •	Basketball is still cancelled. Your needs • You are feeling quite depressed. You had looked forward to basketball. It's important for both your mental and physical health.	Your needs
Healthcare 	You're running low on pain relief medication. Your needs • A supply of medication to relieve pain from spinal injuries.	Your mum is very stressed out. She has had to take time of work to care for you, and this is a big worry for her. She feels isolated and depressed. You are worried about her mental health. Your needs • Healthcare professionals to help your mother care for you.	Your needs •
Security &Safety			

	Your needs	Your needs	Your needs