HELLO?!

ABOUT

CRISIS COMMUNICATION
AND CITIZEN PREPAREDNESS

TNO innovation for life ▬

Flood Control 2015

FUTURE-PROOF
CRISIS
COMMUNICATION

What do you do when something happens in your neighbourhood? What if there's a flood, a riot, an accident? What if the power fails for days, or gas and water are shut off during a harsh winter? And what if there is a fire in your home or office?

Fortunately, these things don't happen often. Unfortunately, this means that we're usually not very well prepared for them. It means that the decisions we make in times of crisis usually aren't thought through rationally, but based on gut feeling and rules of thumb that are different for everyone. For those in the field of crisis communications, it means that when sending out a message, one should take the reciever's perspective to increase the likelihood that the content actually comes across. This makes it possible for the receiver to decide to take appropriate actions.

At the same time, citizens are the real 'first responders' to incidents: they are the first to be at the site, have information before the emergency services are alerted and usually know their own neighbourhood better than professional responders. Citizens' reactions vary considerably: some call 112 straightaway, while others provide assistance to victims. Nowadays it's also quite common to use the internet to send status updates or seek out information. Citizens could be seen as the additional eyes, ears and hands of emergency services. Therefore, the real question regarding crisis communication is: who's the sender and who the reciever. Inevitably, the emergence of social media like Facebook and Twitter will lead to a new relationship between professional responders and citizens. Which is not at all inconvenient, looking at an even smaller government that has to fulfill its role in new and smarter ways: the traditional hierarchical system, in which only the government sent out messages and citizens received them (and acted accordingly), no longer suffices in an era of networked communication with multi-source information, shared simultaneously and instantaneously. Crisis communication thus becomes 'communication' in the full sense of the word: a two-way process in which questions are asked and answers are given, and information is shared, searched and found.

In this changing world, it's a challenge for professional responders to share accurate and reliable information, in time, while citizens expect this more than ever. Sending out conflicting information or holding a press conference 24 hours after an incident are definitely ways to lose citizens' trust in the government. To avoid this, professional responders will have to adapt. This will affect both the responsibilities and competences of crisis communication specialists as well as the actual staffing issues. In many safety regions, the first steps toward this future are already being taken. We expect that this publication will contribute to the further development of future-proof crisis communication.

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Safety & Security Research

... the traditional hierarchical system [...] no longer suffices in an era of networked communication with multi-source information, shared simultaneously and instantaneously.

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(Crisis) Communication as a Way to Enhance Self- Reliance and Resilience

Traditionally, safety and security have been issues that were exclusively dealt with by the government. Investments were made in better equipment to decrease reaction times, in the improvement of procedures and in training of first responders in order to better deal with the situation at hand. However, national governments more and more realize that they cannot exclusively secure citizen safety and welfare. Not only because of the increasing pressure on budget and manpower and the complexity of society, but also because citizens are likely to be present at the scene of a disaster and have the will, knowledge, abilities and goods to deal with the situation at hand. Because governments realize that civilians play a crucial role in the first responders phase, more responsibility is transferred to citizens. However, in order to be able to make accurate decisions, citizens should be well informed about risks, about the actual situation and about possible courses of action when there is an actual crisis.

RISK COMMUNICATION
The perception citizens have of risks often disagrees with objective risk assessments: people may know that travelling by air is safer than driving, but still resist to board a plane while cheerfully commuting to and from work by car every day. A main reason for these discrepancies is the fact that risk perception is not only affected by knowledge of probability and severity of consequences but also by affect. The cognitive and affective systems have relatively independent effects on the perception of risks and are, consequently, affected by different factors.

To date, risk communication mostly taps into this cognitive system by solely informing citizens about the actual risks. Adding to this, by for instance, a frightening picture to a standard message influences risk perception. Including relatively simple messages like 'you can easily perform this' and 'this behavior is successful in mitigating the threat' results in increased information seeking and the intention to engage in self-protective behavior.

A related question is how these messages should be presented to the public. Many of them never check the website about risks in their own living environments. The first bottleneck here is to get citizens to read these messages at all. Social media offers a promising way to achieve this. The next challenge is to present the messages in such a way that they increase risk perception.

CRISIS COMMUNICATION
During a recent fire in a chemical plant in Moerdijk, The Netherlands (2011), citizens were informed by the government that no toxic substances were measured in the smoke, while at the same time they were advised to stay in their homes with doors and windows closed. The evaluation report of this incident identified many aspects to improve: first of all, ambiguous messages led to uncertainty. Parties involved did not communicate with each other (enough) and sent out different information.

Furthermore, it took quite some time before accurate information was shared. In the meantime citizens were sharing questions, concerns and sentiments through social media. Official crisis communication did not take this into account.

This incident illustrates a common flaw in crisis communication: the information given is based on the technical aspects of the incident and does not take citizens' needs into account. Part of this can be solved by ensuring (two-way) interaction between sender and receiver of information as opposed to 'broadcasting' messages.

CHANGE OF MINDSET
The transfer of responsibility towards citizens calls for a change in attitude of the various parties involved. To support this, knowledge about human (decision making) behavior has to be integrated with research on communication and interaction. This will help to make a shift from communication based on the aspects of the (possible) incident, toward communication based on the needs of people involved in this incident.

The dialogue with citizens should, however, not be limited to crises. In addition to awareness of risks and possible preparatory actions, citizens should have the notion that they do have the responsibility and the ability to take control (perceived efficacy).

TNO will continue research on the different ways of communication and collaboration between citizens and first responders (before, during and after crises), the possibilities of data-mining tools like Twitcident and innovative ways to train people in this new way of communication and collaboration. The outcomes will give more insight in effective ways of risk and crisis communication and will contribute to the change in mindset people need to make to enhance self-reliance and resilience.

National governments more and more realize that they cannot exclusively secure citizen safety and security

CRISIS COMMUNICATION
IN PRACTICE

FLOODS
THE WAAL AREA (1995)

During the floods of February 1995, the area in the centre of The Netherlands around the river Waal was threatened by high water. In this case, crisis communication mainly focused on (preparing for) evacuation. The official vision of the governmental actions during this episode was that authorities and governmental agencies performed well. The way in which the evacuation of about a quarter million people was led, received much acclaim.

The starting point for this evacuation operation was favourable: there was a visible and real threat, there was enough time to make the necessary preparations and there was a large degree of self-reliance among people.

POWER FAILURE
ZALTBOMMEL (2007)

On Wednesday December 12, 2007, an Apache attack helicopter flew into the power lines over the river Waal near Hurwenen, in the province of Gelderland. Some of the lines broke, resulting in a power outage in the Bommelerwaard area and parts of the nearby Tielerwaard area. The repair works, and with it the blackout, lasted until Friday evening.

Crisis communication was difficult because many of the everyday communication means like e-mail, telephone and television didn't work, and alternative means like the sound truck proved ineffective. As a result, many people, affected by the power failure, weren't reached at all, or not until very late. Furthermore, the news coverage with respect to the duration of the power outage was more optimistic than the already optimistic prognosis, causing unrealistic expectations among the affected population.

The communication process took the form of traditional one-way communication (sound trucks, door-to door letters, newspapers, radio and television). Although there were special meeting places where information was shared, little attention was paid to feedback from the population concerning the way the crisis was handled.

FIRE
MOERDIJK (2011)

On January 5, 2011, a big fire at a chemical plant in Moerdijk led to the large-scale deployment of all kinds of first responders . The enormous smoke development immediately caught the attention of many people in the surrounding areas. Because of the wind, the consequences of the fire impacted a large area.

The civil defence sirens were activated to give citizens the primary alarm signal: 'Go inside, keep windows and doors closed, turn ventilation off and listen to the local TV or radio station.' During the fire, it turned out that this was not enough. The sirens only give a first warning indicating something is seriously wrong. After that, citizens immediately start wondering what's going on. More information is wished for, necessary even. It took a long time, however, before more information from the government became available, which was then judged as unreliable by citizens (too little, too late and contradictory). The media , and citizens, took much of their information from Twitter, where an active discussion went on, without the government taking advantage.

THE EXAMPLES ILUSTRATE
FOUR RECURRING THEMES:

1. THE SPEED AND FREQUENCY OF COMMUNICATION

Citizens expect to get information about what's going on soon after the incident takes place. This means that the pressure to respond during the Golden Hour (the first hour after an incident) is high. Moreover, during this hour it's still possible to shape the media image of the incident. This causes a dilemma, though, because almost by definition, information is not yet complete at this point. Another obstacle for fast communication is the mandate policy, according to which, among others, communication can't start until the mayor has given his/her consent.

Citizens almost always feel that the frequency of communication is too low. Even the fact that there's no news, or that things need further examination, is news. Initially there was no government communication at all in Moerdijk, while the fire had long been a trending topic on Twitter. Only the day after the incident a press conference was held. In Zaltbommel, it took a long time to distribute a newsletter about the blackout, and information about the failure on the official emergency website, www.calamiteitgelderlandzuid.nl, was woefully behind.

2. THE CONTENT AND TONE OF THE MESSAGE

Information that's incorrect, incomplete or even contradictory, undermines public confidence in the government. Nevertheless, attempts to spread adequate content in messages are not always successful.

Sometimes it simply didn't occur to those responsible to share certain information: during the 1995 floods, people weren't told to evacuate their pets. As a result some citizens took their pets, others didn't. Another example is that there was no information on the reason why some areas were evacuated and others weren't. Citizens didn't understand why they were (not) evacuated.

When the power failed in Zaltbommel, there were misunderstandings and contradictory information too: the expected duration of the power failure was incorrect and kept being changed. It was not clear that it was only a forecast. In Moerdijk, at a press conference about the measurements of the National Institute for Public Health and the Environment, there was no mention of the increase of lead in a particular area. The next day, a toxicologist pointed out on television that the report included data showing just that.

3. THE ORGANISATIONAL STRUCTURE

During an incident, teams are formed and organisations must collaborate intensively on short notice. This cooperation is put under further stress because swift action is required. Lack of clarity about responsibilities, and problems working together in an ad-hoc situation, affect crisis communication in a negative way.

In the case of the 1995 floods, there was an internal struggle between mayors and Rijkswaterstaat, the government organisation responsible for the practical execution of public works and water management. People did not trust each other and undermined each other's authority publicly in the media.

Another difficulty regarding the organisational structure is acting and scaling quickly, without losing sight of the crisis communication's big picture. It's important that the messages of the various parties are aligned, but this proves to be quite difficult with so many stakeholders involved. Additionally, it's not always clear who those stakeholders are, especially when it comes to parties outside the safety or administrative network, or (private) companies specifically involved in an incident.

4. THE ROLE OF SOCIAL MEDIA

Social media are increasingly embedded in our society. Citizens use social media to communicate with each other and share their opinions. At this point, it makes more sense to complain about your energy company on Twitter than to call the customer service: your complaint will be resolved sooner. We can see the influence of this especially in the Moerdijk example. Citizens had access to information that was available on social media, but the formal information lagged behind and was contradictory. This caused citizens to lose their trust in government communication. Because of this, the incident generated much more attention, unrest and emotions than necessary.

Between safety regions there are considerable differences in the use of social media. Generally, it can be said that they struggle with the deployment of social media with respect to crisis communication. This has much to do with two major concerns: how can we judge the reliability of the information gathered through social media? And how can we avoid that the gigantic amount of information causes an 'information overload'?

Discussion at a conference with professionals led to the following thesis: social media are 'just another tool in the toolbox' and, like other media, will have to be used in a conscious and thoughtful way. A well thought-out communication strategy forms the basis for this.

CONCLUSION

This exploration in the safety domain show that citizens feel the speed and frequency of crisis communication could be higher. Among other things, this is due to the increased usage of social media: usually there's much communication on Twitter and Facebook before official communication takes place.

This increases the need for (directed) communication, but also causes a tension between speed and accuracy of communication. Fast communication can lead to carelessness. As a result, the content and tone of messages will probably have to change, for example by indicating what's verified and what isn't, but also by communicating that there's no new information.

The present organizational structures are not always ready for this, as there are considerable differences between safety regions. However, it's clear that this issue is high on everyone's agendas. The influence of new ways of communication, new technological possibilities and the changing role of citizens, invite us to rethink the organizational structure.

Citizens almost always feel that the frequency of communication is too low

Sometimes it simply didn't occur to those responsible to share certain information

'just another tool in the toolbox'

Citizens expect fast reaction after post on social media

An interview with

Menno van Duin

Lecturer at Institute for safety and the Police Academy

'As the recent example in Haren (project x, out of control, 'facebook-party') shows us, the government and professional responders should embrace modern media (Twitter, Facebook, etc.) as well as the more traditional media (112 reports, radio and TV) in their communication approach. Social media users expect more and more that professional responders react specifically to reports and input on social media. This does happen in some places, but not always in the most effective way.'

This view is supported by the results of a questionnaire that was published at the end of September 2012 on the NIFV-website. Most citizens expect professional responders to monitor social media 24/7 and respond directly to messages asking for help. Furthermore, 85% of the respondents mention that they use social media to contact professional responders. Not only to report major crises, but also for messages from a grandchild that granny has run out of medication. Citizens also expect their tweets and discussions to be seen and dealt with by professional responders. In five years' time follow up of reports of acute situations on for instance Facebook are expected to be as normal as a 112 call is now.

'The awareness must grow that the government is no longer the only actor in spreading information, but just one of them.'

Although this research has the limitation that it was carried out with social media users, van Duin expects the social media use to increase further in the years to come. Adolescents use this form of communication more than older people. But 55-year-olds do use social media to keep in touch with their children and grandchildren or in their jobs. In ten years' time communication using social media will be even more adopted than it is now.

'The drawback of these expectations is that citizens can lose their trust in professional responders if their reports are not adequately dealt with. Because of this, they will take matters more in their own hands, private initiatives will arise and the role of the public sector will decrease.'

This means that the role of communication experts with safety regions and professional responders will change. From a passive follower, they become an active linking pin in the communication network. As a result of this, communication about incidents will become more a continuous discussion, instead of asking specific questions. Not only during the warm phase, during the incident, but also pre-emptive, to prevent possible incidents or crisis scenarios. Van Duin expects, therefore, that more manpower and expertise is needed to take up this role in a good and effective way. The effectiveness of actions will largely part depend on the way in which citizens' needs for information and communication are met and anticipated.

'The awareness must grow that the government is no longer the only actor in spreading information, but just one of the actors. This shift in communication goes hand in hand with a shift of authority. If the battle around social media is lost, i.e. the government organizations fail to connect adequately, they can whistle for it.'

SELF-RELIANCE,
A DILEMMA IN CRISIS CONTROL

Most incidents happen without too much warning beforehand. They are reported by citizens, who happen to be on the spot. Despite the high level of emergency response in The Netherlands, it will take professional responders some time to get to the scene of the incident. When they arrive, actions will have been taken by citizens.

GOOD EXAMPLES
There are some good examples of this: after the plane crash in the Amsterdam area Bijlmer in 1992, citizens took it upon themselves to look after each other's children (informal daycare). Because of this, more adults had their hands free to help in other ways. After the explosion in the fireworks warehouse in Enschede in 2000, citizens arranged first aids centers where the wounded were assessed. They also helped with the communications, riding their motorbikes through the city to deliver messages. In the aftermath of the fire in a café in Volendam on new year's Eve 2001, burn victims were taken off the streets by people living in the neighborhood and put in showers. After the Turkish Airline plane crashed near Schiphol Airport in 2009, farmers drove their tractors to the crash-site, which was in the middle of a ploughed field. Ambulances had difficulty reaching this field because of the narrow roads and the mud. Tractors were already in the area and had no problem negotiating the muddy fields. Although the citizens' initiatives led to e.g. uncertainty about the whereabouts of victims, it is clear that lives were saved and further damage was prevented.

RESPONSIBILITY
These are just a few examples of how citizens can and will act when they are confronted with an incident. These kinds of actions are already taking place when the professional responders arrive at the scene. The natural response for professional responders is to take over, to take control; they are responsible, not only for the correct and efficient crisis management, but also for the safety of people (victims as well as citizens). Citizens can, on the other hand, offer much; at a time when much has to be done and all help is needed.

RESOURCES
Citizens are the eyes, ears and hands of professional responders; they are on site, they can see what is happening. On top of that, citizens know their own neighborhood very well. They know where streets lead to, what a normal water level is, that there is an old lady on the third floor of the flat at the end of the street and they know the people who live in their street. Last but not least, citizens also bring their own knowledge, experience and expertise to an incident. In their working life, they might be a doctor or nurse, a

technician or highly valued people manager. It would be a shame if those resources were not used during a crisis.

DILEMMA
This does create a dilemma. Although help during and after a crisis is very useful and needed, it is difficult for professional responders to stay in control and carry out their responsibilities. To make the full use of what citizens have to offer, they need answers to the following questions. How can professional responders quickly assess what actions citizens have taken already? And more importantly, how can they make sure that the quality of those actions is up to standard? Lastly, who is responsible, when a citizen gets hurt while helping others? A database filled with names and expertise will probably not do the job, we will need more dynamic ways to assess citizens' qualities and possible use in a certain type of situation. The discussion that can lead to solutions for this has to start with a belief that citizens can offer valuable contributions in crisis management.

Everyday
COMMUNICATION EXPERIENCES

'The Hague, Friday, 17.15. I'm about to take the train to Amersfoort. Just before getting in, I check my mobile phone to see if my train will leave on time. This train will not ride because of an obstruction on the track near Gouda. When I ask the ticket collector about this, he doesn't know anything. Five minutes later there is an announcement on the platform that the train will not ride, due to circumstances yet unknown.'

Saturday evening, 23.30. I arrive home after an evening out. When turning into my street, there is a policeman in the middle of the road. Driving on carefully, I see another policeman about 50 meters ahead. At the third policeman I stop and ask what is going on. Is it safe to go home? Nothing's going on and of course I can go home. The next day I read in my newspaper that they were searching for an escaped burglar who was hiding somewhere in the backyards of the houses in my street.'

During high water in the riverarea in the middle of The Netherlands, and a threat that a dike may burst, it was decided that the dike would be breached on purpose. The water would, as a result, flow into a floodplain and the city center would be spared.

Unfortunately this was not communicated very well: the volunteer fire fighters in the area organized themselves and filled up the breach with sandbags.

'Sunday afternoon, 14.30. I am enjoying the nice weather in my backyard. A police helicopter passes over my house slowly. Five minutes later, this happens again. This repeats itself for about 20 minutes. Checking the internet does not provide any information on the reason for this. Despite the nice weather, we decide to go inside and close all the doors.'

Hello?! About crisis communicatian and citizen preparedness

TOP 3
CRISIS COMMUNICATION
MYTHS

There are some persistent beliefs about crisis communication. For example, you often hear that it's unwise to share available information with citizens. Citizens don't have to know everything, they don't understand it anyway, they only get in the way and, worst of all, they may panic! In this article we describe some of these myths and their consequences (Disaster Research Center, US).

Only when it's no longer possible to ignore the abnormal … do they accept that something is going on.

1. WARNINGS LEAD TO PANIC

The government think people will panic when something happens. The oft-cited example in The Netherlands is the 'screamer at the Dam'. During the May 4 (2010) remembrance of war casualties, a homeless person started yelling and disturbed the silence. As a reaction to this the mass of people gathered at the Dam square in Amsterdam started moving, wounding 63 people in the process. In the media coverage following the incident, it seemed the man had caused a panic, yet this really wasn't the case. People simply showed the logical response to a disturbance, by walking away from the place of unrest. Within minutes the order had been restored and the commemoration continued.

CONSEQUENCE

The consequence of the belief that citizens will panic if you give them disturbing information is that crisis managers often wait too long - until the very last moment - to communicate about a possible threat.

REALITY

In reality it turns out that crisis communication has to face what sociologists call the 'normality bias'. This is the tendency people have to initially interpret abnormal information as normal: they'll see it as a variation of the normal situation and won't feel threatened. Only when it's no longer possible to ignore the abnormal information - as the strength of the message increases over time, or more sources report about the same threat - they accept that something is going on. The metaphor that's often used here is that of a roly-poly toy. Because of the weight in its bottom, the puppet can be brought off-balance, but will always revert to the starting position. Only when the doll is laid almost entirely on its side, it falls over.

RESULT

By waiting (too) long to communicate about a threat, citizens won't get a chance to go through their own decision process. This will cause more people than necessary to ignore a call to action.

2. CITIZENS WHO DON'T LISTEN TO WARNINGS ARE STUPID

There is a general feeling among professional responders that they are the experts. When they put out a message, calling for action, they believe that this message should be acted upon (immediately) by citizens. People who do not do this are stupid; they don't understand the situation or the risk they run.

CONSEQUENCE

The government think that the communication is fine: they have sent out a message, told the citizens what they want them to do. If people do not act accordingly, it is their choice not to do so.

REALITY

In reality it may very well be that a message has not reached citizens, was ambiguous or gave insufficient courses of action. People go through a decision process before they act. They ask themselves the following questions: is something wrong? Does it affect me? Can I do anything about it? What can I do? If something goes wrong in this process, like a warning that doesn't reach them or ambiguous information , citizens can decide not to take action. This does not necessarily make them stupid.

RESULT

By assuming it's the people's decision not to act and has nothing to do with the communication, it's impossible to get more people to act. Ways to improve the situation only surface when you adopt the citizens' perspective and when you really interact with citizens. People who receive insufficient, unclear or contradictory information can lose confidence in the government as a source of information. Subsequent messages will be taken less seriously as a result of this. This increases the chance that they will not take action again, next time.

3. CITIZENS UNDERSTAND TECHNICAL TERMS

Professional responders usually describe crises in rational and technical terms. If you know what these terms mean, they are very clear and effective. When these (technical) terms are used in crisis communication, the chance is very real that citizens will not understand them. This prevents people from interpreting a warning correctly.

CONSEQUENCE

The government thinks the communication is fine, they sent out communication using the correct technical terms. At the same time citizens may be confused about the content of the message or misinterpret it (thinking they do understand correctly).

REALITY

In reality there can be a lot of confusion among citizens about specific terminology and about what they should or should not do. American research has shown that only about 50% of the population knows the definition of 'Tornado Watch' and 'Tornado Warning'. The term 'watch' is used for the continuous monitoring of the situation, while the term 'warning' is only used when everyone should act immediately. Because people don't know the difference between these terms, they can't judge how acute the situation is. There's quite a difference between being warned that a tornado is approaching or receiving a message that you should go to a shelter right now.

RESULT

The government think the communication is fine. Citizens may either think they know what a warning means (but they're wrong) or they may be confused because they don't know what the warning means. In both cases they will not take appropriate action.
To support citizens to be more self-reliant during incidents, the government communication should be more in line with their (information) needs. Because of this, crisis communication should take into account the decision process people go through, instead of holding on to myths. Important elements in this are clear language that is suitable for the target group and a check if citizens really received and understood the message.

The citizen's perspective

Citizens can be and are self-reliant during crises. Crisis communication is a powerful tool to increase this self-reliance. To effectively employ crisis communication for this purpose, it's important to take the citizen's perspective into account as well as the human decision making processes.

DURING A CRISIS, CITIZENS IN GENERAL SEARCH FOR ANSWERS TO THE FOLLOWING QUESTIONS:

1. Is anything wrong?

2. Does it affect me?

3. Can I do anything about it?

4. What can I do?

To answer these questions, people go through a number of steps. These steps range from very concrete: Does the citizen get the message at all?, to the final moment of decision: Am I able and capable to take an action that can help me in this situation?

If anything goes wrong somewhere in this decision process, a warning and call for action will not be followed. Effective crisis communication pays attention to this. The table describes the individual steps in the decision process and provides tips to enhance crisis communication.

INDIVIDUAL STEPS IN THE DECISION PROCESS

Step	Tip
1 RECEIVING THE MESSAGE Citizens must physically receive the warning.	Tip: Use multiple resources or media, depending on the target group, to increase the likelihood that a message is noticed (heard, seen, read).
2 UNDERSTANDING THE MESSAGE When citizens receive the message, they must be able to process it and understand what it means.	Tip: Make sure the message is unambiguous and don't use difficult or technical language. Keep the target group in mind.
3 BEING CONVINCED THAT THE WARNING IS CREDIBLE Citizens must trust the source, believe it is reliable, to be willing to accept the warning as real (and not a rumour of joke).	Tip: Be sure to be known as a reliable source (reliable and timely information before and during a crisis) and have various other sources confirm your message.
4 CONFIRMING THE THREAT Citizens must take steps to verify that the threat in the warning is imminent or taking place.	Tip: Provide confirmation from different sources that the threat is really taking place.
5 PERSONALISING THE THREAT Citizens must be convinced that the threat can actually affect them personally.	Tip: Provide information in such a way that people understand and assess that the threat can actually affect their personal life.
6 DETERMINING THE NEED FOR (PROTECTIVE) MEASURES Citizens must decide whether they should take action.	Tip: Provide a course of action that is feasible. Add a message describing what will happen if citizens don't take the proposed action.
7 DETERMINING WHETHER PROTECTIVE MEASURES ARE POSSIBLE Citizens must decide whether there are possible actions that will help them in this situation.	Tip: Provide a feasible course of action, specified for each target group in their specific situation.
8 DECIDING WHETHER YOU HAVE THE RESOURCES TO TAKE PROTECTIVE MEASURES Citizens must have the resources (budget, means and capabilities) necessary to do what's asked of them.	Tip: Include an extra message that will increase self-efficacy like: 'This action is easy to take.'; 'You probably have the means to take this action.'

FIRE
AT THE CAMPSITE

On a Tuesday in November, guests at a campsite in the Veluwe, a rural area in The Netherlands, detect a burning smell. Looking around, they also notice some smoke. Moments later they hear a siren. It's not loud and doesn't last long either. Is that an official signal? 'If something is really going on, they'll make more noise.' Only when campsite staff members jump on their bikes and warn guests personally, people start taking action. In this fire drill, it took about half an hour before the site was cleared completely.

Two people can get a completely identical message and still interpret it differently.

Research on crisis communication has long focused on warning systems. The conclusions were that these warnings should be timely and relevant, and should come from a reliable source. However, two people can get a completely identical message and still interpret it differently. Recently, this has led to the insight that individual decision processes play a role here. It's likely that the time required to evacuate an area depends more on the time needed to come to a decision than on the characteristics of the area (e.g. narrow hallways or roads, or just one escape route).

The main conclusion of the 'Fire at the campsite' drill is that the majority of the participants waited for a specific instruction, even after they'd smelled fire and/or seen smoke. Only after staff members reported that there was a fire and that they had to leave as soon as possible, did they come into action. This shows that it's very important for people to understand what's happening, if you want them to behave in a self-reliant manner, just one alarm is often not enough. A mix of signals seems to be more effective. Moreover, just telling people that they should evacuate doesn't suffice: they should also be pointed toward the evacuation route, the destination and the best transportation method. Only then the chances that people will actually take action increase.

TRUST

Previous research has shown that the best predictor of evacuation behaviour is people's degree of trust in the authorities and the media. In this experiment, the majority of the children were warned by their teacher and often left the area in a larger group. Most of them didn't know what to do and followed others. About three-quarters of the children indicated that they'd missed all information about the situation. This could mean that evacuation by group can cause a lot of uncertainty among individuals. This can be reduced by providing individual information as much as possible.

In the context of self-reliance, a remarkable result was that older women have less confidence in their own judgment than older men. On top of that, older women don't seek out extra information as often as older men. That makes them a group to keep in mind; it's even more important to make sure that they receive information about the situation.

INFORMATION SUPPORTS DECISION MAKING

The results from this study corresponds very well with the model of the decision making process, described in the previous article. A warning must physically be received by citizens before they can respond to it (a small portion of the participants had not received a warning at all). They must then be able to understand the message (the sound signal was not interpreted as a warning). These sources must seem reliable to them. They then look for other sources that confirm the warning (burning smell and smoke, warnings by campsite staff, teacher and other people's behaviour). When they realise that they are really in danger themselves, they look for the best thing to do (leave the site) in a way that best suits them (on foot, by car). So here's another confirmation that crisis communication doesn't stop after citizens have been warned. A consequence of this is that if, due to a lack of time, compromises have to be made, the bet should be on communication tools instead of on physical pointers for the escape route.

AMOUNT OF INFORMATION

A common belief in crisis communication is that warnings should be brief. Actually, in a crisis situation, people want as much information as they can get. The more information they receive, the better their understanding of the situation. This helps them to make better decisions. Because much information is given verbally during an incident, people do struggle to remember everything. Repeating the message (a few times) is a good way to support citizens.

It's likely that the time required to evacuate an area depends more on the time needed to come to a decision than on the characteristics of the area.

There is a risk of a dike breach. In case of a dike breach, the water will rise rapidly and we advise you to take measures.' This message reaches you as a text on your cell phone. What do you do? In an experiment, the actions 25 participants took in response to this message were tracked. 25 other participants received a slightly different message: besides the warning they also got an advice for a concrete course of action: 'There is a risk of a dike breach. In case of a dike breach, the water will rise rapidly and we advise you to leave your home and move to higher ground.'

Leave your home
and move to higher ground

FINDING INFORMATION

Citizens who don't know exactly what's going on, or don't even notice that there's a real risk, start looking for additional information. That has to do with their own interpretation of information. Nowadays, people have access to a wide range of sources. When they're threatened by a flood, they can consult various websites and social media, they can text friends and family, or they can go to the neighbours to discuss the situation. Based on this information, previous experiences and their own understanding of the looming disaster, they make an independent decision as to whether they will or won't evacuate.

COURSE OF ACTION

The citizens in this study turned out to decide to evacuate sooner if they were urged to do so by the government. If you want people to take action, it is therefore useful to give them a concrete course of action to follow.

Regardless of this decision, they all sought additional information. Both groups asked for the same amount of information, from the same sources and of the same kind. So the advice to evacuate does not seem to alter the information processing steps, but it does seem to influence their decision taking.

RESPONSIBILITY

Citizens feel personally responsible for the decision to evacuate. This is why they believe that they have to search for additional information. Most often, information from the government and experts was looked up, with a preference for the experts. In terms of content, citizens were looking for the consequences of the flood: how high will the water get? Uncertainty about the risk of flooding and its consequences makes citizens hesitant to simply follow the government's advice. When experts contradict each other, this causes a lot of uncertainty, resulting in citizens ultimately doing nothing.

RULES OF THUMB

Although participants could click on 25 cells, the average amount of information requested was only 8 cells (32%). This again showed that people don't decide based on an exhaustive analysis of all available information (rational), but use heuristics (rules of thumb). For example, a number of participants indicated that they would always err on the side of caution (and thus evacuate). Others relied on what the experts said. Different people may use different rules of thumb and make completely different decisions based on the same information.

Besides the cognitive trade-offs that people make, social considerations also play an important role. People react to what others in their environment do and often follow their behaviour. This can also be seen as a rule of thumb: 'If the neighbours leave, I will leave as well.' These heuristics could also be used to influence people. When key players in a social network leave, the citizens who use that as a rule of thumb will follow.

Citizens don't automatically follow government advice. Based on knowledge, experience and available information, they will make their own assessment of what's best for them. If your starting point is that citizens make their own assessments, crisis communication perhaps shouldn't focus exclusively on trying to influence behaviour ('go and evacuate'), but also on the processing of information. For example, the government could communicate explicitly about uncertainties, or about the most reliable information source. In this way, the decision-making process of citizens may be influenced more effectively, resulting in more people behaving in the desired way (evacuating the area).

Bringing the outside world in

An interview with Eric Seugling

Senior communications advisor at

the Fire Brigade Hollands Midden

'Crisis communication is not only important for the management of the incident itself, but for dealing with the aftermath as well. During an incident your focus is naturally on informing citizens, acknowledging emotions and preventing more damage. You would like citizens to do the right thing, which can vary from leaving the site of the incident to actively helping out. For example, we once asked a photographer to mail a photograph of an incident to the Regional Policy Team (ROT). He was already on the spot and we were not. Within a few minutes, his photograph gave us a clear picture of the situation. At the same time, during an incident you should always keep in mind that actions taken in the acute phase may affect the settling of the incident in the aftermath. Questions that aren't (sufficiently) answered will come back to you like boomerangs.

This is why we quickly seek out partners involved in an incident and use them to spread information too. Newspapers, in this case, are more of a medium for us than a partner. They are a good way to reach a large audience, but there's less room for interpretation in the message.

To communicate effectively, you need to bring the outside world in. What questions do citizens have? What information do they have that could help us? What about emotions? That's easier said than done. Because of the multitude of messages during an incident, as a communications advisor you can't see the forest for the trees. An analysis tool that helps you to quickly distinguish questions from exclamations, or a word cloud that shows which topics are mentioned most

often, already helps tremendously.
In the end you'll want to see all the relevant messages yourself. A good analysis tool that decreases the number of messages you have to take a look at, saves a lot of work!

If we can follow what's happening during and after the incident on top of that, we get a good picture of how the incident developed, and the impact our communication has had on that. Crisis communication is becoming more diffuse, while at the same time we have to communicate in a more specific way. We desperately need the outside world for that!'

In the end you want to see all the relevant messages yourself.

Citizens don't automatically follow government advice. Based on knowledge, experience and available information, they will make their own assessment of what's best for them.

Hello?!   About crisis communicatian and citizen preparedness   Research

Two men run through a busy urban environment.

Panic sparks from their eyes. In a frantic rush to their friends' house, where

a terrible disaster seems to have taken place, they climb walls and jump over

cars. At the apartment they kick in the door, just to find their astonished pal in

fine shape. While reaching under the couch to recover the smartphone he had

dropped there just moments ago, he glances at his buddies with a questioning

look. 'Dude!', they exclaim, 'we didn't hear from you in over twelve seconds!

No tweets, no SMS,

not even the slightest Ping,

no WhatsApp...

WHAT'S UP?!'

USING SOCIAL MEDIA
DURING INCIDENTS

CRISIS COMMUNICATION EXPERTS

One of the most heard reactions to the use of social media during incidents by professional responders is: 'We don't have the time for that.' A close second is: 'We don't know if the information on social media is reliable.' Although some safety regions are exploring the possibilities of using social media during incidents, many are still looking for ways in which this can work for them. To explore what could help professional responders to overcome these difficulties, we presented communication experts with an analysis tool. This was a low-tech demonstrator: on the surface it did what you would expect it to, but it wasn't a working system. The experts tried out the different analytical possibilities, and gave us feedback about their usability.

Four communication specialists from the safety regions Groningen, Hollands Midden and Brabant-Noord got access to a real set of tweets, relating to the fire in the control centre of the Dutch Railways in Utrecht in 2010. As a result of this fire all railroad traffic to and from Utrecht was disrupted for hours. Many passengers were stranded and there was a lot of uncertainty.

As time, information overload and reliability are the main issues when using social media during incidents, we looked for analyses that would contribute to this. To quickly assess which tweets need a second look we added the following analyses: Sentiment trend; Wordcloud; Number of questions versus the number of exclamations; Map with the locations of the relevant tweets and attachments. The communication experts doesn't need to see all the tweets, but can focus on the tweets that probably are most relevant and informative. To determine the reliability of tweets we added the following analyses: Map with the locations of the relevant tweets; Top 10 tweets with the most followers; Top 10 tweets with the most reach; Top 10 tweets with the most influence and Attachments (photographs en links). The rationale behind this is that when somebody is in the neighborhood of an incident, his information is probably more reliable than when he is on the other side of the country. Furthermore, tweets that have the most reach or followers must be taken seriously; others are taking them seriously! The last functionality offered was a 'search' button.

As our analysis tool was a low-tech demonstrator, we analysed all the tweets by hand (three independent analysts). This gave us some first-hand experience of the difficulties that arise when you try to sort a large number of tweets according to these functionalities. For instance, even after repeated discussions, we could not determine if some of the tweets carried a positive or a negative sentiment. If we cannot decide on this, how can we expect a tool to make this decision? Another example is the sorting of questions and exclamations. Although using question marks and exclamation marks gave us a good first start, some questions don't come with a question mark. The order of the subject and the verb provided some extra clues. But still, it was difficult to use general rules to decide on this.

The above scene is from a commercial for a telecom provider, promising to keep you in touch with your friends at all times. They want us to believe that everyone is active on social media 24/7. Exaggerated as this might be, it's a fact that people use social media like Facebook and Twitter to find out what's happening in the world and report on this as well. This is why during incidents, professional responders can monitor social media activities and use the information they find, react to the questions that arise, and affect the sentiments that surface.

Societal developments like these invite us to view the information exchange between civilians and professional responders in a new light. That's why at TNO we've set up an experiment to research the interaction through social media, in this case Twitter, during a simulated incident. In this article, we'll report on the lessons we distilled from the results, in order to improve the efficiency of communication between authorities and the public.

Screenshots of the low-tech demonstrator
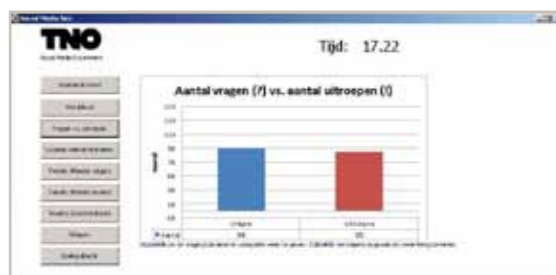
Categorized proportion of tweets per condition

Legend:
- Control before
- Control after
- Experimental after
- Experimental after
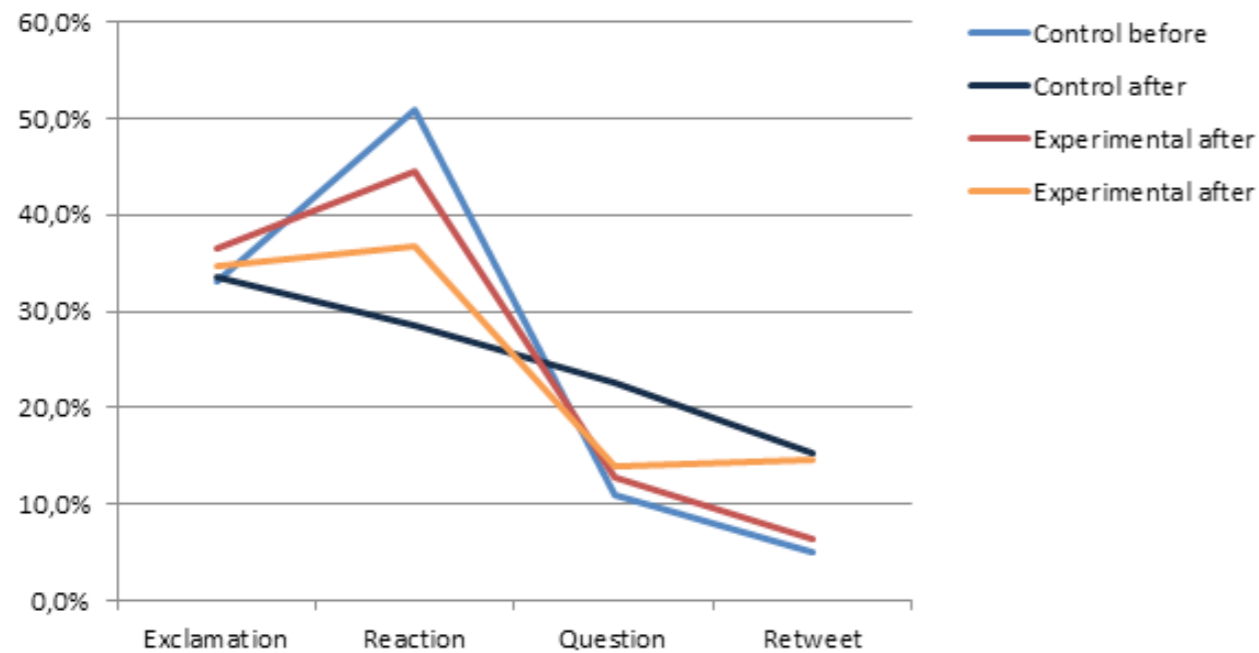
RESULTS

The communication experts were predominantly positive about the analytical functionalities of the low-tech demonstrator. They especially liked the 'word cloud' of most-used words in the tweets.

This gave them a better picture of what was going on than the sentimental trend. The sorting of tweets into two groups (questions and exclamations) was also an eye-opener. This gave them a quick overview of the kinds of questions that people ask. Even if they miss out on some of the questions, they do get the general idea of what questions are asked at a certain point. Sorting on the basis of attachments would give them the possibility to quickly find photographs of the incident. Photographs are seen as more reliable than messages, and they provide valuable information for first responders approaching the scene of the incident.

In addition to this content analysis, they also found the reliability analysis important. The top ten most followed tweeters, or Twitter users with the largest reach, gave an instant sense of the sender of a message. This helped them to interpret the reliability of the sender and the message.

The general feeling was that with this type of analytical functionalities, they could limit the information overload that social media monitoring can cause. The analyses would need to be continuous (not just an impression at one given moment in time) to be most effective. Based on this information, they wouldn't per se act differently, but they'd do it in a more focused and effective manner.

CITIZENS

Related to the test with communication experts, we wanted to find out what information citizens need and seek during an incident and if it helps to address their questions explicitly compared to giving standard information. To measure this, 20 participants were presented with a simulation of an incident during a concert. About seven minutes into the concert, the screen on which they were watching the concert went black. At the same time a loud crash could be heard. After that, the simulation ran for another 10 minutes. Participants could share information and questions on twitter and received (standard) information about the situation. The subjects were asked in advance to twitter as much as possible, which they did. To assess their state of mind, they filled out a questionnaire before and after the simulation. Once the incident was under way, 10 participants received standard information (scripted), the other 10 received (scripted) information that matched better with their own questions. For this, we'd prepared a list of the questions we were expecting to be asked with a set of standard answers. As soon as such a question was asked, the scripted response was given.

RESULTS

Looking at the answers to the questionnaire that asked about their state of mind, participants turned out to be rather affected by the simulated incident they'd faced. In general, they felt less comfortable and more angry. What's striking here is that the experimental group, the group that received specific answers to their own questions, had a more extreme reaction than the control group. It seems that the more information you get, the less you're at ease. A reason for this may have been that participants felt more involved in the situation when they received more specific information.

An increase of tweets clearly marked the start of the incident. Although we had asked the participants to tweet a lot anyway, there was a clear peak just after the power went out.

Image left
Ratio of different types of tweets over time

Image below
Games masters providing scripted information

First, both groups started asking what'd happened.
The group that didn't get a specific answer kept asking these questions. The experimental group that did receive an answer to its request for information, then began asking other questions: they asked for a course of action (What should we do?) and, later, for an interpretation (How could this happen? Who's responsible?). This seems to indicate that those directly involved in an incident first feel a need for information about the incident ('What is going on?'), then for a course of action ('What should we do?') and finally for an interpretation ('How could this happen?'). The fact that the number of questions decreased in the experimental group, after their questions had been answered specifically, indicates that it makes sense to specifically answer citizens' questions.

Not only do the questions stop, you also reinforce the feeling that citizens are taken seriously. This has a positive influence on the emotions shared through social media. General information – even if it contains the same facts - does not have the same effect: the number of questions asked stays the same.

During the discussion afterwards, the participants in the experimental group indicated that they felt they'd received adequate answers to their questions. The control group found that the given information was too little and too late. This left them frustrated; they felt they were not taken seriously. Both groups found mobile communications (SMS or Twitter) the best means for situations like this: if you're directly involved in an incident, you don't always have the possibility to look up a website or turn on the radio or TV.

'Fortunately nobody was hurt here'

LESSONS LEARNED

- **Self-reliance (and citizen participation) can best be stimulated through adequate and timely information about an incident.**

- **Those involved in an incident directly prefer to be informed through mobile communication (SMS, Twitter). Afterwards, or for other target groups, that can also be a website or a press conference.**

- **The order in which questions are asked, seem to be as follows: information, course of action, interpretation.**

- **Questions that are answered, will not be asked again. This leads to fewer questions (in the aftermath) and helps to avoid uncertainty, anxiety and irritation. Simultaneously, this reduces the pressure on professional responders, allowing them to spend their time and energy on other tasks.**

- **With the right supporting analysis tools, emergency services can inform citizens in a more specific and therefore more efficient manner.**

- **Questions don't stop when the acute phase of an incident has ended. Even after the incident, communication should be facilitated.**

'Navigating in a digital environment' was the name of a large experiment in which we followed the actions 160 participants took in response to a virtual accident. Research on human behaviour in response to an incident is of course best carried out in reality, but this is usually practically not possible. You simply don't know when an incident will take place or what kind of incident it will be. If you want to join in as a researcher, you're always too late. Conversely, it's not ethically accepted to conduct a research project in which people are actually at risk, in order to measure their reactions.

Research on human behaviour in response to an incident is of course best carried out in reality, but this is usually practically not possible.

RESEARCH ON BEHAVIOUR

Therefore, the following three methods are generally used for research on behaviour: assessment, mental simulation and real-life simulation. In an assessment, people who were involved in an incident are asked what they did at the time. Sometimes a questionnaire is used, but often qualitative methods like (group) interviews are preferred. With mental simulation, people are presented with a fictitious situation, for instance: there is a fire. Then they're asked what they would do in that situation. In the real-life simulation, people are asked to participate in a simulated incident. During the incident, their actions and reactions are recorded as best as possible. All three methods provide opportunities to get a feel for what people do when something happens, but at the same time the reality is that you often don't get to know people's real behaviour.

ASSESSMENT

Assessments are, of course, always done after the fact. Sometimes much time passes after an incident before citizens are questioned. By then it's difficult for them to look back and say exactly what they did, when and why. The incident has often already become a 'story' in their minds, supplemented with information and insights from others. Additionally, group discussion can have a certain dynamic in which individual experiences are diminished or altered. For example, people can (unconsciously) choose to paint their own role more positively than it actually was: a socially desirable answer.

MENTAL SIMULATION

With mental simulation, people are asked to imagine a situation that has not (yet) occurred. You present them with a situation and ask them to imagine being in it. This is often supported by sounds, smells and images, for example by showing a video in advance, hanging posters on the wall of the test lab or by starting a small fire and producing smoke outside. Then, you ask what they would do. Not everyone is able to imagine themselves in such a situation, so responses will often be rational in nature: not a good reflection of what people really do.

Interestingly, mental simulations are often a good predictor of future behaviour: if you have spent time considering what a good response would be when a fire breaks out, you are likely to remember that if the situation arises. In other words, mental simulations are often more suitable as a preparatory or training tool than as a measuring instrument.

REAL-LIFE SIMULATIONS

In real-life simulations participants are asked to take part in a simulated incident. This gives them the chance to take action and show real behaviour (actually leave the campsite or click on information sources). This increases the chance that you get people's 'real' responses. The disadvantage of this method is that it is difficult to register individual responses and actions. To do that you would need one-on-one monitoring. This is very expensive, but would also disturb the experiment itself: participants can hardly be expected to act naturally when there are so many observers around. So, although the experimental setting might guarantee the right data, it is difficult to collect them. Another disadvantage is that a real-life simulation is based on scripted improvisation. The situation is acted out by professionals, following a script but also adding their personal interpretation. It can, therefore, never be exactly copied with a new group of participants.

DIGITAL ENVIRONMENT

Using a digital virtual environment solves most of these problems. On the one hand, it allows participants to walk around and take action like they would in the real world. On the other hand, the scenario is completely scripted and all actions are recorded, The experiment can, therefore, be repeated endlessly with new groups of participants. Thus adding up to a group of participants that is large enough to base conclusions on. Because all actions and reactions are recorded, individual behaviour of participants can be measured and compared. Although the development of a virtual environment in itself is not cheap, it is relatively cheap when you think of the amount of individual data that can be gathered in this way. Monitoring by observers would be much more expensive. Moreover, the more often a scenario is used, the lower the cost per participant. This doesn't go for real-life monitoring.

REALLY?

We too noticed that some people (about 5%) found it difficult to imagine themselves being in an accident, they kept thinking of it as a 'game'. A few participants really had trouble operating the virtual environment. Despite a tutorial scenario, they got lost in the bushes or fell over the railing of a bridge, into the water. However, comments like: 'My victim is really dead now', 'Why didn't that stupid ambulance do anything?' and 'I wanted to run away but someone walked up to me and said we had to go and help', indicated that the majority of participants had no problem immersing themselves.

SCREENSHOTS
OF THE SCENARIO

'Kom terug, volgens mij heeft hij pijn! We hebben je hulp nodig.'

Using the serious game Virtual Battlespace 2, designed for training military personnel, we developed a scenario suitable for citizens. The virtual environment consisted of a small area with a sea on the left side and mountains on the far right. People were asked to walk to a job interview. To get there in time they needed to take the shortest route (there was an alternative route farther to the right, but it would not get them to the interview on time). The designated route passed a bridge over a river. When the participants reached a specific distance to the bridge, an accident would occur (right in front of them) blocking the bridge.

Participants could react in various ways: do nothing, call 112, walk away, talk to bystanders or help the victims. Depending on their actions, there was a response from the virtual environment: a report using 112 was confirmed and people who walked away were approached by bystanders: 'What's going on?' 'Shouldn't we help?' Bystanders could answer a number of standard questions, but didn't take any action. The same applied to the victims; they hardly answer any questions, but keep moaning with pain. The participants could also move the victims by picking them up or dragging them away from the cars.

All these actions were recorded, including the passage of time and the distance of the participant to the incident. This allowed us to make a detailed analysis of people's behaviour in response to an accident.

THE EFFECT OF THE MESSAGE

If people are asked not to go to the Red Creek because of a flooding risk, they tend to turn out to flock there to see if it's really that bad.

We know that crisis communication can affect people's behaviour, if the message reaches them and is thought to be reliable. For example, suggesting a possible course of action increases the likelihood that citizens take action. But what do citizens do about a course of action when they don't have enough information about the incident?

We also know that different people can react in different ways, even though they've received the same message. This has to do with their personality, prior knowledge, experiences and rules of thumb. Is it possible to make up for this by sharing information about risks in their own environment? Although citizens are more satisfied with process information than with nothing at all, it's still unclear what impact it has on their actions. How do we ensure that citizens are satisfied with our crisis communication and still take action? In an experiment, we tested the hypotheses that arose from these questions with the help of a model for human decision making.

HUMAN DECISION MAKING

1. RECEIVING THE MESSAGE	Citizens must physically receive the warning.
2. UNDERSTANDING THE MESSAGE	When citizens receive the message, they must be able to process it and understand what it means.
3. BEING CONVINCED THAT THE WARNING IS CREDIBLE	Citizens must trust the source, believe it is reliable, to be willing to accept the warning as real (and not a rumour of joke).
4. CONFIRMING THE THREAT	Citizens must take steps to verify that the threat in the warning is imminent or taking place.
5. PERSONALISING THE THREAT	Citizens must be convinced that the threat can actually affect them personally.
6. DETERMINING THE NEED FOR (PROTECTIVE) MEASURES	Citizens must decide whether they should take action.
7. DETERMINING WHETHER PROTECTIVE MEASURES ARE POSSIBLE	Citizens must decide whether there are possible actions that will help them in this situation.
8. DECIDING WHETHER YOU HAVE THE RESOURCES TO TAKE PROTECTIVE MEASURES	Citizens must have the resources (budget, means and capabilities) necessary to do what's asked of them.

COURSE OF ACTION

Citizens differ in their responses to incidents. Some will immediately come into action, others will first want to find out more about the incident or await official communication. Research has shown that people come into action quicker when crisis communication gives them a possible course of action. This is consistent with people's decision making behaviour: in the last step, before the final decision, they ask themselves what actions would help in their situation. A message in which a specific actions is mentioned will help them through this step. However, they must still feel that they are physically, mentally and financially capable of taking these actions.

Still, emergency services often feel that citizens don't follow the courses of action they suggest. If people are asked not to go to the Red Creek because of a flooding risk, they tend to turn out to flock there to see if it's really that bad. Apart from Thrill-seeking behavior, the reason for this might be in another step of decision making. If citizens are not convinced that there is a real risk, or that the risk affects them, they will not follow the course of action suggested.

This leads to two hypotheses:
• Citizens who are given a course of action will take action more often or sooner than citizens who aren't given a course of action.
• Citizens who are given a course of action, combined with meaningful information, will take this course of action more often or sooner than people who don't get meaningful information (no information or process-information).

RISK COMMUNICATION

People are all different from each other, simply because they have different personalities or come from different backgrounds. People also differ in the experiences they've had in their lives. For instance, you might come in contact with incidents more or less often depending on the place where you grow up. If you, or someone in your immediate family, has experienced something bad, you react differently when something similar happens again.

As crises do not occur frequently in The Netherlands, the majority of citizens has little experience in this area. Still, many people live in an environment where the risk of an incident is very much present. Consider the coastline, the central river region and areas near large (chemical) plants. Research shows that people often aren't aware of the risks in their neighbourhood and don't actively seek out information about them. To make matters worse, the government almost never explicitly communicates about specific risks.

Citizens who aren't aware of the risks in their own environment are more difficult to convince of a threat or of the seriousness of an incident. Looking at the model of people's decision making behaviour, they need more information and, thus, time to determine whether the crisis affects them personally. Communication about risks can in this way contribute to crisis communication.

This leads to another hypothesis:
• Citizens who were previously informed about potential risks will take action sooner (and/or more frequently) than people who haven't received this information.

PROCESS INFORMATION

As a reaction to citizens' expectations of timely and frequent information about incidents, emergency services have started paying more attention to 'process information' in their crisis communication. This is information about what you're doing as an emergency service, even if there are no new results to report. Citizens no longer accept that there is no communication until sufficiently confirmed results are available, When professional respond organisations can't comply with this, citizens become dissatisfied or lose confidence. A possible answer to this is process information: by communicating that you're doing the best you can ('We are heading to the scene of the incident,' 'We're measuring the air quality)', you prevent people from becoming dissatisfied.

First responders, however, get the feeling that citizens are becoming more passive. If citizens think the government is working on the situation and is in control, they won't take action themselves as quickly: their behaviour becomes less self-reliant. How do you find the right balance between preventing citizens' dissatisfaction and still keeping them active? The key to the answer probably lies with people's perception of the risk; a government that communicates to be in control, give people the idea that there actually is no risk. 'Process information' in itself might therefore not be the best answer to this. Meaningful 'process information' (We are heading to the scene of the incidents and will arrive in about seven minutes.), possibly in combination with a course of action might do the trick. It would also be interesting to see if citizens come into action sooner or more often if they don't get any information at all; the 'process information' does not influence their perception of the risk and they may just show self-reliance in reaction to the situation they are in.

This leads to two more hypotheses
• Citizens who receive 'process information' will take less action, or later, than citizens who receive meaningful information.
• Citizens who receive 'process information' will take less action, or later, than citizens who receive no information at all.

112?
There's been an accident!

Our 148 participants witnessed an accident in a virtual environment that occurred right in front of them. After their own first response they had to deal with different combinations of elements of crisis communication: prior information (yes/no), meaningful information (yes/no) and course of action (yes/no). All their (re)actions were recorded, so we could analyse what actions a particular combination of crisis communication triggered.

COMBINATIONS OF ELEMENTS OF CRISIS COMMUNICATION

ELEMENTS OF COMMUNICATION	PRIOR INFORMATION	MEANINGFUL INFORMATION	COURSE OF ACTION
Group 1	No	No	No
Group 2	No	No	Yes
Group 3	No	Yes	No
Group 4	No	Yes	Yes
Group 5	Yes	No	No
Group 6	Yes	No	Yes
Group 7	Yes	Yes	No
Group 8	Yes	Yes	Yes

PRIOR INFORMATION
The prior information the participants received was hidden in the description of a job opening. One half of the participants went off to a job interview for a position at a company that worked on advertising for healthy living. The other half applied for a job that dealt with bringing road safety to people's attention.

MEANINGFUL INFORMATION
Participants who received meaningful information got messages like:
'The ambulance is on its way and will arrive in approximately seven minutes.'
The other half received 'process information', information about actions that are being taken, without giving explicit answers. An example of this is:
'The ambulance is on its way.'

COURSE OF ACTION
One half of the participants received a course of action, a specific proposal for an action that an individual citizen could follow. An example of this is: 'Look whether the victims are at risk.' The other half received no course of action.

RESULTS

In this article we can only describe the first results of this experiment, carried out in September-October 2012. By the end of 2012 all data will be analyzed, and more detailed conclusions can be formulated.

The experiment consisted of a 30-minute scenario involving an accident between a car and a truck on a bridge. There were two victims in the accident: one from either car. One of the victims was in plain sight (Victim 1), the other one was hidden by one of the cars (Victim 2). This makes contact with Victim 1 rather logical. To make contact with Victim 2, the participants had to walk between the cars and search for him. Before starting the scenario, the participants practiced working with the virtual environment. While helping a woman retrieve her lost packages, they used all the relevant keys on the keyboard.

PARTICIPANTS
A total of 148 people participated in the experiment. Per condition (groups 1-8) there were 15-18 participants. The backgrounds (male/female and level of education) were more or less the same in the different groups.

PRIOR INFORMATION
Participants who received prior knowledge and a course of action (groups 6, 8) did not walk away from the accident as often as participants who did not receive prior information and a course of action (groups 1, 3). This seems to indicate that prior information influ-ences citizens in their decision to stay with the incident and help the victims. The prior information in this experiment was hidden in the text for a job interview; participants didn't consciously receive this information as a warning and didn't search for it themselves. This shows that even subtle forms of prior information can influence decision making.

MEANINGFUL INFORMATION
Participants who decided to walk away from the accident did so more quickly when they didn't receive meaningful information (groups 1, 2, 5, 6). The presence of a course of action did not make a difference here. Meaningful information doesn't seem to influence the decision to walk away. But when participants decide to walk away, it does seem to influence the time they need to decide this. Meaningful information in a message can, therefore, influence citizens to stay with an incident longer, and thus help the victims. Participants who didn't receive meaningful information and didn't receive a course of action (groups 1, 5) least often made contact with victim number 2. To contact Victim 2, participants needed to take specific action. They seem not to make that effort when they don't receive meaningful information and a course of action. To stimulate citizens to take action, a combination of meaningful information and a course of action seems the best approach.

COURSE OF ACTION
The data show that participants who received a course of action (groups 2, 4, 6, 8) did not walk away from the accident as often as participants who didn't receive a course of action. Moreover, participants who received a course of action, without meaningful information (groups 2, 6) made contact with Victim 2 more quickly than participants who hadn't receive a course of action (groups 1, 5).
Providing a course of action, therefore, influences participants to stay with the incident and try to help both victims. This is consistent with other research; citizens that are given a course of action are more likely to take action.

300,000

Number of new users added to Twitter

PER DAY

5.9,000,000
Unique visitors of **Hyves**
in 2012

69%

OF US MOBILE USERS ACCESS THE INTERNET ON THEIR PHONES DAILY

1993
Year internet started
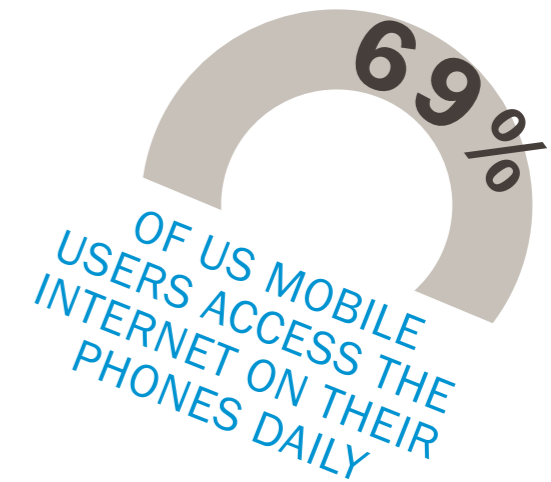
1.7,000,000

Dutch accounts sent a tweet

in a 3-month period

3,135,000
LinkedIn users in
The Netherlands in 2012

1,8 ZETTABYTES

QUANTITY OF INFORMATION STORED WORLDWIDE

55,000
THE LARGEST NUMBER OF TWEETS PER HOUR
COLLECTED BY TWITCIDENT (ELECTIONS 2012)

PER USER
2
social media maximal

5.972.360
Facebook users in
The Netherlands in 2012

8 OUT OF 10 DUTCHMEN
IS ACTIVE ON SOCIAL MEDIA

2.500,000

PHOTOS UPLOADED TO
@FACEBOOK EACH MONTH

96% OF 18-35 YEAR OLDS ARE

ON A SOCIAL NETWORK

WHY THE GOVERNMENT SHOULDN'T NEGLECT SOCIAL MEDIA

During or immediately after an incident, social media users describe what they saw, and what they know or think they know about the incident, in words and pictures. Journalists who rush to the scene send off the first news tweets. If the government sticks to its traditional rigid approach, they'll be one of the last to communicate about the same incident. This could have a negative effect. Citizens may get the impression that the government have no information, do nothing, or even that they don't have an opinion they want to share.

VIRTUAL CRISIS
Worse, social media can get abuzz with a crisis that isn't really taking place, made up by citizens aiming to disrupt the peace on purpose or created by rumours as a result of a lack of information. Such virtual crises never took place in reality, but can still have a substantial influence on public order. If they're not dealt with quickly and properly, they could cause actual incidents. Take the example of 'Bommen Berend', the celebration of the end of the Siege of Groningen (The Netherlands) in 1672. During the festival, social media revealed considerable commotion among the crowd gathered in the market square when a power failure occurred during (but not caused by) the fireworks display. Just when everything fell quiet, two ambulances started wrestling their way through the puzzled crowd. The local authorities and police were able to influence the commotion by, among other actions, posting messages on social media, stating that there was a power disruption, unrelated to the presence of the ambulances. Thanks to this alert action, the panic remained online-only.

TWO APPROACHES
It's clear that we can no longer ignore social media, for two basic reasons. First of all, there is the negative approach: it's there, citizens expect the government to use it and sometimes a crisis is (partially) due to social media. A virtual crisis can be more harmful than a crisis in the physical world. To prevent or suppress this, you have to be present in social media. Secondly, there is the positive approach: social media provide opportunities for improved situational awareness; of the source and impact area (facts), and the response (sentiments) in society. It also offers opportunities for cooperation (citizen participation), as social media provide access to tons of real-time information messages and make it possible to connect easily with citizens.

A more participatory form of crisis management is needed. After all, a crisis is too important to leave to the professionals. Luckily, social media give us just what we need.

> **After all, a crisis is too important to leave to the professionals.**

The four strengths of social media

Social media enable citizens to go a step further in their contribution to safety and security. Everyone can subscribe to RSS or Twitter feeds and keep an eye on YouTube channels. This means that safety and security organisations have perfect access to the eyes and ears of citizens, as well as to their knowledge. Because of this, the information that's needed to act quickly and precisely in a crisis situation can be gathered much faster and in more detail.

In fact, social media enable safety and security organisations to use citizens as sensors, enriching them with a countless number of information sources. And, unlike simple sensors, we humans can add knowledge and interpretation to data instead of just (re)producing them. The ambition for all parties involved in a crisis situation is to make use of these sensors in four way: by monitoring social media continuously, sending messages, asking questions and interacting with citizens.

MONITORING
Many citizens who have relevant information about an incident post this on social media. Monitoring social media enables safety and security organisations to notice a (potential) crisis early on, to obtain an up-to-date overview of the situation and to correct rumours and incorrect information. It allows you to keep tabs on what concerns citizens (content network), who they are and who make up their social network (actor network). Monitoring is the central activity to the usage of social media. As soon as the relevant information has been analysed, information can be sent out, questions can be posed or a dialogue can be started (interacting).

SENDING
At the moment, the government send out information but do not expect citizens to answer. Citizens are informed and sometimes given a course of action. For example: 'There is a major fire: Go inside and keep doors and windows closed.'

ASKING
Besides sending out information, the government can also ask for specific information or help through social media, because social media offer the opportunity to reach many people, real-time and at low costs. Social media can also be used to find (indirect) victims, to give them the help they need. One example is the AMBER Alert: 'Missing: Jan de Bruin: 14 years old from The Hague. Blond hair, black jacket, white shoes. Missing since 26-10-2011. Photo at http://amberalert.nl. If you have any information, twitter: #vermist@ JandeBruin, Phone 0800-6070.'

INTERACTING
Both citizens and safety and security organisations can pose a question with the aim of starting a dialogue or 'multilogue'. This works for situations where a one-off answer is not the intended effect. For instance, look at this tweet from @nonym: '@police_aa Why so many police at the #Dam in #Amsterdam?' and the reaction: '@nonym, nothing going on. Police present because a #demonstration is expected today in #Amsterdam'. @nonym can then react again (dialogue), but it's also possible for more people to join in (multilogue).

smart filtering
for real-time situational awareness

Increasingly, photos, film clips and written accounts of citizens who witness an incident being posted online, without direct notifications to professional responders. This rapid messaging about incidents or disasters quickly turns into a mountain of data that's theoretically useful to emergency services and law enforcement, but completely unstructured and therefore impossible to go through.

Fundamental questions are: how can we deal with the enormous amount of information on social media, and what can we do with it? What information can be distilled from the messages, and how do we decide which messages are relevant? Twitcident is a tool developed for professional responders to help find useful information and display it in a user friendly dashboard.

TWITCIDENT

TNO, TU Delft and an Amsterdam-based startup recently developed Twitcident, a web-based tool that automatically searches, filters and analyses messages regarding (impending) incidents.
Twitcident distills potentially relevant messages based on two filters. The first filter distills relevant messages from the internet, based on the context in which they were sent: location, event or group. Secondly, from these potentially relevant messages, Twitcident filters the messages that contain information labelled as relevant by the end user, based on their content (using words like fire, violence and crowd/commotion).

Experience using Twitcident has shown that only a small percentage (6-10%) of the contextually relevant tweets remains so after the content filter. These messages can be visualized as a message list, by geotag and in graphs. Pictures sent with the messages can be shown and different time plots can be chosen. This makes the human analysis user friendly and easy, which is essential in stressful situations.
The next step is to analyse the selected messages, based on both context and content. This analysis still has to be done by hand. There are hopes that some of this manual work may be taken over by machine intelligence in the future.

QUALITATIVE AND QUANTITATIVE MESSAGES

Twitcident is validated as a 'real-time' information source, but data can also be collected after a disaster has occurred. Through analysis of many different incidents, we learned that there are two types of messages:

1. Messages that are relevant because of their unique content. We call these qualitative messages. These messages mostly contain facts, for example: 'I see a fight,' or 'I'm going to kill...' These are the kinds of messages that prompt action. Professional responders will want to trace the sender, try to contact him or her, or go to the location the message refers to.
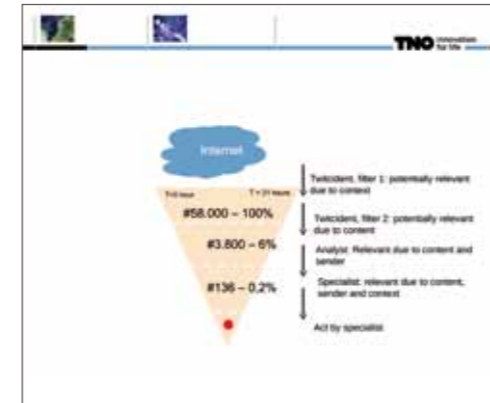
2. Messages that are relevant because many messages contain similar content. We call these quantitative messages. These messages typically contain feelings and opinions, like: 'It smells funny here' or 'It's very busy here.'
In general, professional responders wouldn't take action based on one message stating it's busy, but if a large number of people post the same information, they will.

The distinction between these two types is relevant for analysing the messages. Qualitative messages need to be read by professional responders. The quantitative messages don't have to be read individually, as a statistical analysis of all quantitative messages will provide enough information.

TWITCIDENT AS AN EARLY WARNING SYSTEM

One of the disasters that was analysed is the Pukkelpop Festival. In the Summer of 2011 a storm raged over the festival terrain in Belgium, damaging the tents.
A case study carried out by TNO and HKV Lijn in Water revealed an explosion of messages with questions, rumours, facts, photographs and videos.
The enormous boost in the number of messages sent can be considered as an early signal of the impending disaster.

Twitcident was also used during Queen's Night and Queen's Day (2012), when Queen Beatrix and the Royal Dutch family visited the province of Utrecht. Monitoring tens of thousands of tweets provided the police with useful information about the atmosphere, potential threats and crowds on the streets.

For example, Twitcident signalled an eyewitness of hooligan violence as well as potential risks, including death threats aimed at the Royal Dutch family.

If the authorities can be warned before a disaster takes place, or at an early stage, they can include the facts in their decision making and immediately respond to rumours. Maps, photos and visualised statistics give them an even better situational awareness. This added value can only be created if the relevant messages are processed in a smart way, and if we learn how to interpret the signals. Twitcident will continue to develop innovative solutions, profiting from machine and human intelligence to increase its added value.

Social media: roughly right or precisely wrong?

Even though introducing social media in crisis management and crisis communication seems more than promising, the implementation comes with several challenges. 'The wisdom of the crowd' is an often-used phrase, but just how wise is the crowd? There is much that the crowd knows: they see, hear and feel what's happening. Since the police can't be everywhere at the same time, information from the crowd is very welcome for public order management.

CORRECT OR FALSE?

Not all the information that finds its way to social media is correct. Validating what's right and what's blatantly false is an enormous challenge. Rumours about shootings are for example forwarded, creating turmoil among citizens. Sometimes absolutely right, but often false as well. How good the self-correcting mechanism of the crowd is - correcting rumours - really depends on the type of crisis. What can, or should, the role of the government be in influencing this crowd?

WELL-DEFINED BOUNDARIES

Traditionally, organisations in the safety and security domain were mostly hierarchical. But the well-defined boundaries that previously indicated where an organisation began and ended, and who communicates what, have become vague. An even greater challenge is that citizens have no role description, even though they fulfil a key role. It is difficult to organize without an transparent organisation in which tasks and roles are completely clear. That calls up the following questions

as well. How do you organize in an open environment? How do networked organisations work together within a networked society? This may easily lead to work being done twice, inconsistent communication and a lack of clarity about responsibilities. If everyone works together, who is then ultimately responsible in the case of an escalation?

DILEMMA

What should the government communicate: double-checked facts or speculations? This is called the trade-off between the speed and the reliability of a message. Social media create a demand for a speed and intensity of communication that the authorities currently cannot meet.

The dilemma is whether to choose the careful communication (precisely wrong) or fast, incomplete and potentially incorrect communication (roughly right). Keeping citizens satisfied who will accept no errors but also want to be kept up-to-date, that's where the art comes in!

> What should the government communicate: double-checked facts or speculations?

EXAMPLES OF THE (LACK OF) WISDOM OF THE CROWD

During a fire in the municipality of Valkenswaard, crisis communication advisors used Twitter for the first time in The Netherlands to respond to the many tweets concerning this fire. There was a rumour that a fire-fighter had died, and that caused a lot of commotion. The professional responders didn't know whether the rumour was true or not. (So much for the wisdom of the crowds.) Half an hour later, when they could communicate that it wasn't true, the rumour quickly disappeared.

Soon after the shooting in the Ridderhof shopping centre in Alphen aan den Rijn in The Netherlands, inaccurate information was spread via Twitter. The name of the shooter was revealed. Accidentally, there was someone else with the same name, which created confusion. Another rumour that circulated was that the shooter had also shot his mother. The professional responders quickly sent out messages that dispelled the rumours.

Only two hours after the shooting at Virginia Tech, the students began a Facebook group called 'I am OK at VT'. Within 24 hours all those who were still missing had been traced. The authorities would have taken a good deal longer to ascertain this, using the classical approach.

A SWOT ANALYSIS FOR SOCIAL MEDIA

To get an overview of the advantages and disadvantages of social media, we resurrect a vintage method: the SWOT analysis. In this analysis, we identify strengths, weaknesses, opportunities and threats, which can be used to identify effects of social media. This analysis can be very useful when deciding on the communication strategy and the role social media can play in that.

Social media SWOT

Strengths of social media
1. Anywhere & anytime
2. Low barrier
3. Speed
4. Direct
5. Transparant
6. Dialogue
7. Rich and diverse
8. Personal

Weaknesses of social media
1. Intensity
2. Barrier
3. Rapid change
4. Overload
5. Transparant
6. Decentralised
7. Immature
8. Value unknown

Opportunities of social media
1. Reach
2. Unity
3. Involvement
4. Influence
5. New value webs
6. Empowerment
7. Change
8. Value creation

Threats of social media
1. Miscommunication
2. Digital divide
3. Chaos
4. Lack of control
5. Abuse
6. Sociobesitas
7. Web 2.0 bubble
8. Influence

A SWOT ANALYSIS

STRENGTHS

1. ANYWHERE, ANYTIME: An intrinsic characteristic of the internet is that it has the potential to be used anywhere in the world, whenever you like. This makes it possible for social media to be independent of time and location, making them ever more ubiquitous.

2. LOW THRESHOLD: You used to need digital skills, knowledge and prosperity to be able to use social media (and the internet in general). But improving usability and user friendliness, and decreasing costs, are making social media accessible for everyone.

3. SPEED: Broadband and mobile internet are increasing the speed of sending and receiving messages. This causes online communication to shift from asynchronous (like email) to synchronous or real-time (chat). On top of that, the 'cloud' allows information to be shared with large groups at once.

4. DIRECT: Due to social media, individuals can now be reached directly and in great numbers at once. What was once impossible or very expensive is now cheap or free. Social media flatten the world, as one can communicate directly, without hierarchy.

5. TRANSPARENT: Since information has become easier to find, the world has become more transparent. 'Honesty lasts' is now a reality, as everything you do online leaves its traces. Moreover, the adage in social media is that sharing information outdoes possessing it.

6. RICH AND DIVERSE: There are more alternatives in the 'conversation spectrum' than ever. You can use text, images, video, speech and gestures to create and consume information, and to communicate. As media become richer, people connect with each other in more natural ways.

7. DIALOGUE: Social media lower the threshold to start a dialogue to approximately no cost at all. Moreover, communication has changed from sending to just one person to sending to two or more: multilogue communication.

8. PERSONAL: Along with providing information, you can now communicate in a personalised manner. It is possible and probably valuable to increase the number of personalised conversations, although many organisations are still struggling to do so.

WEAKNESSES

1. INTENSITY: The lack of time and space restrictions create an inefficiency risk, which can lead to reduced productivity. The enormous quantity of high-velocity, non-stop information causes high expectations and social pressure. This can require too much attention and even cause stress.

2. BARRIER: The internet is accessible to nearly everyone, but there are still substantial groups of people who don't use it. This may be due to a lack of equipment like computers and phones, but also to restrictions caused by handicaps or local regulations.

3. RAPID CHANGE: Social media change rapidly with new possibilities and dangers. Before late adopters have adopted a new medium, and before policy and law are adjusted, the next big thing has already popped up. New adjustments are needed before the old ones are implemented.

4. OVERLOAD: The weekly amount of produced information can now be measured in exabytes: more than the entire internet a few years ago. Social media is the biggest driver of this growth, due to its intensity (speed, directness, quantity) and dispersion (many different media).

5. TRANSPARENCY: Tracing your digital tracks, network and identity is becoming easier, as online activity is increasingly linked to your profile, while protecting or erasing data has become harder. There also is a growing number of applications that combine data from different sources.

6. DECENTRALISED: Formal communication has become more challenging, as the consistency of the message is likely to get lost. Because everyone is empowered to communicate, the power of traditional broadcasting diminishes. This makes it harder to become and remain fully informed.

7. IMMATURITY: Even though we've used digital communication for more than a decade, it still has its issues. The networks, computers and software on which it depends are not always reliable. Moreover, laws and policy are not yet sufficiently adjusted to social media.

8. VALUE UNKNOWN: The value, for all stakeholders, is unknown, and has hardly been studied. Cost-benefit analysis is difficult to make, especially for society as a whole. Luckily, it's now possible to measure the value of several elements of social media separately.

FOR SOCIAL MEDIA

OPPORTUNITIES

1. REACH: Everyone's reach is increased by social media, as you can communicate directly with whomever you want, anywhere in the world, from any place on the planet. The principle of 'six degrees of separation' is quickly becoming outdated.

2. UNITY: People can now unite forces more efficiently and effectively. This has changed the way organisations, governments and communities act and work. Citizens can influence the production procedure and value chain, and even initiate revolutions: just look at the Arab Spring.

3. INVOLVEMENT: Being able to have a dialogue with anyone anywhere at low cost allows you to co-create and to allow citizens to participate in the policy cycle. Two-way communication provides new opportunities for many organisations and individuals.

4. INFLUENCE: The authority organisations and opinion leaders used to project on the masses is reduced by social media. People can inform themselves better and more easily, and can make their opinions known to the world. The masses can correct polluted and incorrect information as well.

5. VALUE CHAINS: Social media provide possibilities for collaboration, as well as social and technological innovations. There is a tendency towards open innovation and open data. They've made it easier to join a value chain and provide new niches and develop new business models.

6. EMPOWERMENT: Social media allow individuals to communicate easily and cheaply with the rest of the world. This empowers them in several areas, including safety in risk communication. Moreover, social media offer the possibility to unite and create one strong voice.

7. CHANGE: Due to the rapidly changing character of social media organisations, and individuals, can distinguish themselves by being the first to use new opportunities within social media.

8. VALUE CREATION: Social media provide possibilities to create relationships with third parties and create valuable exchanges for all. By having a dialogue, information and ideas can be shared, while mistrust and frustrations can be cleared out.

THREATS

1. MISCOMMUNICATION: Social media increase miscommunication due to an information overload and speed, among other things. This can cause inaccuracy, lack of nuance, and lack of compensation for lost non-verbal communication. This may lead to incorrect or early conclusions.

2. DIGITAL DIVIDE: There are increasing differences between early adapters and late followers in ICT related innovations. In developed countries the divide grows smaller, but on a global scale it doesn't. This divide might increasingly make its mark: think of voting and financial transactions.

3. CHAOS: Communication through classic media can be managed and controlled reasonably well, but social media is more like anarchy. Sometimes people act like organised masses, but mostly their behaviour is chaotic and unpredictable.

4. LACK OF CONTROL: Social media allow people to unite and persuade others more easily. This decreases (governmental) control, which can have dangerous results when people have negative goals. Also, over-empowerment is underestimated: one message can cause a lot of damage.

5. ABUSE: Malicious people can abuse social media's transparency in various ways to enrich themselves, for example with people's personal information or their social networks. Even though new legislation and jurisprudence is aimed at minimising abuse, this threat is likely to increase.

6. SOCIOBESITY: To the threat of infobesity, social media now add a social component, which expects users to be online constantly. When the options provided by social media are exercised to the limit, efficiency and health could suffer.

7. WEB 2.0 BUBBLE: Many options provided through social media wax and wane. Friendster, MySpace and Second Life are long gone. Who knows how long Facebook and Twitter will last? This creates insecurities regarding how much time and money should be invested in a platform.

8. INFLUENCE: The empowerment of people and communities creates the risk of value destruction. Anyone can put (correct or incorrect) information online and spread it easily, but the damage to individuals, institutions, brands and governments can be enormous.

Crisis communication
is mainly about
responding to public unrest,
entering into the conversation
with the people involved
and society as a whole.

Increase 'transfer
of training'.

GETTING BETTER
AT YOUR JOB

Ultimately, you learn because you want be better at your job. This can be a job that you're already doing, or it can be work that you plan to do later in your career. Applying what you've learned to your present or future work environment is often called 'transfer of training'. When developing learning means/materials, it's useful to make use of existing knowledge on transfer of training. In this article we'll mention the most important factors that increase 'transfer of training'.

MOTIVATION
Of course it helps if you're motivated to learn. Everyone understands that it's easier to focus on something if you actually feel like learning. Motivation also helps to pull you through if you temporarily don't know how to proceed.

JUST IN TIME
It helps if you actually use something shortly after you've learned it. The opposite is also true: if you learned something a while ago, it always fades. It is then more difficult to use it when you have to.

'REAL' TASKS
The transfer of training increases when you're dealing with 'real' tasks. In other words, when problems and situations in the training environment resemble situations that you could also encounter in your own work. This gives you an extra learning incentive, as the exercise becomes a useful experience. In your work you should get the chance to use these experiences.

FIND OUT YOURSELF
Things you've found out yourself remain stuck in your memory, and you remember them better than the things others have told you about. You've already thought about them through, and you understand why they're the best solution or approach.

REFLECTION
If you reflect on your thoughts, actions and attitudes, and distil concrete action to improve upon yourself, you increase the transfer of training. Unfortunately, reflection is a rather tricky skill. For example, your brain has to have matured sufficiently. It's also pretty hard to know if you're reflecting on the right things. This is why reflection works best when the process is guided by a supervisor.

EMOTION
Finally, it helps if you feel emotions while learning. This doesn't mean that you have to suffer mortal agony: in such situations you actually don't learn at all. However, a healthy sense of involvement, the feeling of time pressure and disappointment when something doesn't work out, does increase the transfer of training.

Serious gaming offers many possibilities to put you to work in 'real working situations' and to allow you to find out yourself what the best solution might be. Combined with a guided moment of reflection at the end of the game, this makes for a valuable learning experience.

Everyone is familiar with these words: 'Once upon a time, in a kingdom far, far away…' They're an invitation to step into another world. A place teeming with princes and princesses, dragons and dwarves, witches and sorcerers. Sure, dragons don't exist, and witches can't shatter into a thousand pieces, but that doesn't matter for as long as the story lasts. Even modern fairytales, like those written by J.R.R. Tolkien or J.K. Rowling, manage to tow us into another reality, at least for a while. Of course, the idea is that you come back from the other world with a valuable lesson. There's always a morale: good tends to beat evil, so you'd better behave yourself, even if it's tempting to choose a different path.

Once upon a time…

SUSPENSION OF DISBELIEF

If you've ever watched children play, you will have seen that they often use a 'different reality'. 'So I'm the mother and you're the father!' The girl who claims to be the mother understands that her teddy bear is not a real baby. But for the duration of the game she suspends her disbelief, allowing her to have fun playing.

Adults are still able to suspend their disbelief. The big success of Harry Potter is a good example of this. We know it doesn't fit our reality, but as long as we're in the story, we allow ourselves to get carried away.

LEARNING WHILE PLAYING

Playing is one of the first ways in which people learn, besides repetition and imitation. It's a powerful and natural way of learning that seems to be embedded into our brains. While playing you can try out new things in a safe environment, as it doesn't have a major impact on reality when something goes wrong in the game. That's why this form of learning is immensely useful, for example in the form of serious gaming.

CONCENTRATION

Additionally, serious gaming can prolong the effective learning time of adults by a factor of two or four. Adults can concentrate for about half an hour when they're listening passively. When they're actively playing a game, and are making progress, this can extend to one - two hours. And it can be even longer if the game touches on personal interests. People often have so much fun playing the game that they don't even notice that they're learning.

From actual practice

An interview with

Eveline Heijna

Senior communication advisor at VDMMP, a consultancy focused on organizations in the public order and safety domain

From the very start of the focus group for the serious game for crisis communication, Eveline Heijna was involved. As a member of the focus group, she has, among other things, taken part in the discussions about the content and the learning goals of the game, and participated in the pilots as a games master. Furthermore, she has contributed her experience and knowledge for the development of the scenarios and the feedback mechanism.

The fact that this game focuses on the process of crisis communication within the crisis organization is a step in the right direction according to Eveline. 'Communication about an incident, crisis, calamity or disaster receives more and more attention, and that is a good thing. Various incidents and evaluation reports have shown that it is not easy to do this right. It is important that communication experts are educated, trained and have practiced. This game helps to gain a clear understanding of the process, the flow of information and the different partners that communicate and have their own responsibilities during a crisis. This understanding of the parties and actors involved, I think, only contributes to communication with the outside world.

'The game is a good addition to the way in which we educate, train and practice now. Most training focuses on the organization of the crisis organization, the aims you want to achieve with crisis communication and the way in which you can do this in practice. Furthermore, people are often trained for specific positions, skills and competences involved, like the analysis of the surrounding area. The game takes a different perspective and addresses other aspects. Think of the understanding of what information might be available with the various parties involved, but also of the roles, tasks and responsibilities of these parties. That's why the pilots prove that the game is a welcome addition to the current training.'

In the discussion afterwards, it is not about right or wrong. The discussion and interaction between the participants take central stage. It is about the choices made and the actions taken, and above all, about the thoughts behind these. Sharing these thoughts stimulates the learning effect for participants. In the paper-based version of the game, the satisfaction of citizens is monitored by the games master. For the participants, this serves as an indicator if the actions they take, generally speaking, contribute to the satisfaction of citizens. 'TNO is now working on methods that will allow for more detailed forms of feedback in the digital version of the game. In 2012, TNO has focused mainly on the development of these feedback mechanisms and the related learning effects of the game.'

'Crisis communication is not only initiated during incidents that involve physical safety, like chemical fires, floods or a power failure. Crisis communication is mainly about responding to public unrest, entering into the conversation with the people involved and society as a whole. That is why in 2012 a second scenario was developed that specifically addresses public unrest and doesn't start from the classical crisis. This second scenario deals with unrest in a city area and the differences between two groups of people involved. A situation more aimed at public order management. But, again, the aims of the game surface. In this situation the game contributes to the awareness and insight of the communication experts as well; in relation to the surrounding area, the parties and the actors involved.'

'I think participating in this focus group was very useful. Apart from contributing my knowledge and experience, I have learned things as well. In my opinion, TNO has delivered quite an achievement. I hope the game will contribute to the education, training and practice of communication experts in the field of crisis communication.'

The impact of your choices

You usually learn something when you see what the consequences of your actions are. For example, you learn that it's good to have an umbrella with you when it's about to rain: you'll get wet if you forget. In your work, you learn that you shouldn't let a deadline pass without doing your work, as colleagues and customers won't be pleased and will probably make you aware of this quite clearly. This helps us to show different behaviour next time.

WRONG!

In education, feedback is often given by teachers or instructors: they evaluate your performance and tell you how well you did. What's striking is that their feedback is mostly negative: it indicates what you've done wrong. E-learning programs tend to do this as well. Making a wrong choice will cause a pop-up to appear with the word 'Wrong!' in a big red font. Sometimes you can't even continue before you've fixed your mistake.

This type of feedback actually comes from the outside. As the recipient, you have to interpret such a message first. It's not always clear why your choice wasn't right, which means that you don't always learn something.

EXPERIENCE IT YOURSELF

Feedback can also be given in a different way. What you really want is to create the type of situation like the umbrella at the beginning of this article. You want people to experience that it's not a good idea to forget their umbrellas. If they get soaked once, they probably won't forget it next time.

Serious gaming offers the possibility to give feedback in a different way: you can show the consequences of choices or behaviours in the game or have players experience them themselves. This allows the payer to stay in the learning situation, give meaning to that situation and allows them to experience themselves what consequences a choice has. Feedback given this way speaks to players in a very different way. They will actively work and search for a solution to improve their results themselves; an active approach that will make the learning experience stay with them much better and longer.

CUSTOM MADE

Good feedback is linked to the learning goals, but also to the target group. In crisis communication it is difficult to determine what is right or wrong. Only afterwards do we know if it was necessary to evacuate the citizens to protect them from the high water. In retrospect, it can turn out that a river has in fact not flooded and that there was no need to evacuate. On top of that, there are more ways to do the right thing. That means that it is not logical to introduce rigid feedback, resulting in 'a score'. It is wiser to stimulate awareness about the situation, the logical partners in this situation and the probable feelings citizens have when confronted by this. To do this you have to think from the outside inward: what do others need from me?. This is the opposite of what most communications advisors are used to: what information do I have that I can share with others?

MIRROR

To change this, we actually want to change the 'belief-system' communication advisors grew up with. To achieve this, we show a player what he/she has done and how others will react to that. The metaphor that can be used for this is 'a mirror'. In the process the players will become aware of the need to change, a sense of urgency. At that point they are open to a different way of communication. In discussion with others they can explore what way of communication will work for them and still achieve the communication goal. The next time they play the game, they can try out this new behaviour.

SERIOUS GAMING

A GOOD WAY TO DEVELOPMENT

Video games are extremely popular, especially among young people. The main purpose of these games is to have fun while playing. Simultaneously, though, you're very busy completing missions, scoring points, beating others or getting to a higher level. While playing, you keep getting better at the game. This makes gaming a useful tool to teach new things. If the game is fun, you don't even notice that you're learning.

SERIOUS GAMING

Contrary to what the phrase suggests, serious gaming is not serious and boring. Above all, the adjective 'serious' means that the game has a goal outside the game itself, as opposed to classic games, in which the lack of external goals is the whole point. A good serious game motivates users to work more often, longer and with increased focus, on a task that's also relevant outside of the game. This makes it highly suitable as a training tool.

TRANSFER OF KNOWLEDGE

Traditionally, we choose to transfer knowledge through books or PowerPoint presentations at first. We then search for ways in which people can apply this knowledge in their daily work. But that is not so easy, as the material is offered in a fragmented way: first knowledge, then skills, and usually forgetting that there's also the aspect of attitude. This is why you often hear pupils say that it takes a while for the things they have learned to come together and fall into place. If we could find a way to approach learning in a more comprehensive way, training could become much more effective.

EXPERIENCE

Gaming creates the possibility to offer (new) tasks integrally. People actively set to work in an environment similar to their working environment and discover themselves what the underlying rules and principles are. They gain a deeper understanding and memorise better. The safe environment of a serious game makes it possible to try out new behaviour and experience its consequences. Already, leaners can gain experience. As it turns out, this new behaviour can then, often easily, be applied to individual working practices.

The purpose of a serious game is to learn something. Putting it more strongly, the player should meet specific learning objectives. To make this possible, these objectives have to be clear at an early stage, as they serve as the basis for the game. The learning objectives obviously need to have a direct relation with the tasks performed by the target group in their work situation. In the development of our serious gaming projects we follow three different phases consulting various experts.

GAMES TO LEARN FROM

IDENTIFY LEARNING OBJECTIVES

In the case of the serious game crisis communication, we started by asking experts what competencies a crisis communication advisor should master to deal with an incident or disaster. This resulted in a collection of about seventy learning goals . These learning goals were then sorted by competency The learning goals, including their competencies, were then printed on separate cards.

REVIEW AND PRELIMINARY SELECTION

In a meeting, the members of the focus group were asked to review the cards in pairs. They were allowed to discard goals and to add new goals on extra cards. Finally, they had to select the top ten relevant goals.

CONSENSUS AND FINAL SELECTION

The results of the various pairs were then discussed by the entire group. At the end of this session we had a list of seven learning goals which everyone agreed upon. During a final review,, some of these goals were combined as they were closely related, resulting in four learning goals for the design of the serious game.

BENEFITS

This structured approach for defining and selecting learning goals benefits the development of a serious game in various ways. First of all, we get an inventory of the top learning goals that could be targeted upon by the game. Furthermore, there is consensus between the experts and representatives of the target group that these are indeed valid learning goals. The learning goals are available right from the start of the design process, guiding and scoping the design process. This creates a solid foundation to actually build the (digital version of) the serious game.

Keeping the citizens in mind

An interview
with Marlous Verheul
Strategic Policy Advisor Safety
at the municipality of Soest,
The Netherlands

'I have enjoyed contributing to the development of the game. Ultimately, crisis communication is the most important tool you have when something goes wrong. Everyone recognises the situation in which you don't mind so much to be in a traffic jam if you know why it's there and approximately how long it will take. Hospitals use this knowledge in waiting rooms by indicating waiting times; transport companies put messages on their buses explaining why an empty bus just raced past the bus stop. That is the essence of crisis communication: making sure people are informed about the aspects that concern them, that impact their daily lives.'

'The game helps professionals in the field to become more aware of the different interests between citizens and crisis communication advisors, and show more empathy for the 'victims', in the broadest sense of the word. By focusing on these interests, it's easier for the communication advisors to find the right words to get the message across.'

'In the game, we tried to give the player feedback from the different perspectives: How satisfied are the citizens with the information they receive? How satisfied do you think the various partners are? How satisfied is your own organisation? Ultimately, it is, of course, very subjective which of these parties leaves the greatest impression with its feedback, though the very fact that all that feedback is there makes the game so powerful: it shows you whether in your work you're guided by the wishes of your directors or by the wishes of the citizens; and whether there are any parties that you didn't think of at all.'

'It was an unforgettable experience to work on this game with different professionals from various backgrounds. I suppose that in the end, this may be a very good way to support communication advisors in various parts of The Netherlands, preparing for their role in larger incidents.'

After finishing the concept phase, the crisis communication game was initially developed as a paper-based game. This is the second step in our usual process for game development, which allows everyone involved to actually go hands-on with what we're working on. Despite having involved various parties from the start, it's quite normal for the first play sessions to generate long lists of potential improvements. This is the advantage of doing it all on paper, as changes are easier and cheaper to implement.

The paper-based game

COLLECTION OF CARDS

The paper-based game consists of an A3-sized game board and lots of cards. There are three types of these: cards with partners that can play a role in a scenario, cards with information and cards with which the player indicates what action he/she'll take.

Before the game begins, the user receives a card introducing the scenario. This is the introduction of the game situation. As soon as the player indicates that he/she's read the card, the timer will start. For each scenario, the potential partners have been selected, who will then provide information cards. For a water scenario, the district water board will be a partner. If the scenario deals with public unrest, they will not be selected as a potential partner. Some partners will indicate that they have information, others will not and will only provide information when explicitly asked for. So the user can react to partners who offer information, but he/she also has to actively ask partners to share what they know.

Based on this information, the user has to give a communication advice. On an advisory card, he/she'll fill out for whom the message is intended, what the intention of the message is and who should release it. Each advisory card is linked to a maximum of three information cards.

POP-UP

The cards really are a low-tech version of what will be a pop-up in the digital version of the game. In the paper-based version, a games master with a stopwatch in hand ensures that all cards are given to the player at the right time and in the correct order.

SUPERVISION

Supervising the paper-based game is quite intense: one game master supervises one player or two in case the game is played in pairs . When playing together, the players discuss the meaning of the information they're provided with and advice they'll give.

SCORING/ASSESSMENT

The player's score in this version is tracked only roughly: the goal of the game is to support citizens in making decisions during an incident. The score shows citizens' satisfaction with the speed, form and content of the player's communication.

In general, not communicating or doing this too late has a negative effect on the score, while timely communication to the right audience has a positive effect. In the digital version, this assessment can be elaborated on in more detail.

TESTING

In three pilot studies, we used the paper-based version to test whether the game works as intended. In the first pilot, we concentrated on the game itself: how do players experience the rules, the time pressure and the choices they have to make? At the same time, we got feedback on the scenario: is it realistic enough to pull the player into the story? In the second pilot the feedback took centre stage: what feedback does the player need to learn from the game and what is the best timing for this feedback? For the third pilot we developed a completely different scenario, in order to test whether the same game concept could be applied to different incidents.

All comments were continually incorporated into new versions of the game. In this case, we have developed six versions before we even started developing the digital version of the game.

Better prepared for your own role

An interview
with Clarion Wegerif
Communications advisor at the
Hoogheemraadschap
De Stichtse Rijnlanden

'When I read the call on Crisisbeheersing Nederland 2.0 to work on the development of a training tool for crisis communication from within the field, I was immediately enthusiastic. This had to do with the combination of the subject of flooding and the plan to develop a serious game. I sent an email straight away and was invited to join the focus group.'

'From my own experience of working at a municipality, I know that there's little knowledge of water management there. For example, they often don't know what their own sewer management department does, what problems can arise as a result of heavy rainfall and which parties are involved. Of course the world of water management can be fuzzy; they don't just handle floods, but also, for example, droughts and water quality. That's why for a district water board, a regional government body charged with managing water works, the communications advisors of the municipality and the security region are important partners.'

'My main contribution was with respect to content. Together, we developed a scenario about flooding, based on real experiences. It became a very realistic scenario with flooded basements and sewers, and water on the highway. What questions does this call up? What does it mean for your communication? Which parties are involved? Who exactly is your target audience? A large levee breach almost never occurs, which is why it's better to practice smaller incidents. That's difficult enough! I feel that my time was well spent. The things I contributed have actually been used and form the basis of the game.'

'The first pilot in Utrecht was a success, it was nice to see how people became aware of the various parties involved in flood management while playing. Citizens don't care how many or which parties there are. They just want accurate and timely communication, which means you have to take full control behind the scenes. During this afternoon it became very clear that there's a lot of knowledge and that it's important to know each other and recognise everyone in their own roles. I think everyone left with quite concrete intentions to work on this.'

'The second pilot involved a mixed group of players. People of safety regions, municipalities, water boards and the ministry of public works played the game together. Besides the insights that came up during the first pilot, some great discussions arose. How do you deal with situations like this? What information do you have at a certain point in time? What happened, was exactly what we wanted: people got to know each other and each other's roles.'

'The participants were very enthusiastic, both about the choice for a game and about the role you play in it. You have a helicopter view, combined with an omnipotent role. This teaches you to understand other parties and roles, and gives you a better overview of the entire situation. This means that you are then better prepared to fill in your own role.'

The main purpose of developing a serious game is to offer players the possibility to practice the dilemmas they come across in their real work in a more accessible way. This means that to make a game effective, and to get professionals to actually practice with it, a game has to meet a number of conditions.
First of all, the content of the game scenario has to sufficiently resemble something that could actually happen, or has already happened, for the professional to feel that he or she can learn something that's useful for daily work. Additionally, you want a player to have really learned something at the end of a game: learning should not be coincidental. To achieve this, we put our learning goals front and central when developing the game and its scenario(s).

GAME DESIGN

Some of the learning goals can very well be supported by the game design and mechanisms. One of the learning goals upon which the crisis communication game is built is 'Working under time pressure'. It's easy to see how the game complies with this: a player gets 45 minutes for each scenario. This should be sufficient to read all information messages and take action. However, some people need – or take – more time to read and interpret messages, or take action, than others. Thinking long and hard about a possible advice won't leave room to handle all the story lines in the scenario. The game design, therefore, creates time pressure, forcing learners to work faster or straighten out their priorities. Thus, it resembles a real crisis.

DURING THE GAME

During the game, the player gets continuous feedback by displaying a clock. The clock starts at 45 minutes and counts down to zero. In this way the user can see how much time is left at any given moment.

AFTER THE GAME

After the game, first the user gets to see whether she's requested all the information messages. Then she sees how much advice she has given and how much time passed between receiving the information and giving the advice. This says a lot: generally, you need more time if you find something difficult.

DEBRIEFING

In the debriefing, which is guided by a trainer/coach, we delve deeper into the advice that took the user a bit longer. Why did he/she spend more time? Did he/she miss any information? Did it remind him/her of a previous experience? By looking at the scenario this way, you learn how you can handle a similar situation in the future.
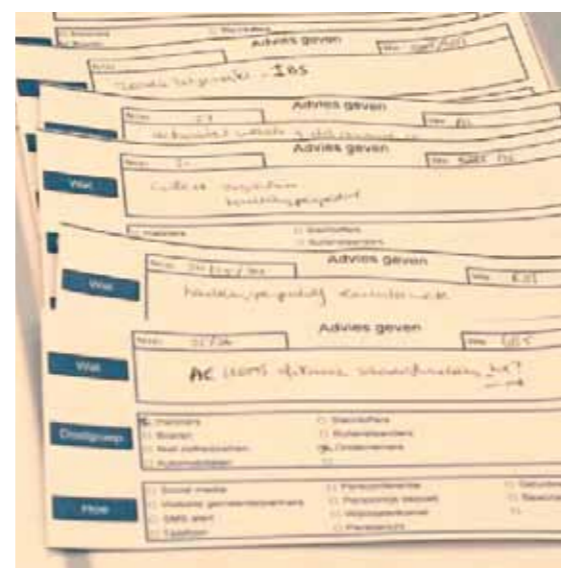
SCENARIO DEVELOPMENT

For the development of game scenarios, we use the EBAT method (Event Based Approach to Training). Working from the learning goals, in scenarios we create situations in which a player can show the behaviour we're looking for. While playing, we provoke the 'right' behaviour or the typical pitfalls.
In this way, the player can gain experience and learn from his or her own choices. Most of the learning usually happens during the debriefing. Using concrete examples from the scenario, the player's choices and considerations are talked through with supervisors. This really makes people think.

For crisis communication, it's important for the user to get a clear picture of her own roles, tasks and responsibilities. During an incident many things have to be done and time is always short. Knowing the boundaries of his/her role can save a lot of time. It also helps if the user knows who the probable partners are and what she can expect from them.

In the scenario we've captured the tension between timely versus reliable advice. What makes the crisis communications advisor's work hard to do? And how can we get him/her to realise that things could be done differently?
To get this right, we've relied on the practical crisis communications experience of our focus group, consisting of representatives of safety regions, municipalities, water boards, the National Crisis Centre and crisis communication trainers .

DURING THE GAME

Before the game starts, the player must specify which partners he/she expects to play a role in the scenario. During the game, he/she will work with these partners. If he/she hasn't selected a particular partner, he/she won't have access to this partner's information. Some of the partners – the user's own team and the press – will always indicate when they have information. Other partners, such as the water boards, don't always do this spontaneously. This means that if the user chooses a reactive approach, he/she's going to miss information.

Not giving timely advice, based on the information the user gets, will sometimes lead to an escalation. In that case, the user hears, through the press or social media, that citizens choose a clumsy course of action, or that they're dissatisfied with the management of the incident. This realistic and natural feedback gives the user the opportunity to adjust his/her behaviour while the game is still running.
We have also implemented a satisfaction meter, indicating the citizens' satisfaction with the player's means and timing of communication. Where possible, we also take account of the specific content of the messages.

AFTER THE GAME

After the game, some graphs are presented to the player. These show whether he/she's been pro-active or reactive, which partners he/she's approached the most and how much advice he/she's given. He/she can also see the changes of the satisfaction score in a timeline. The level of satisfaction can be linked to the development of the scenario.

This gives the user insight into his/her own approach and into the cooperation with partners. Is he/she aware of this? Does he/she recognise it? By playing the game more often, the user will see what actions and recommendations influence the game. In this way, he/she'll get a feel for what effects his/her behaviour causes and how he/she can improve.

DEBRIEFING

The game is meant for crisis communications advisors working for safety regions, municipalities and water boards. This allows us to explicitly address the cooperation between these parties, while at the same time appealing to a potentially large target group. For that reason, no specific attention is paid to the various agreements, protocols and approaches within these organisations.

To achieve transfer of training, we don't just discuss the experiences of the users during the debriefing, but we also link it to their own daily practices: what can I change to improve myself, how can my work be organized differently, what can I already do tomorrow?

BEST PRACTICES FOR SERIOUS GAME DESIGN

In recent years, a major shift has taken place in the games industry. The experience gained developing of games for leisure and entertainment has turned out to be very useful when designing serious games.

The basic idea is that only documents and specifications are not enough in the design process. A game contains many elements and relationships, dynamic parts that are hard to grasp as long as you can't get a real feeling by trying them out. The players themselves are an unpredictable factor as well. The sooner you can take this into account and use it in your design and development process, the better. As it turns out, the best moment to explore the design and development of a future game is when the game is still in its most flexible form; when adjustments are needed, these can be implemented in an easy, fast and cheap way.

That's why we use the following four steps. First of all we work on the concept of the game, together with the focus group. Secondly, this concept is developed into a paper-based version, which is tested carefully with the focus and the target group. Thirdly, a digital demonstrator, a so-called mock-up, is developed. This mock-up is again tested extensively with the target group. Finally, we build a working prototype .

1. CONCEPT OF THE GAME
The first step towards a concept is a schematic sketch. This diagram is a summary of our initial assumptions about, in the case of Flood Control 2015, the crisis communication domain and the role of a crisis communication advisor during a crisis. We then work with the Utrecht School of the Arts on a first concept for the game. Multiple brainstorming sessions are held, with the selected learning goals taking centre stage.

The concept is then tested in discussions with individual experts and the focus group.

2. PAPER-BASED GAME
The paper-based version of the game is the first playable elaboration of the concept. In the case of Flood Control 2015, this version has been adjusted 19 times, based on testing, input from the team and feedback from the focus group. A paper-based design has huge benefits for the development of a serious game. The most important advantage is that the game can be played relatively quickly, which allows people from the target group to grasp what the game will be like much faster than if you only tell them about it. This enhances the quality of the feedback they can provide. Another advantage is the time needed to adjust elements of the game. Making changes in the software takes much more time and money. In a paper-based version, this is a matter of a couple of hours or days. A design is never perfect right away; therefore we engage in a cyclical process, with many opportunities for feedback and adjustments.

Often we'll test a game with our focus group and do pilots with the target group long before the first line of software code has been written. In this way, we have a much firmer understanding of the requirements the game should meet by the time we are actually developing the digital version of the game.

3. MOCK-UP
For the serious game crisis communication, this will be the next phase. Visually, a mock-up is quite simple. Characters can be simple drawings and little attention is paid to detail and colours. Instead, the focus is on translating the intended gaming rules and playing mechanics as implemented in the paper-based game to the software mock-up. From the paper-based version we have an approximation of what the game should be like, but now this has to be established in a digital version. At this point we also pay close attention to the human-machine interaction . In our view, the interface of serious games need to be as simple as possible, matching the characteristics of the target group,.The mock-up is also tested, following a systematic procedure, by the focus group and the target group, based on which it's adjusted several times.

4. PROTOTYPE
The prototype is a more elaborated version of the mock-up in which the gaming rules and mechanics have been tested and implemented, and the display and interaction with the player have been approved. At this stage, the focus is shifted from developing the functionalities to improving the graphical user interface. This makes the prototype look like a real game more and more.

TOGETHER
INTO THE FUTURE

Because the government cannot save all citizens in case of an incident or disaster, professional responders are constantly weighing what needs to be done, and what needs to be communicated - when and how. The effect of communication on citizens is a very important factor in these considerations, as it can help them to be as self-reliant as possible.

Operational choices for a certain approach, message or communication means implicitly imply that you cannot do something else. Scientific substantiation for choices like these are, however, hard to find. This makes it difficult to make the 'best' choices. The developments and research results described in this magazine are, amongst others, based on experiments on human decision making and human behavior. Therefore, the findings provide building blocks to further optimize communication and interaction between citizens and professional responders.

Special attention has been given to the way in which citizens receive a message and what they need to take action. This knowledge can already be used by communication experts in the safety organizations. Together, operational experts and research institutes cooperate to further support the interaction between citizens and professional responders.

Citizens as well as professional responders increasingly share information using social media. Technological developments allow us to

monitor and analyze information in order to organize and utilize it. Research on communication between citizens and first responders should, therefore, include social media, and its effect on self-reliance and resilience. What are the bottlenecks, what opportunities can be taken up, together with operational experts?

The world is changing and relevant parties in the safety and security domain need to connect to this. This leads to new approaches of communication. Professional responders will need new competencies to handle this. Increasing awareness of the effects and impact of actions is a powerful basis for learning. That is why, at the moment, game-technology is used to explore effective and efficient ways of learning. Virtual environments can be used to practice new approaches or to explore new possibilities and behavior. Organizations in the safety and security domain also feel game-technology can contribute to their professionalization because it can make training less complex to organize. The various possibilities are still in their infancy, but experience gained in the defense organization can get us started. A good example of this is the civil-military cooperation; in this cooperation both worlds come together, using the expertise and experience gained over the years. Actions will only become more complex and cooperation between specialized departments within the defense organization and professional responders will

increase in intensity. A number of institutions in The Netherlands is already picking up the results and insights presented in this magazine. Furthermore, TNO intends to take the lead in a joint initiative of Safety regions and Water authorities to explore and develop ways and training to implement these findings and enhance citizen awareness and preparedness. An example of this is the Flood control 2100 initiative, in which various research institutes and operational experts work together to achieve this.

Apart from that, there are also international initiatives like the EU framework-program Horizon 2020 and the Water Management of the European boundary crossing rivers. Communication strategies to enhance citizen preparedness are essential to this.