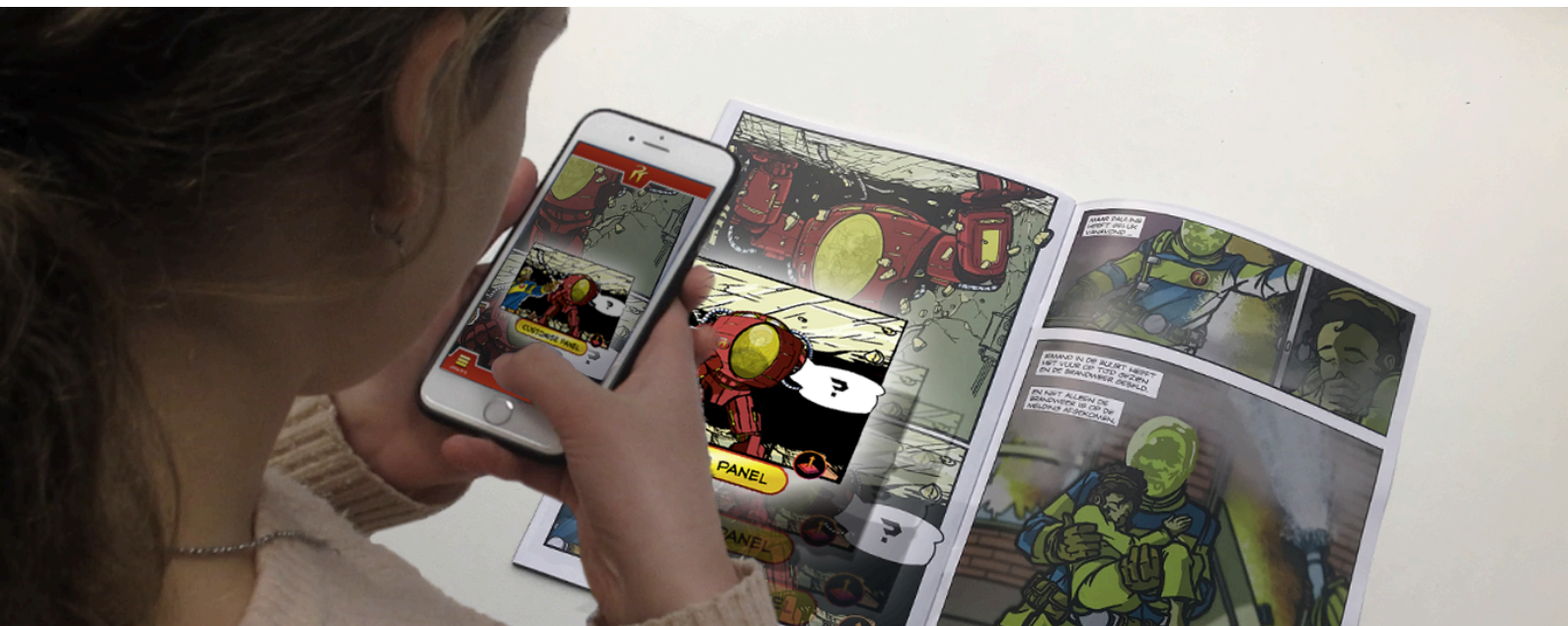


Master Thesis

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# Entertainment Education

a strategic implementation for fire safety



Jens Hellewaard  
4287282

# Abstract

Every 3 minutes, someone dies in a domestic fire accident. The Comics for Safety Foundation aims to improve worldwide fire safety with the help of entertainment. In this thesis, the effectiveness of the communication strategy Entertainment Education is tested for the use of fire safety.

A qualitative research was performed on Dutch children between 12 and 15 years old to determine their values and needs during their entertainment consumption. The results included a strong need for self identification in entertainment and the need to share their entertainment with friends and be able to enjoy it together.

A quantitative research was performed on the same target audience to measure how knowledge, attitude and behaviour are affected by comparing education provided in comic book form versus education provided in plain-text form. It was found that children who read the comic book significantly learned and remembered more knowledge after two weeks compared to the group that received the education in plain-text form.

To create a successful campaign, elements were designed to reinforce the strength of the comic books. An app was designed that functions as a digital reading environment where children can enjoy the comic books together with their classmates, using AR features to enhance the reading experience. The education will be provided via secondary schools on a thematic fire safety day.

The goal for the next five years is to successfully implement the campaign and improve fire safety by reaching 200.000 children in at least two countries.

Student	Jens Hellewaard 4287282
Chair Mentor	Prof. Dr. Erik-Jan Hultink Dr. Ir. Ianus Keller
Company Mentor	Ir. Martijn Boosman Comics for Safety Foundation

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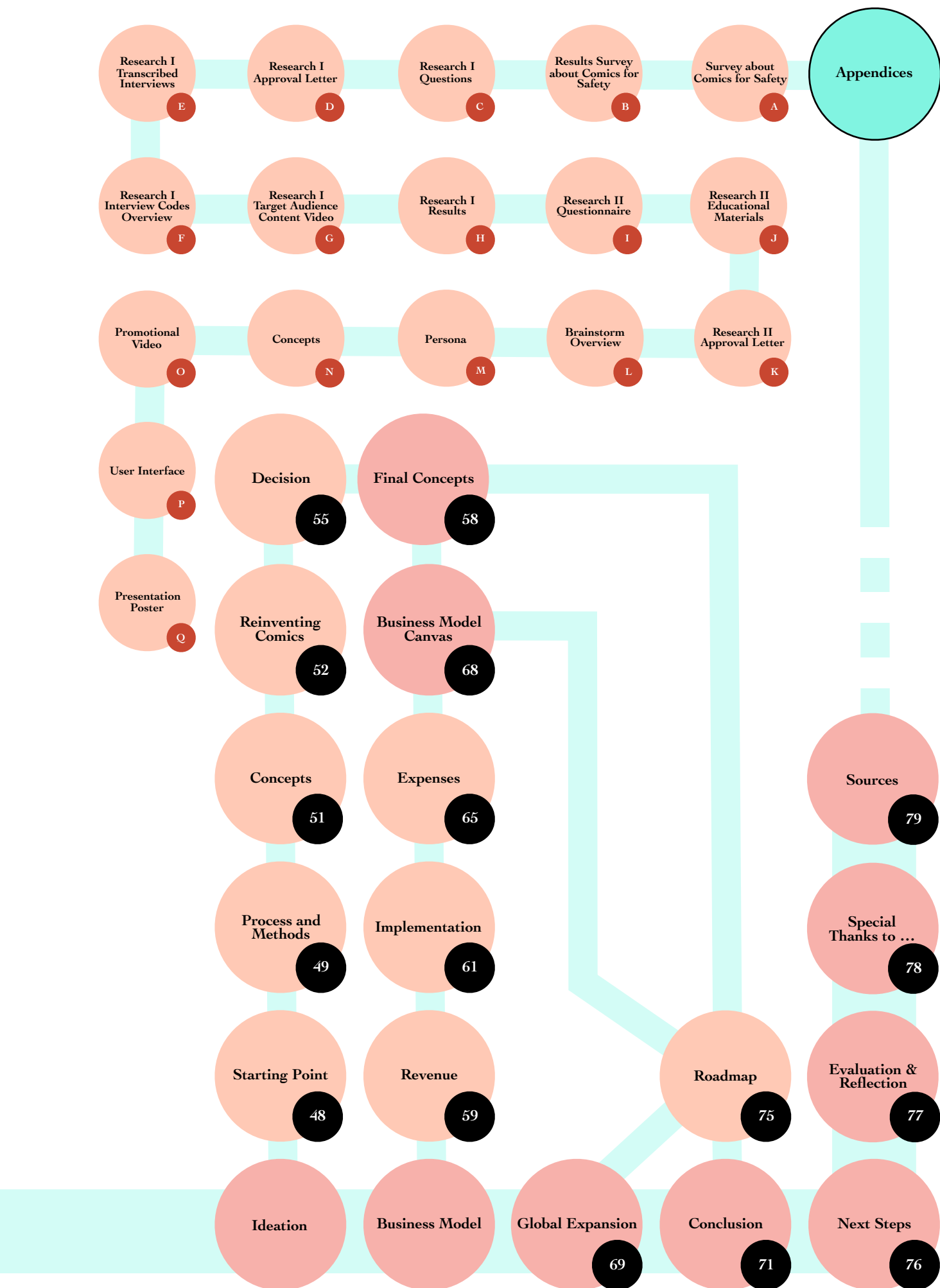
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# My Goals

In the old city center of the Bangladeshis capital Dhaka, at least 69 people have died due to a large fire. The fire raged in at least five houses, but is now under control.

NOS, 21-02-2019

In this first chapter, I will give my personal view on the project. Conversely to the rest of this thesis, this chapter is written from a first person perspective. The rest of the thesis will use a more formal tone and style, except for the occasional 'personal view'-columns, where my opinion in relation to the subject will be disclosed.

Early 2019, Martijn Boosman contacted me with a possible graduation project that might fit my interest: comic books that are aimed to educate people in low-literacy countries about fire safety, for instance in Bangladesh.

At that moment I was especially triggered, because it met two requirements I was looking for. (1) Designing for business to consumer (B2C) and (2) using marketing techniques to 'nudge' people into a certain direction that I believe is beneficial for society.

At that time, I was looking in the field of convincing people to take decisions that lower their environmental impact, but fire safety had something important in common: you can hardly argue against it.

Coincidentally, Bangladesh was on the news that evening, because an enormous fire caused a large number of deaths in the capital Dhaka. This news confirmed the importance of fire safety right away and immediately the project started to come alive.

Purely from a personal point of view, I started to formulate three goals that I wanted to achieve with my graduation project in order to confirm that the project suits my interest, ambition and world view.

## 1. Impact

First of all, as mentioned above, my goal is to have a positive impact. My goal for the graduation project is not only that it is positive, but I also aim to make this impact as large as possible. In case of fire prevention in Bangladesh, my goal would be to create a roadmap where eventually comic books can change the behaviour of as many Bangladeshis people as possible and hopefully save as many lives as possible.

## 2. Critical view

A lot of the research that I will perform during the project consists of psychological theories. While this is a very interesting field, it is also really tricky to make assumptions or to stick to golden rules, because the human brain is a lot more complex than can be broken down in a few behavioural theories. Therefore, my goal is not to stick too much to one theory and have a critical view on all the research studies that I read.

## 3. Fun & Creative

While the subject of fire safety might not directly relate to the word 'fun', the subject of comic books definitely does. My goal is to really come up with a way of getting people involved into fire safety in a fun and creative way. Not only because I think this will increase the effectiveness of the education, it will also make my own project more fun to do.

# Stakeholders

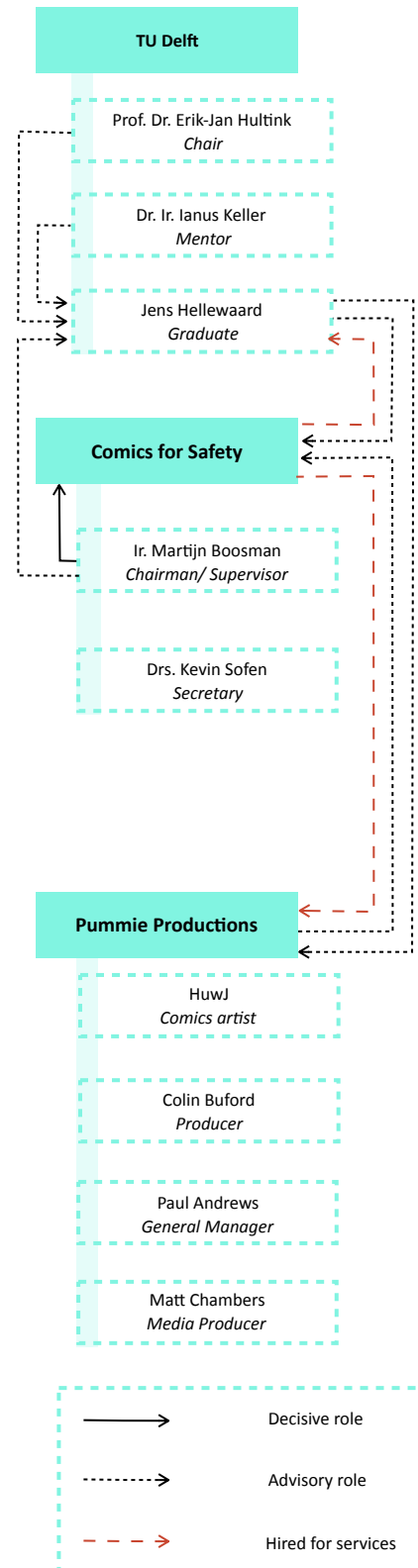
One challenging aspect of this project will be the stakeholder management. The direction of the project can be decided by different people from different companies that are based in different countries. Therefore an overview of the different roles are created to clarify the organisational structure.

I am a graduate student for the TU Delft, who is advised by the supervisory team (H.J. Hultink, A.I. Keller, M. Boosman). I work in this project for the Comics for Safety Foundation, which is directed by two members of the board. The final decisions are made by M. Boosman, but are also influenced by the recommendations provided in this thesis, Pummie Productions and the other board member, K. Sofen. M. Boosman is located in the Netherlands and K. Sofen is located in the United States.

The deliverables for Comics for Safety are the recommendations based on the research, the design of the campaign and the creation of a business model and roadmap. Based on the research, recommendations will also be written towards Pummie Productions for the content of the comics.

Pummie Productions is the creative company that is hired by the Comics for Safety Foundation to create the content related to the Pyrotechnix concept. The creative rights of the Pyrotechnix concept reside with Pummie Productions. The company also has an advisory role on the direction of the Comics for Safety foundation. The main point of contact from Pummie Productions is the comics artist HuwJ, who is located in Japan.

The responsibilities in terms of stakeholder management which are part of the project are mainly to make sure there is progress in the project, to align with Pummie Productions and to justify the actions and recommendations to M. Boosman. The activities concerning sponsorships and aligning with financial partners is outside the scope of this thesis and will be executed by the board of the Comics for Safety Foundation.



# Project Definition

The goal of Comics for Safety is to improve worldwide fire safety by creating content that is both entertaining and educating. The goal of this thesis is to help making this happen by performing the following steps:

## 1. Literature research

At the start of the project, existing literature will be examined to learn about the topic and to see how the Comics for Safety Foundation can learn from earlier attempts for similar causes. The main research areas are Entertainment-Education (EE), fire safety and comics. Based on the literature research, the target audience will be decided.

## 2. Target audience research

When the decision for the target audience is made, a qualitative research will be performed to know how this audience is entertained, how this audience is educated and what will be the best strategy to reach and engage this audience.

## 3. Effectiveness research

Based on the literature research and the target audience research, a quantitative research study

will be designed which tries to measure the effectiveness of EE versus normal education. The goal of the study is to know whether there is an effect from comics on the target audience, how this effect can be enhanced and how this effect relates to the effect of other education methods.

## 4. Campaign design

After all this research is done, there is a strong fundament to design an effective campaign that reaches the target audience and engages them into the content. This can be done by strengthening the campaign by designing (VR) games, apps, posters, educational material, etc.

## 5. Business model

After the design of the first campaign, which will mainly be funded by sponsors, a strategic business model will be developed to create a formula on how the Comics for Safety Foundation can become sustainable in terms of expenses and revenue. A roadmap will be created to determine how the foundation can expand over time. Which markets should be entered and who will pay for the efforts.

## THE PYROTECHNIX

HuwJ is the creator of the concept 'the Pyrotechnix'. This concept is especially designed to entertain and educate people at the same time on the subject of fire safety. The story consists of a team of real hero fire fighters who use advanced technology to save people from terrible fires, often created by the bad guys Pandora and the Jinn, Flashover and Firebug.

### Vulcan

*Real name: Kain King  
Job/ skill set: Team Leader and  
Forensic scientist*



### Astrea

*Real name: Unknown  
Job/ skill set: Data analyst, High Tech  
Engineer*



### Prometheus

*Real name: Will Jacks  
Job/ skill set: Pilot. Exit strategist.  
Medic.*



### Athena

*Real name: Audrey Jacks  
Job/ skill set: Tech, Structural &  
Mechanical Engineering Specialist*



# Entertainment Education

## Definitions

This chapter will look into the communication strategy called Entertainment-Education. It will shine light on the definition of strategy and it will show the theoretical way this strategy works.

### 1. What is Entertainment-Education (EE)?

The main goal of the Comics for Safety Foundation is to change the behaviour of the reader towards fire preventive actions. The way to increase the efficiency of this attempt is that it should be fun to read and the reader should be intrinsically motivated to read it, because of the entertainment factor.

The project is therefore a perfect example of Entertainment-Education, also known as infotainment or edutainment. In this thesis report it will be addressed by its abbreviation “EE”. The concept of EE is best defined by Singhal & Rogers in 1999:

**Entertainment-education** is the process of purposively designing and implementing a media message both to entertain and educate, in order to increase audience members’ knowledge about an educational issue, create favourable attitudes, and change overt behavior.

In this definition, there is a link between what EE is (a combination of educational and entertaining content) and what it aims for (increased knowledge, favourable attitude and change of behaviour). This relates to the approach of how knowledge, attitude and behaviour can evaluate the performance and learning in complex environments (Schrader & Lawless, 2004).

Most of the existing research on the effects of EE are therefore measured by these three factors. Some of the literature uses the comparable model of planned behaviour by Ajzen in 1985, which takes more factors into account (see figure 1). The model of planned behaviour acts as a bridge towards the subject of behavioural sciences, which is very extensive, complex and very relevant for this thesis. Therefore, another chapter will be dedicated to the subject behaviour change. This chapter keeps its focus on the direct (behaviour) effects linked to EE.

### 2. The effectiveness of EE

In order to properly start a project that is based around EE, evidence should be in place that proves the effect of EE on the different aspects of Ajzen’s theory of planned behaviour.

Shen & Han (2014) conducted a meta-analysis of the effect of 22 different cases of EE and found a small but significant effect on all the measured outcomes: knowledge, attitude, behavioural intention and behaviour. The strongest effect was on knowledge and the other factors were only weakly influenced. Note that a meta-analysis might describe a more positive scenario than reality, due to a publication bias (Rothstein et al., 2005).

Besides the significant effect on the four aspects mentioned in the study above, there is also the study of Borrayo et al. (2017) that proves the effect on the remaining two aspects of Ajzen’s theory of planned behaviour: the subjective norm (i.e. the perceived social pressure to perform certain behaviour) and self-efficacy (i.e. the perceived ability to perform certain behaviour).

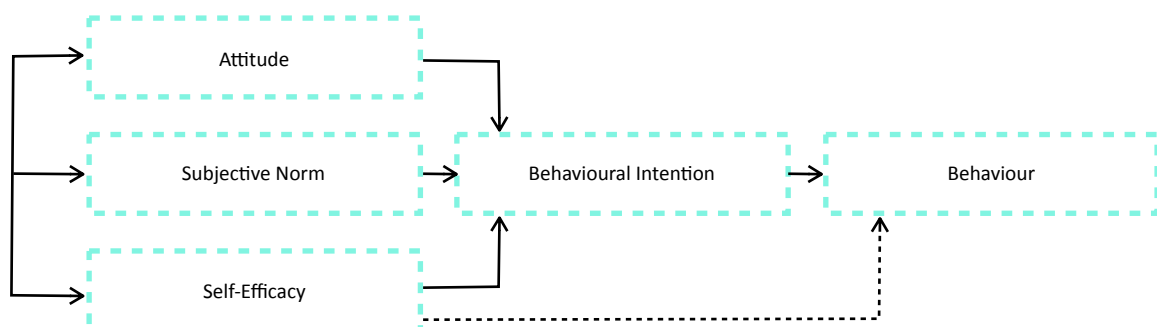


Figure 1. The theory of planned behaviour by Icek Ajzen.

These two aspects increased significantly for participants after seeing an EE video about mammography, compared to other research groups that saw normal (non-narrative) videos about the same topic.

### 3. Explanation of the effects

In the definition of EE, Singhal et al. make a direct link with knowledge, attitude and (intended) behaviour. In this literature review, the aspects of the subjective norm and self-efficacy were added according to the theory of planned behaviour. Together this leads to a number of different aspects that are all significantly influenced by EE cases.

However, there must be an explanation of why these links exist and how exactly the implementation of an EE concept can eventually alternate behaviour. The link from EE to behavioural change can be explained from both the educational as from the entertainment side.

From an educational side, the effect seems rather straightforward. Educational content that is consumed affects the knowledge. Secondly, the gained knowledge affects attitude and behaviour, because knowledge or cognition is seen as one of the three constructs of attitude besides conation (i.e. the willingness to perform any action) and affection (Hilgard, 1980). An example of this can be taken from advertisements. A commercial about a soft drink can tell you that a new soft drink only contains 15 kCal per bottle (knowledge). Your prior knowledge and thoughts about this is that you find your calorie intake important and that you think 15 kCal per bottle is low (cognition). The effect of this new knowledge is that you start to like the soft drink better (affect) and want to try it once in the next few weeks (conation). This cognition, affect and

conation together form the dimensions of attitude. The positive attitude that was caused by the new knowledge might eventually cause you to buy more of this specific soft drink (behaviour). This cycle of effects can also be found from the educational knowledge which is processed in the EE. However, while this cycle of effects might seem straightforward, it rarely occurs this way in practise. Estimated, only 5 percent of decisions are made in this 'rational' way of thinking. More about this will be discussed in the chapter 'Entertainment-Education - Behaviour Change'.

Secondly, there is the stronger effect of the entertainment side of EE. Slater & Rouner (2002) created a model where you find the link between different elements from entertainment media and how they influence people's attitude and behaviour (figure 2). Direct examples of behaviour change from entertainment are violent video games or tv programmes which can provoke aggressive behaviour with gamers (Sherry, 2001) or the effect of 'fit girls' on social media on the food consumption behaviour of the followers (Williams et al., 2014).

In the model, the different aspects can be found which eventually lead to behaviour change. The model claims that the effectiveness of EE can be increased by creating an appealing storyline, increasing the quality of the production, making the persuasive subtext subtle and creating characters that look like the target audience in a way that they can identify themselves with these characters.

After looking at the theoretical effect of EE in this chapter, next chapter will look at these effects in practise by examining a few relevant examples of EE.

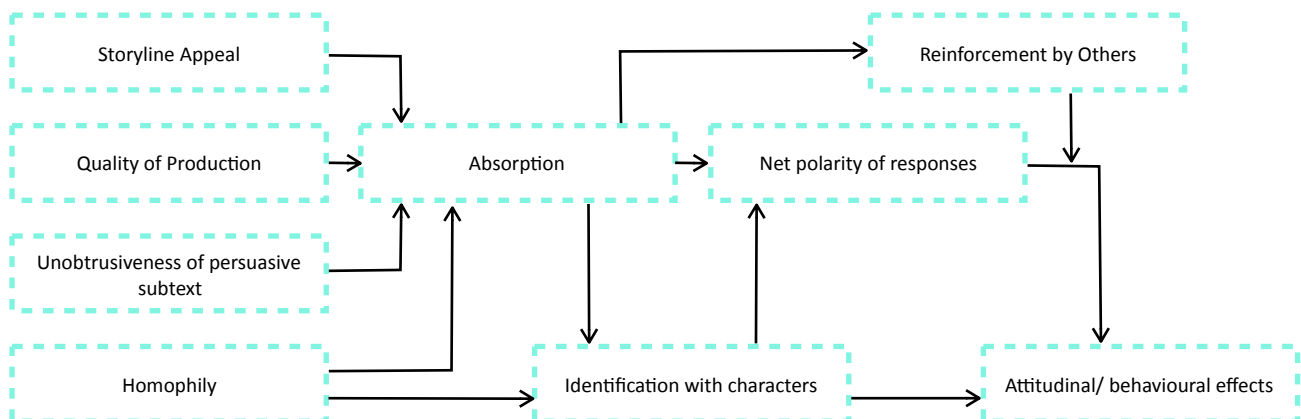


Figure 2. The extended elaboration likelihood model by Slater & Rouner (2002)

# Entertainment Education

## Examples

One of the biggest success stories of EE is the South African television series that launched in 1994 about South African people who face their social, health and development challenges in the fictional 'Soul City' Township (see figure 3). One of the main issues addressed in the series was tackling HIV/AIDS. In a study on the effectiveness of the series, Tufte (2001) found that 43% of people who watched Soul City spoke openly about HIV and AIDS compared to 25% who didn't watch the series. Secondly, 38% of the viewers often used a condom during sex, compared to 6% who didn't watch it. Note that this effect might be partly influenced by a selection bias: e.g. people who talk openly about HIV and AIDS might be more likely to watch the Soul City series. Tufte gave several reasons for the success story of Soul City of which a number are state below:

- Soul City keeps making seasons with the same character and the same quality brand which enlarges viewer's loyalty and identification with the characters
- Soul City applies a multi-media strategy where they enlarge the campaign with radio programmes, newspaper booklets, adult educational material, etc.
- Soul City develops materials and courses, training and education, in the issues of concern

Another example also tried to tackle HIV and AIDS in Africa, but this time with comic books (see figure 4). Kuwa Shujaa is a three volume comic book series using EE to change behaviour in HIV and AIDS prevention at schools in Nairobi,



Figure 3. A promotional poster for the 12th season of the Soul City series in 2014

Kenya (Obare, et al., 2013). The students aged 12-19 received comic books, additional educational material to talk about in class and a flyer for parents to explain about the comics. A study was conducted with around 3000 students with measurements before and one year after the campaign. The students that got the Kuwa Shujaa comic books significantly knew more about HIV/AIDS, more often talked to someone about it, were more likely to support inclusion of people with AIDS and showed reported a lower rate of unsafe sex compared to the people who didn't have the comic book campaign. Note that the group who received the comics, also got regular education about the subject, which has probably influenced the results.

When specifying even further towards EE using comic books for fire prevention, two examples can be found. In 2011, Marvel created a single edition comic about Spiderman and Captain America collaborating with the Fire Department of the city New York (FDNY). Although this implementation has a lot of similarities with the Pyrotechnix idea, this comic book was launched



Figure 4. One page from the Kuwa Shujaa comic book about being HIV positive

as a single media strategy, without including any other assets to increase the effectiveness of the fire prevention (see figure 5). Also, no research was done on the implementation and effects. While the public aim of the comic book was to teach children about fire prevention, another trigger to start this campaign might have been to increase the reputation of the FDNY.

A second implementation for comics for fire prevention is another single edition comic that is combined with an educational lesson about burn safety in both the United States and India for children aged 5-7 years old. Prior to the lesson and after the lesson, the children had to answer three questions and their answers improved heavily after reading the comic. Although this comic is more aimed at increased knowledge about burn prevention, this research can not be seen as academically justified. Firstly, the sample size for the US and India were respectively 74 and 39, which is fairly small. Secondly, the questionnaire existed of only three questions, which doesn't give an in-depth overview of the child's knowledge. Lastly, the existing research on the effectiveness of EE on knowledge is often biased because of the pre-test effect (All et al., 2017). This study found that if two groups receive exactly the same educational course, only one group had a pre-test on knowledge and both groups have a post-test on knowledge, the group with the pre-test will significantly score higher on the post-test (see figure 6). Therefore, it must be taken into account that there will always be an inflation of the test scores if the goal is to test the acquired knowledge from a specific educational course. The main solution for this is to always have a group that does the same pre- and post-test without participating to the same educational course.



Figure 5. The single edition comic for fire prevention made by Marvel in collaboration with the Fire Department of the city New York (FDNY)

After looking at examples that are in a way similar to the Comics for Safety concept, the conclusion can be drawn that there is a possible effect for using EE. However, the amount of credible existing research that specifically tests the effect of comic books for fire safety, is very limited. Next chapter will dive into the subject of behaviour change and the different aspects that influence behaviour.

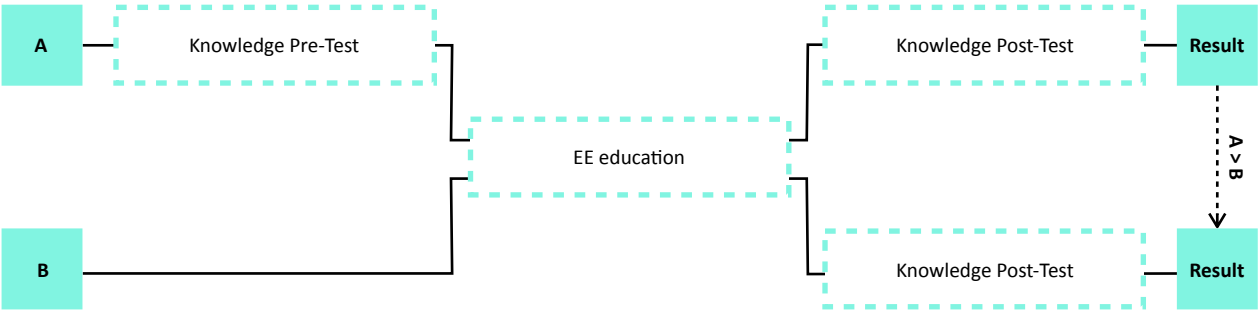


Figure 6. The pre-test effect on measuring acquired knowledge (All et al., 2017).

# Entertainment Education

## Behaviour Change

In the first chapter about EE, it was already described that one of the goals of EE is to change behaviour. For the Comics for Safety project, change in behaviour is also the most important goal (e.g. people need to check their smoke alarm every month to increase their chance of surviving by 50% in case of fire (Ahrens, 2008)). This chapter will look into different theories and models regarding behaviour change and look at the different variables and factors that are important in this process.

Two theories have already been mentioned, because they are closely related to EE. The first one is Ajzen's Theory of Planned Behaviour (TPB), which claims that attitude, subjective norm and self-efficacy can together predict the behavioural intention.

The second one is Slater & Rouner's Extended Elaborated Likelihood Model, where the effect of creative content on behaviour is determined by the level of absorption and the level of identification with the character.

### 1. The theory of planned behaviour

The TPB is commonly used in psychology, but is mainly criticised because of two reasons. Firstly, because the theory would show a correlation effect rather than a causal effect (Sniehotta, 2014). While the theory states that attitude predicts behaviour, more often it is attitude that follows certain behaviour. In the first chapter about EE an example was given about a soft drink with only 15 kCal. While this example is still relevant, it must be noted that the thinking process more often works the other way around. In this case, it starts with someone buying the soft drink (for example because it was placed on eye level in the shelves), the person likes the drink, will create a positive attitude towards it and will use the low amount of calories as an argument for drinking it. This person often can't tell his own reasoning and will falsely state that he bought the drink because it had low calories, while in fact it was just because it was placed on eye level in the shelves. This is called the theory of cognitive dissonance (Festinger, 1962).

The second flaw of the TPB is that the theory assumes that someone is only performing reasoned actions. This would be described by Kahneman in his book *Thinking Fast and Slow* (2011) as using system 2 (the system responsible for

deliberative and logical thinking). Therefore, the TPB would fail to give a trustworthy prediction of someone's behaviour, since people are most of the time behaving according to system 1 (the system responsible for intuitive and emotional thinking). Note that it is still relevant to use the aspects of the TPB as predictors of behaviour, because there are long-term high investment decisions which do work broadly as described by Ajzen (e.g. buying a new car).

### 2. The extended elaboration likelihood model

The Extended Elaboration Likelihood Model (ELM) is an adjustment to the normal ELM that is especially created for EE content. It is not widely used in existing literature and there is no existing analysis of the validity and utility of this model. On account of the applicability with this project, this theory will still be used to assess and compare different EE content on the level of absorption and identification with the character.

However, in the Extended ELM, the level of identification with the character is claimed to be solely dependent on the level of homophily (i.e. the level of identification with those who are similar to themselves). Since the Pyrotechnix concept stars characters with a high level of heroism, the model would suggest that this results in lower identification with the character and thus less behaviour change.

The phenomenon of having characters in a story with a high level of heroism is addressed in literature with the term 'wishful identification' (Feilitzen & Linné, 1975) which is defined as 'the extension of identification, which refers to people's desire to become or to act in the same way as a certain media character'. This definition suggests that it would, just like normal self identification, also influence behaviour. Greenwood (2007) found that the level of behaviour change was indeed correlated with the level of wishful identification. In her study, where she observed the change in aggression level for women that watched female action heroes, she even found a stronger relationship between aggressive behaviour and wishful identification compared to self identification. This indicates that wishful identification (i.e. heroic characters) is even more effective to change behaviour than normal self identification.

### 3. The health belief model

Next to the TPB and the Extended ELM, the Health Belief Model (Rosenstock, 1974) is another model which is often used to predict behaviour. It is normally used in the field of health prevention, but since health prevention and fire prevention both address behaviour that prevent possible severe long-term danger, this model will also be discussed in this context. The model describes a couple of factors that influence the likelihood of certain behaviour. The most important ones are the perceived severity, perceived vulnerability, response efficacy, perceived barriers and a cue to action (see figure 8). In an example of checking whether a smoke alarm is functional or not (preventive action), a person would have to be motivated because there is an existing chance of fire (perceived vulnerability), which would cause a risk of getting harmed in that fire (perceived severity). To check the fire alarm would lower that risk of getting harmed (response efficacy), but it also takes effort to do it (perceived barriers). A reminder scheduled in the agenda would help to perform the action (cue to action).

The Health Belief Model contains two useful additions to the TPB and the Extended ELM. The first is the inclusion of the perceived importance. A person might have a positive attitude towards fire prevention, a high self-efficacy and a positive subjective norm, but if the person sees no urgency or importance in the topic, the behavioural intention is very unlikely to lead towards actual behaviour. The second addition is the inclusion of the short-term behaviour which Kahneman would describe as system one. The cue to action is a trigger to perform a certain behaviour at that specific moment, which overcomes the problem of System 2 being fully determined to perform a behaviour, but System 1 not acting upon it.

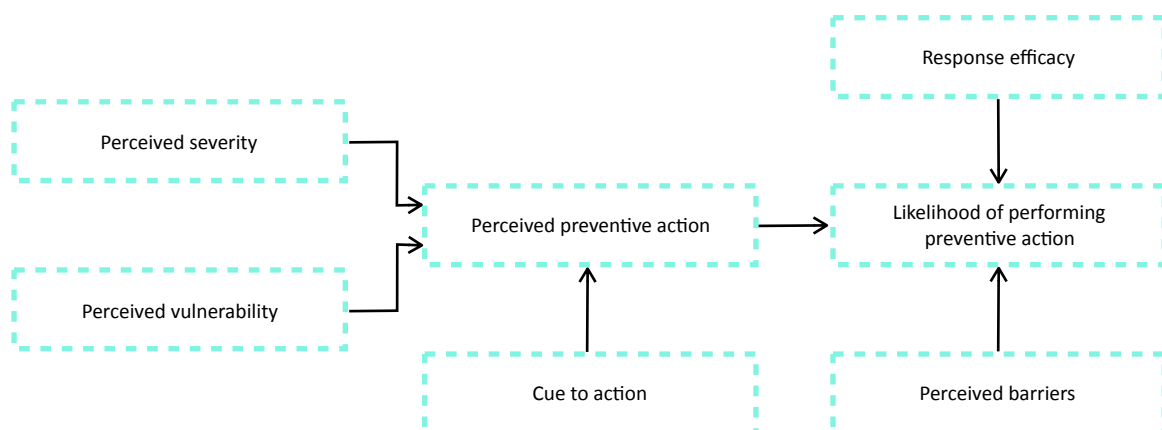


Figure 8. The Health Belief Model by Rosenstock (1974)

### 4. Theories based on automatic behaviour

This cue to action is also mentioned in the very simple behaviour model of Fogg (2009).

In this model, which fully builds on System 1, it is stated that performing a behaviour will only happen if there is something that triggers a person to perform an action that is in line with his motivation and is within his abilities (see figure 7).

The thing that is missing in both Fogg's behaviour model and the Health Belief Model is the interpretation of the trigger to be successful in convincing System 1 to perform the behaviour.

Sharot (2017) wrote that the three most effective ways to cue for action are social incentives, immediate reward and progress monitoring. In the

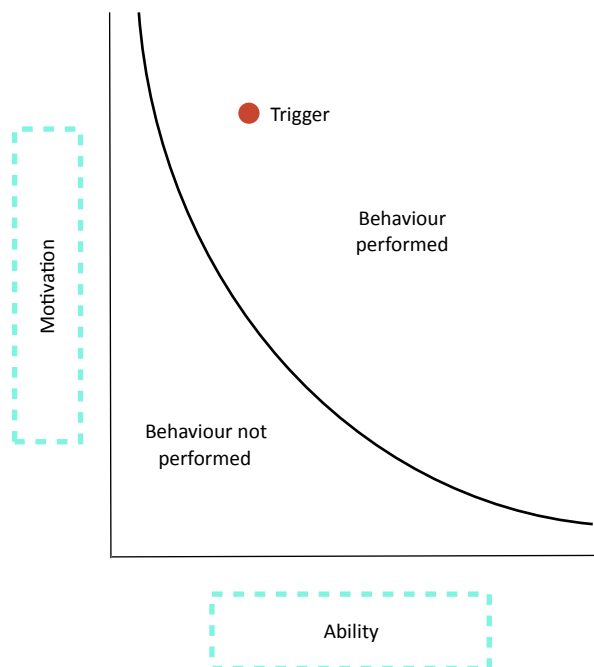


Figure 7. The behaviour model by Fogg (2009)

example of checking the smoke alarm this could be respectively seeing someone else check his alarm, receiving points for it and receiving a weekly overview of the estimated fire safety risk.

Another popular strategy that is commonly used nowadays using Kahneman's System 1 theory is nudging. A nudge is defined as any aspect of the choice architecture that alters people behaviour in a predictable way without forbidding any option or significantly alternating their economic incentives. Putting fruit at eye level in the shelves counts as a nudge, forbidding fast food doesn't (Thaler & Sunstein, 2009). In other words, the strategy is to make the desired behaviour the easiest/ most likely behaviour to perform.

## 5. Conclusion

During this thesis, not one of the mentioned theories will be used above others. All theories have

their own specific value and offer a new way of looking at behaviour change and offer starting points for creative solutions. Since most fire safety actions involve quick, short-term and low involvement behaviour, the emphasis will be on theories that make use of Kahneman's System 1. Also, in a lot of theories the influence of others' opinion is seen as a dominant predictor for someone's behaviour.

The behaviour theories in this chapter hold the different aspects that will be used as variables to determine the effect of the Comics for Safety campaign. For example, it will be very interesting to measure the difference in attitude, self-efficacy, subjective norm etc. after a participant has read a Pyrotechnix comic book.

Next chapter is about fire safety and will take a look at the severity of fire safety problems around the world.

## Personal note

Since I don't study behavioural sciences and during my master program I only have been briefly introduced to behaviour theories, it is hard to draw strong conclusions from existing research without having too much experience within the field. Especially since a lot of theories contradict each other. Therefore, the aim of this chapter is not to decide which of the theories is 'most true', but rather give a disquisition of the most used theories out there and the reasons why these theories are used and why they are criticised. From the overview of all these theories it is at least possible to notice some recurring

aspects that always play a role in determining behaviour.

During this thesis, I've learned at least that the most commonly known theory (in this case Ajzen's TPB) isn't always the preferred theory to use and that diving deeper into the literature might sometimes bring completely new insights into the subject (e.g. attitude follows behaviour, instead of the other way around). But the main conclusion from these broadly varying theories is that the human brain is still far too complex to comprehend completely and that there is no exact right or wrong.

# Fire Safety

## Problem Definition

This chapter will take a look at the severity of fire safety problems across the world. The goal is to get a better view of the problem for different groups, in different regions and at different ages. In addition a broad indication of the causes of the problem will be provided.

Every 5 minutes, someone dies as a victim of fire (IHME, 2018). Around 80 percent of fire victims dies in a residential fire (American Academy of Pediatrics, 2000). These fires are often caused by human errors like unattended cooking or careless smoking (Miller, 2005).

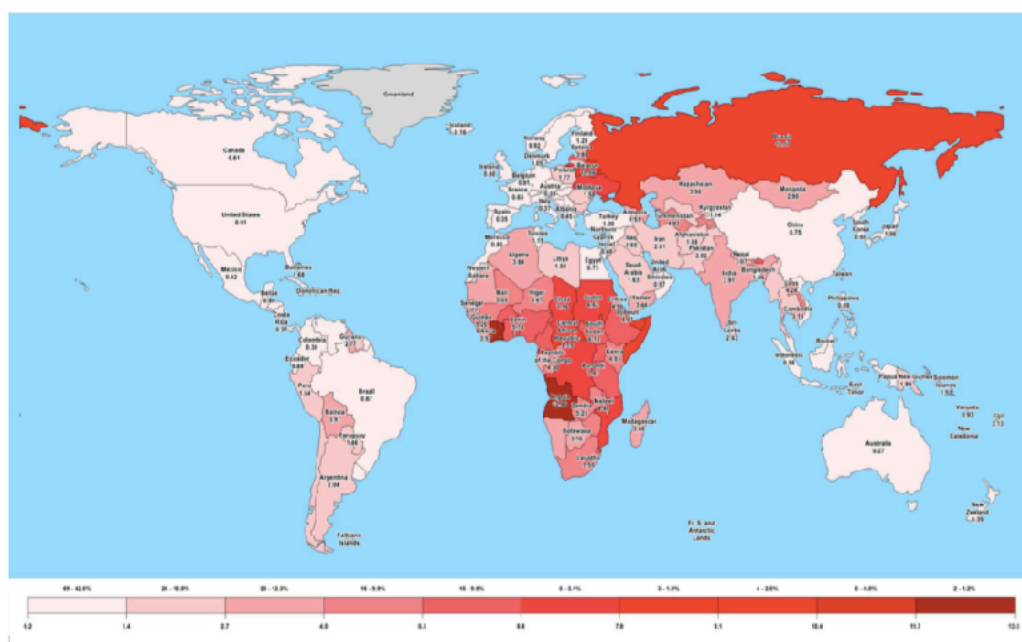
Not only the general population suffers from fire accidents. Fire fighters also face severe safety and health problems. The National Institute for Occupational Safety and Health (NIOSH) recently undertook two large studies focused on firefighter cancer and concluded that firefighters face a 14 percent increase in cancer-related deaths, compared to the general population in the U.S (Daniels et. al., 2014). This means that the U.S. annually loses around 296 firefighters to firefighting-related cancer. Although there is no global research done on this topic, it can be assumed that most of the world faces firefighter safety problems with the same scale or higher.

### 1. The most severe problem areas

In figure 9 the weighted deaths from fire are shown per country. Ivory Coast has the largest number of fire-related deaths with 15 deaths per 100 thousand inhabitants. Most Sub-Saharan African countries face a high number of fire deaths.

There are a number of common causes for fires in third world countries like (1) fuel-based cooking and heating systems that are prone to accidental outbreaks of fire, (2) women wearing increasingly more often loose artificial silk dresses while cooking which can easily catch fire and (3) people who smoke in their bed (Masellis & Gunn, 1992).

Surprisingly, relatively wealthy countries are also high on the fire death list like Russia (8 deaths), Belarus (8 deaths) and Ukraine (5 deaths). The reasons in this region can be explained by three main factors: (1) the harsh winters increase the number of electric stoves and heating appliances, (2) the uninformed people in society often leave open fires unattended and (3) the remote or rural communities have a lower chance of survival in fire-related incidents due to their distance from the fire brigade (the Moscow Times, 2019).



## 2. Fire incidents per segment

The age group that is most often victim to fire accidents is people of 60 years and older. In the Netherlands, 50% of the lethal fire accidents are within this age group, which accounts for 25% of the population (Eysink Smeets et. al., 2015). The second most vulnerable age group is children below 5 years old. For both age groups there is the problem that a large part of the victims was physically unable to escape their house in time during a fire. See also figure 10.

Therefore, when looking at fire prevention, it would be better to take a look at the number of fires that have been caused by each age group instead of solely looking at the age group that becomes victim. Unfortunately, data about domestic fire incidents in general linked to age groups isn't available. This is mainly because demographic data is normally only captured when somebody is injured or dead, so whether people above 60 years and below 5 years are contributing to the amount of fire incidents just as much as they contribute to the amount of victims, is unknown.

While people between 10 and 34 years old have a relatively low death rate for fire-related incidents, fire-related deaths do however contribute a relatively high share to the total deaths of that age group (see figure 11). For children between 5 and 14 years old, fire-related burns are in the top 10 causes of death (WHO, 2014).

Next to age, wealth is also a large predictor for fire-related deaths. Not only between first world and third world countries, but also within one country. For instance, a child from the lowest social class in the United Kingdom is 16 times more likely to die in a house fire than one from a wealthy family (WHO, 2014).

## 3. The situation in the Netherlands

In the Netherlands, on average 'only' 47 people die as fire victim annually (0,17 out of 100.000 inhabitants), which means that the Netherlands is number 5 on the list with countries with the lowest fire-related deaths per 100 thousand inhabitants (Brushlinsky et. al., 2015).

For every two hundred residential fires reported at the fire brigade, there is only one resulting in casualties and the number of residential fires has decreased from 800 in the year 2000 to 400 in 2013 (Eysink Smeets et. al., 2015).

Nonetheless, in developed countries like the Netherlands, every casualty is one too much and the government invests heavily in fire safety education.

The two biggest causes of fire are unattended cooking and failure of electrical devices. These causes result however less often in casualties. Careless smoking causes a small proportion of residential fires, but accounts for a relatively large number of casualties.

The absence or the malfunctioning of smoke alarm is one of the largest problems for Dutch residential fires. From all the fatal fire-related incidents, 33 percent had a smoke alarm installed and only 20% had a smoke alarm installed that also functioned properly.

For all fire-related incidents that didn't cause any casualties, 66% had a smoke alarm installed that also functioned properly.

To do something about a fire safety problem in a country, preventive campaigns are widely used to try to change the behaviour of society. Next chapter will take a look at existing preventive campaigns and why they succeed or fail to reach their goal.

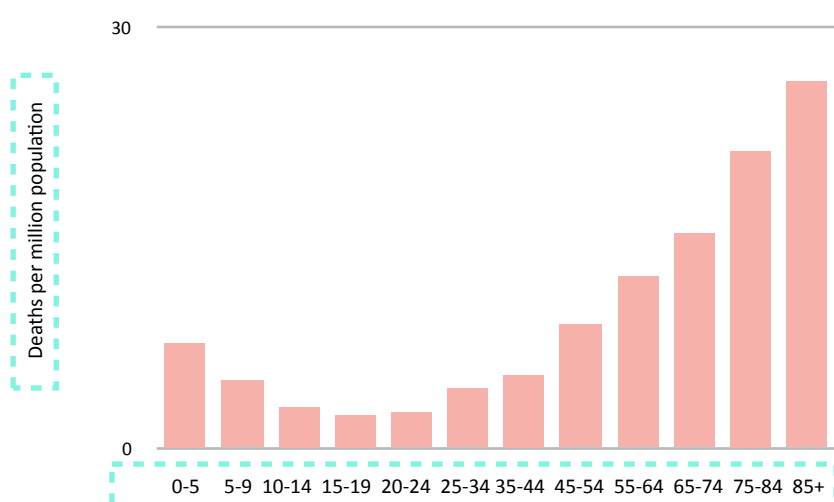


Figure 10. The number of fire-related deaths per age group per million population (Ahrens, 2018)

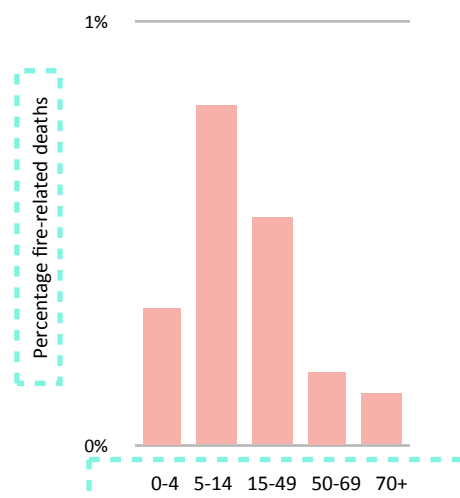


Figure 11. Percentage fire-related deaths of the total deaths per age group (IHME, 2018)

# Fire Safety

## Prevention Campaigns

When talking about fire prevention, it is sometimes argued whether acts like ‘having a smoke alarm installed’ is called ‘prevention’ since it doesn’t actually prevent a fire, merely warns you of an existing one. To clarify this, the definition of the project group RemBrand (2015) by the Dutch fire brigade is used during this entire report:

**Prevention** is considered as all activities that focus on preventing the emergence of fire, restraining an emerged fire and enabling a timely escape from a fire.

The scientific council of the Dutch fire brigade published a report that analyses different ways of using promotional campaigns for fire prevention and why some campaigns reach the desired effect that the others do not (Eysink Smeets, et al., 2015). The scientific council proposed two methods that are found to be effective for fire prevention campaigns:

**Self-persuasion.** The realisation that the motivation for change has to come from within, so the persuasion factors of another person’s influence is irrelevant (Aronson, 1995). Example: instead of saying: ‘install a smoke alarm!’, asking: ‘what would be a good measure to increase the fire safety in your house?’.

**Implementation-intention.** It is subordinate to goal intentions as it specifies the *when*, *where* and *how* portions of goal-directed behavior (Gollwitzer, 1999). Example: instead of asking someone if they will install a smoke alarm, also ask them when exactly they are going to do that and ask them to note it down in their agenda.

Other recommendation of the scientific council were the use of Cialdini’s six principles of persuasion to drive behaviour change from the campaign: reciprocity, commitment and consistency, social proof, liking, authority and scarcity (Cialdini, 1993). Another recommendation was to make use of a combination of resources in different channels to create a ‘prevention package’ (Pol & Swankhuisen, 2013). Other research about principles that influence the effectiveness of preventive campaigns was

done by Nation et al. (2003). They came up with nine principles that are correlated with effective programs (see figure 12). Although this paper studied preventive actions for health risks, most of the outcomes can also be applied on fire prevention, since both preventions concern small behaviour changes to prevent future risks with a relatively low probability.

The remaining of this chapter will focus on a couple of prevention campaigns to see which principles are applied and which points of improvements could have been made.

### 1. Doe de deur dicht

This is a Dutch campaign that runs since 2016 and aims to let people close their doors inside their house at night and install a working smoke alarm in order to increase the time there is to leave the house, in case of fire. The campaign is widely focused across the Netherlands with seniors living at home as their core target audi-

Principle	Definition
Comprehensive	Multicomponent interventions that address critical domains (e.g., family, peers, community)
Varied teaching methods	Programs involve diverse teaching methods that focus on increasing awareness and understanding
Sufficient dosage	Programs provide enough intervention to produce the desired effects and provide follow-up as necessary to maintain effects
Theory driven	Programs have theoretical justification, are based on accurate information, and are supported by empirical research
Positive relationships	Programs provide exposure to adults and peers in a way that promotes strong relationships and supports positive outcomes
Appropriately timed	Programs are initiated early enough to have an impact on the development of the problem behaviour
Socioculturally relevant	Programs are tailored to the community and cultural norms of the participants
Outcome evaluation	Programs have clear goals and objectives and make an effort to systematically document their results relative to the goals
Well-trained staff	Program staff support the program and are provided with training regarding the implementation of the intervention

Figure 12. Table that shows the 9 principles that are correlated with effective programs (Nation et al., 2003).

ence. The campaign included news articles, social media posts, information events and physical items that were distributed like flyers, posters, stickers and door hangers (see figure 13). The campaign reached over 1 million people and in a sample of 1000 respondents, there was a 37% awareness of the campaign, 10% higher awareness of fire safety risks after the campaign and 2% more people that changed their behaviour and closed their doors at night (Project Nationale Preventieweken, 2018).

The door hanger is an element in this campaign that might create an extra incentive to change the behaviour. People might intent to close their door, but forget it, because it is not in their habit. The door hanger functions as a cue to action/implementation-intention, because it stimulates someone to specify which door they want to close every night and mark that door with the door hanger. Then, they will see the door hanger every time they enter the room (especially because of the bright contrasting color) and be triggered to actually perform the behaviour. This physical stimulus should increase the effectiveness according to Fogg's behaviour model, which is discussed in the chapter about behaviour change.

The campaign could have been improved on the socioculturally relevance by looking at the context of the target group and the reasons why people leave their door open in the first place (forget to close, ventilation, more space for pets, etc.) and why people would want to close their door besides fire safety reasons (privacy, keep heat inside, etc.). By tapping into these reasons for opening or closing the door, the audience might be more involved, because they recognise the situation.

Secondly, they could have increased the response efficacy, which is one of the factors leading to behaviour changes, as mentioned in the Health Belief Model. For example, an automatic door closer could have been offered on their website, to enable an easy solution for having the desired effect, without having to constantly think about the behaviour.

## 2. Heet in huis

This is a campaign from 2015 aimed at Dutch students to raise awareness and let them be more responsible with fire. They launched a website, a mobile game and payed attention to the subject on special events held at student associations in Leiden. The mobile game features a number of scenarios that are both recognisable for the target audience and potential fire safety risks (see figure 14). There is no data available about the results and reach of the campaign.

The biggest strength of the campaign is the recognisability of the situations for the target audience, which increases the self identification and therefore, according to the extended ELM, also triggers behaviour change. The mobile game is a way of exploiting the campaign, which fits the target audience well and also triggers the need for progress and immediate reward (Sharot, 2017).

Improvements for the campaign could be to create more content via social media for this campaign. Since the campaign has a very playful and fun approach for the awareness, it is very suitable to go viral within the target audience which increases the reach of the campaign and alters the subjective norm about how other students are looking towards fire safety behaviour. This could be done by making game achievements shareable via social media and create multiple small videos on youtube that are fun and easy to distribute and share among the target audience.

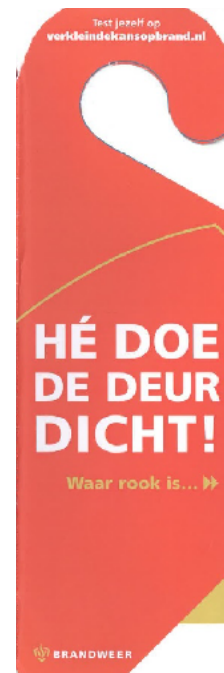


Figure 13. Door hanger from a campaign from the Dutch fire brigade 'Doe de deur dicht!' (2016)



Figure 14. Images from the 'Heet in huis' mobile game.

### 3. Dumb ways to die

The Heet in huis campaign was most probably inspired by this Australian campaign from three years earlier that aimed at safe behaviour around trains. The core of the campaign was a playful video with a catchy song called 'Dumb ways to die', featuring a couple of animated characters that all died in a very unfortunate and stupid way (see figure 15). The last verse is about characters who die in a train accident. The video ends with someone saying 'be safe around trains, a message from Metro'.

The Youtube video was watched over 180 million times and the mobile game has over 97 million downloads. Creatively, the campaign was therefore a huge success. Whether the campaign was also effective in terms of behaviour change around trains, is a different question. Metro Trains itself claimed that the year after the campaign had launched there was a 30% decrease in the number of near-miss accidents in Melbourne, but after that year the number of accidents stabilised again and there was no effect measurable (Hicks, 2015).

It is nearly impossible to do a longitudinale study of all the effects of a campaign that went viral on such a large scale, but when the focus is too much on the commercial and too little on the message, the chance of reaching the desired behaviour is very small (Pol & Swankhuisen, 2013).

Besides, people who watch the video or play the mobile game, often don't do that on a moment that they are near a train and are tempted to perform dangerous behaviour. Therefore, the trigger aspect from Fogg's behaviour model is missing, which might declare the high awareness of the video in combination with the relatively low effect. One way to improve this would be to place stickers or posters with a reminder (prompts) to the Dumb ways to Die video everywhere at railway crossings and at train stations.



Figure 15. An image from the Youtube video 'Dumb ways to die' from the Australian public service company Metro Trains, Melbourne

Another strong point from the campaign is the option to 'promise' that you will not do dumb stuff around trains (see figure 16). Around 90 million people did this on their website (Hicks, 2015). This aspect is a clear use of Cialdini's principle for persuasion, commitment and consistency: by making people promise it, they have a bigger chance of keeping that promise, compared to solely having the intention to be safe around trains.

### 4. The Truth

The Truth is a large multi-channel campaign in the United States against tobacco products which runs since 1998. Although the effect of individual media ads cannot be proven, it is proven in multiple studies that exposure to 'the Truth' leads to a lower initiation of smoking (Sly et al., 2001; Farrelly et al., 2009), was cost-saving for the American government (Holtgrave et al., 2009; Xu et al., 2015) and increased the attempts and desire to quit among smokers (Farrelly et al., 2012; Richardson et al., 2010).

The campaign includes a tremendous amount of television commercials, songs, Youtube videos, social media posts, etc.

In 2010, a television commercial from 'the truth' was launched called 'recall'. This video shows an announcement from the CEO of the fake company 'Shards O'Glass' where he announces



Figure 16. The page on the website of Metro Trains, where visitors can click a button to 'promise' that they will not do dumb stuff around trains.

to recall all the company's products because they are 'addictive and deathly when used correctly'. He hopes to restart production once they 'can provide consumers with a safer line of broken glass treats.' After the announcement, the text 'big tobacco's products kill someone every 6.5 seconds' is shown, 'maybe it's time for a recall' (see figure 17).

The commercial smartly makes use of the surprising effect where the connection between Shards O'Glass and tobacco products isn't known yet. The viewer will probably agree with the products being recalled. After making the well placed comparison, it is harder for the viewer to deny the risks of tobacco products due to Cialdini's 'commitment and consistency' principle.

Another part of the campaign is the promotion of the number of teens that is still smoking, which has decreased from 23 percent in 2000 to 5 percent in 2019 (Newman, 2014; the Truth, 2019; see figure 18). The low percentage of teens that

still smoke discourages the group that still does according to Cialdini's 'social proof' principle. Secondly, it shows the progress that is made in the past years, which is a positive influence according to Sharot (2017). Thirdly, the campaign that links to the fact is called 'the generation to finish it', which sets the goal for the current generation, bundles them under the same banner and therefore creates a very negative social norm towards the people who still smoke, something that is known to influence behaviour from Ajzen's Theory of planned Behaviour.

The criticism on 'the Truth' is mainly because some of the campaigns would mock and scare existing smokers. This would not be helpful for smokers to stop and can even have a contrary effect on them (Jane, 2015), therefore the campaign could have been even more successful if they would exclude the communication elements that make use of fear appeals. An in-depth analysis of the effectiveness of fear in prevention campaigns is shown in the next chapter.



Figure 17. Image of the 'Shards O'Glass' products in the 'Recall' video from 'the Truth' campaign. The video launched in 2010 in the United States.



Figure 18. 5% of teens smoke, cigarette use is on the decline. The image is linked to the 'last generation to finish it' campaign from 'the Truth'

# Fire Safety

## Fear Appeal

During the first phase of the project, the comics artist HuwJ created a number of concept posters for promotional purposes. Some of these posters clearly made use of the 'fear appeal' strategy (see figure 19). Since recent studies has shown a lot of criticism on the strategy, this chapter will dive into the topic to create substantiated recommendations for the use of this strategy within the Comics for Safety project.

**Fear appeal** is a persuasive message that attempts to arouse fear in order to divert behaviour through the threat of impending danger or harm (Maddux & Rogers, 1983).

The scientific council of the Dutch fire brigade concluded that focusing on fear as the main trigger for behavioural change is proven ineffective. A lot of studies agree with this conclusion (Peters e.a., 2013; Ruiter e.a., 2001; Ruiter e.a., 2003; Ruiter & Kok, 2012; Jessop & Wade, 2008). The reason for this ineffectiveness is that people generally don't want to experience this fear and therefore want to get rid of it (Eysink Smeets et al., 2015). The automatic response to get rid of this fear is to decrease the perceived vulnerability of the fire treat ("that won't happen to me") or to decrease the perceived severity of the fire treat ("they are exaggerating, it isn't that serious"). This reaction can also be found in brain research, where people immediately take distance from information which threatens them personally (Kessels e.a., 2010). The scientific council of the Dutch fire brigade makes an exception for using this approach, if the campaigns offers the preventive action as the easiest way to get rid of the fear, even easier than denying the treat. For example, by giving everyone a working smoke alarm with them, right after scaring them about the danger of not having one.

The conclusions about fear from the Dutch scientific council are build on the Extended Parallel Process Model (Witte, 1992). This model describes whether fear appeals campaigns have the effect of danger control (i.e. installing a smoke alarm) or fear control (i.e. "that won't happen to me"). See figure 20). To reach the effect of danger control, the people must perceive the danger as high in terms of vulnerability and severity and they must perceive the solution as

high in terms of self-efficacy (i.e. "I believe I will and can take these preventive actions") and response efficacy (i.e. "I believe these preventive actions will control the risk").

Kim Witte tested his model two years later (1994) in the context of AIDS prevention. He examined the effect of three different aspects: (1) the emotional fear raised from the campaign, (2) the perception about the solution and (3) the self-efficacy of the person. There was a strong correlation between the last two aspects and the danger control, while the emotional fear had no significant correlation with the danger control. The emotional fear however, did have a strong correlation with the fear control, while the other to aspects did not. From this study, it can be concluded that a preventive campaign should not aim to create emotional fear, because this will



Figure 19. Concept poster created by HuwJ for Comics for Safety about the importance of checking your smoke alarm, clearly making use of the 'fear appeal' strategy.

only increase people's fear control and not the danger control.

Also, a broad analysis of existing studies on the fear appeal approach pointed out that these campaigns sometimes have a positive effect on the behavioural intention, but the reverse effect where people are more likely to perform non-desired behaviour is even more likely to happen (Elliot, 2003).

While the fear appeals approach is proven to be ineffective or even counter-effective, it doesn't mean that every communication needs to be happy and positive. This would also be hard when educating about a topic like fire safety where most risks are hugely negative. Bringing negative information is not a bad thing. It is even

more likely for people to be picked up than positive information (Dijksterhuis & Aarts, 2003). In addition, Tversky & Kahneman (1981) have studied framing information in a negative way: telling what someone can lose leads to more effective behaviour than telling someone what he can win. For example: it is more effective to tell students that they get a 5% fine on their tuition fees if they don't register in time than telling them they get a 5% discount on their tuition fees if they do register in time. In conclusion, as long as the communication doesn't arouse much fear, the information can be brought in a slightly negative way and always focus on a high self-efficacy and response efficacy.

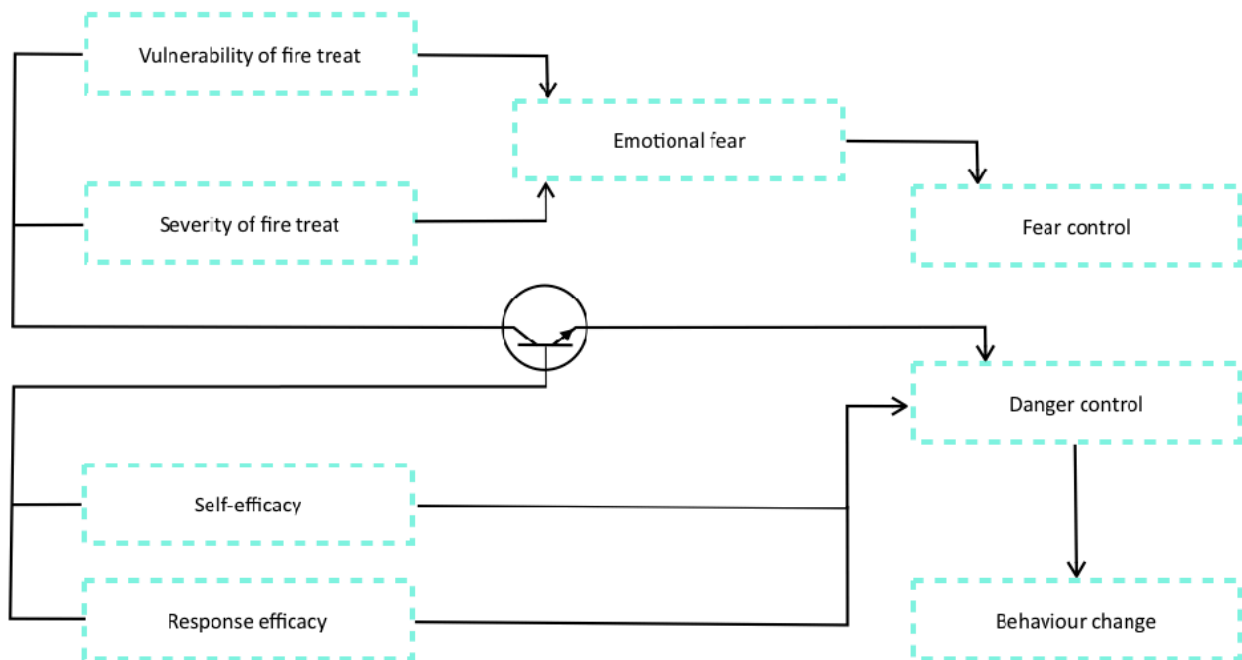


Figure 20. A schematic view of the Extended Parallel Proces Model by Kim Witte (1992). The model shows how emotional fear does not directly result in behaviour change. The model shows a 'transistor effect' which means that the vulnerability and severity of the fire treat, only contribute to danger control if the self-efficacy and response efficacy are high.

# Comics

## Sequential Art

The concept that started the idea for Comics for Safety is the Pyrotechnix concept. The Pyrotechnix is a team of characters created for the use of comics. While the concept is still open for adjustments and transitions towards other channels like an animated series or video game, it is likely that comics will remain the core of the campaign. Therefore, this chapter will give an overview of what comics are.

**Comics** are juxtaposed pictorial and other images in deliberate sequence, intended to convey information and/or to produce an aesthetic response in the viewer (McCloud, 1993)

McCloud's short definition is 'sequential art'.

In this definition, 'comics' are the medium. This medium is used by different objects like comic books and graphic novels. The difference between those two forms of comics is a little bit more vague, but is often explained as (1) graphic novels consisting of a single continuous longer story where comics often consist of multiple volumes and (2) due to the more professional sounding name of the graphic novel, it often results in the more serious genres like sci-fi, biography and history to be called a graphic novel (Schumacher, 2010).

Comics offer a couple of advantages opposed to other types of media. Especially for educational purposes the combination between text and visuals cause easier remembrance of the information, better understanding of the information and a higher engagement from children (Combs, 2003). Also, comics are likely to improve the literacy rate of the reader, which can be a huge benefit in low-literacy countries (Carter, 2007).

Comics are a suitable medium for the entire range of mainly entertainment focussed (e.g. Spiderman) to completely educational focussed (e.g. IKEA manuals, even these could be considered as comics!). In terms of style, comics are, just like any other art form, completely free in their choices. However, comics often contain a more simplified rendering of reality. McCloud has explained this with the principle of self-identification (see figure 21). A very detailed character has the advantage of being a better representation of its real-life counter-part, but the more a character is simplified, the higher the number of



Figure 21. A person shown in transition from detailed to simplified. Simplified characters are more likely to trigger self-identification (McCloud, 1993)

persons it can possibly resemble. In figure 21, the character on the left could only be one person, the character in the middle can resemble a thousand and the icon on the right can be any human.

McCloud pointed out how Tintin is a good example of using the simplification technique to create more absorption in the story (see figure 22). The character of Tintin is very simplified and therefore it can resemble any reader, which causes a higher self-identification. The second thing that Hergé (Tintin's artist) does, is drawing the environment more detailed. The detailed environment absorbs the reader into the story, because the reader identifies with Tintin, by whom he feels to be resembled. Both self-identification and absorption in the story are claimed to be predictors of behaviour change (Slater & Rooner, 2002).



Figure 22. Tintin makes use of 'klare lijn': a very simplified character that is easily relatable in combination with a very detailed surrounding to become more absorbed into the story. (McCloud, 1993)

# Comics

## Popularity

### 1. Regional differences

Comics can roughly be divided on a global level into three regions where different styles and characters are widely popular. The American region with the United States as main driver, the European region with Belgium and France as main driver and the Asian region with Japan as main driver (see figure 23). The American style is recognised by the amount of action and the super-heroes, the European style is recognised by the 'klare lijn' with cartoon-like characters in a realistic scenery and the Asian style is recognised by large heads, large eyes, extreme expressions of emotion and often printed in black and white.

The popularity of comics in each region is correlated with rise of the most popular characters in that region. Since there is little data available about the popularity of comics over time, the appearance of the word 'comic books' in all existing literature is used to measure the popularity over time via Google Ngram. Different translations are used to see the differences in regions (see figure 24, 25 and 26). Figure 26 shows the appearance of the Mandarin Chinese word for comic books, because the Japanese language is not available. However, most Japanese Manga's are also very popular in China. Nowadays, nine out of ten of the most popular comics in China are Japanese (Zhang, 2016). Before 1950, China had a couple of own popular comics, but due to the large variety that was available, it is hard to link specific comics to the Google Ngram data. In all three regions, different spikes in popularity can be observed, caused by popular comics. Also, the competition with other media can be observed by decrease in popularity of the comic books where troughs in the graphs can be found. For example, the Superman TV series first aired in 1952 and arcade game PacMan was released in 1980. These two examples are not solely responsible for the decline in comic book popularity, but rather stand for the rise of television and gaming as a (partly) replacement of the comics medium.



Figure 23. Left: comic from the United States (Spiderman), Middle: comic from France (Asterix), Right: comic from Japan (Naruto)

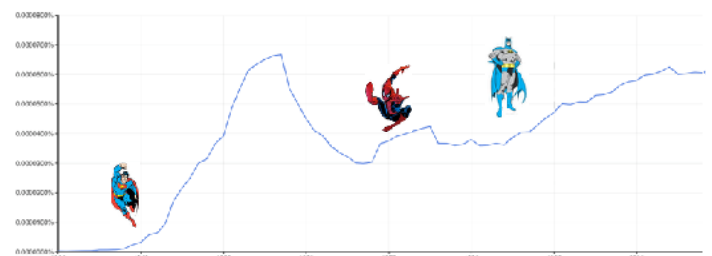


Figure 24. The appearance of the word 'comic books' in books written in English between 1930 and 2008 (Google Ngram Viewer). Superman's first appearance was in 1938. 'The amazing Spider-Man' released in 1971. Batman's 'The Dark Night Returns' released in 1986.

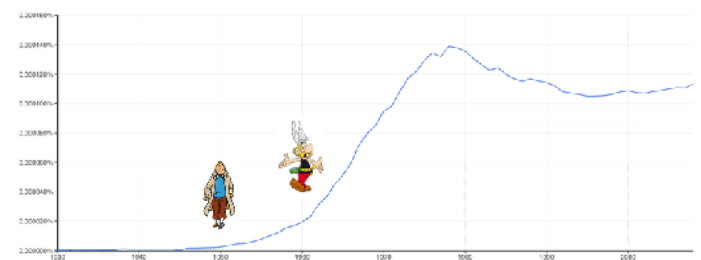


Figure 25. The appearance of the word 'bandes dessinées' in books written in French between 1930 and 2008 (Google Ngram Viewer). The first comics from Hergé's TinTin released in 1950. The First Asterix comics released in 1961.

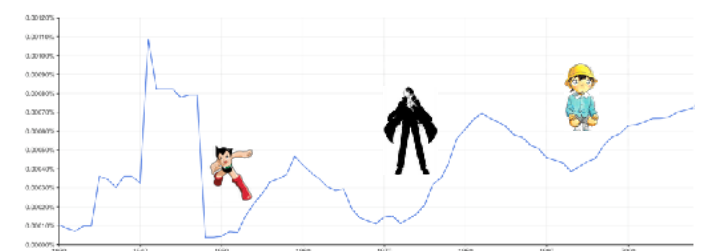


Figure 26. The appearance of the word '漫画' (màn huà) in books written in Mandarin Chinese between 1930 and 2008 (Google Ngram Viewer). Astro Boy was first released in 1952. Black Jack was first released in 1973. Case Closed was first released in 1994.

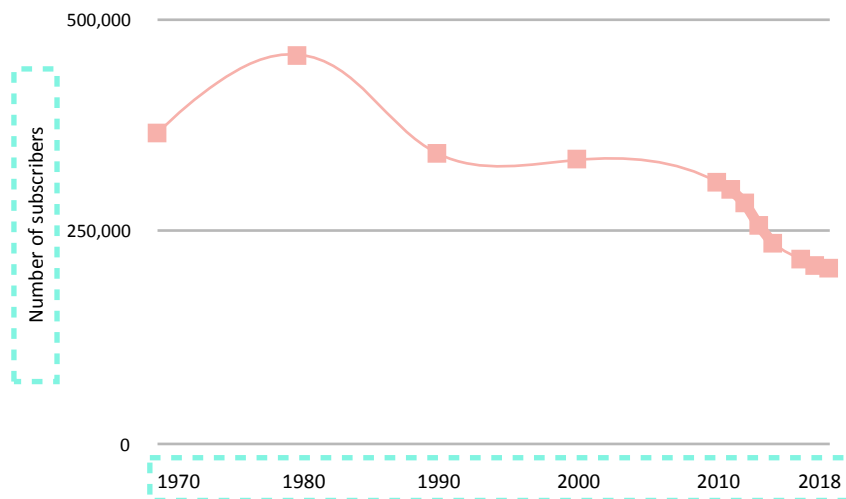


Figure 27. The total number of Donald Duck subscribers in the Netherlands (Het Oplage Instituut, 2018).

## 2. Popularity in the Netherlands

In the Netherlands, the Donald Duck is the most popular comics series. The Donald Duck Magazine is read by 81% of people in the age group of 6 - 12 years old (NOM, 2014). Although the magazine is very popular, the number of subscribers has decreased over the last 40 years (see figure 27). In this figure a similar trend is visible as in figure 25, which confirms that countries within the comics style regions are similar in their comics consumption.

## 3. Age of the comics reader

Although there is no global data available about the comics consumption per age group, figure 28 shows the distribution of the borrowed

comics in US libraries across different age groups. The age group of 12-15 years old reads the most comics. A total of 51% of all borrowed comics is read by people younger than 18 years old. Note that the consumption of the comic books doesn't necessarily mean that other age groups are negative towards comics. Also, the distribution across ages is probably different in other regions like Europe and Asia. In Europe, most popular comics are aimed at a slightly younger age group than the American superhero comics. Therefore, a similar figure for Europe would be skewed more to the left. Looking at the Pyrotechnix characters, it is very similar to the American style, which might suggest that the same age group of 12 to 15 years old is most likely to become engaged with Pyrotechnix comics.

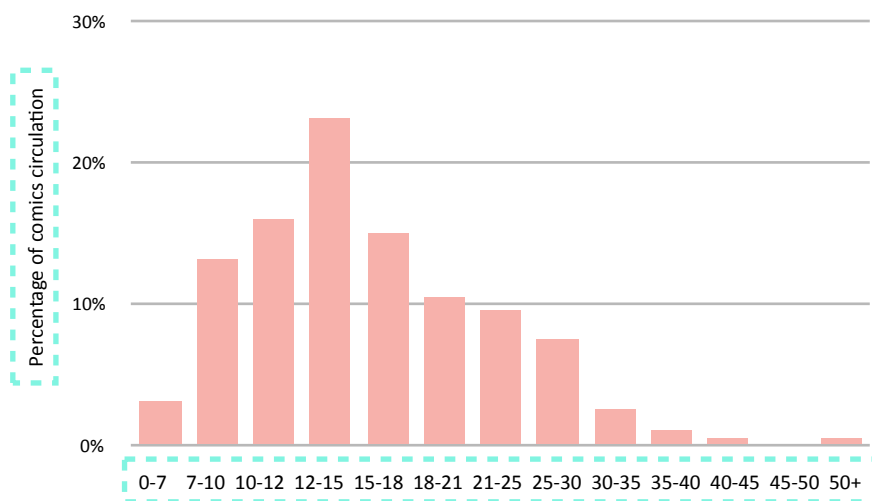


Figure 28. The distribution of comics that are borrowed in the library in the US per age group (Schneider, 2014)

# Target Audience

The previous chapters of this thesis focussed on collecting existing knowledge about EE, fire safety and comics. In this chapter, the findings of those chapters are used together with the results of an online survey to determine the best target audience for this thesis project.

## 1. Online survey

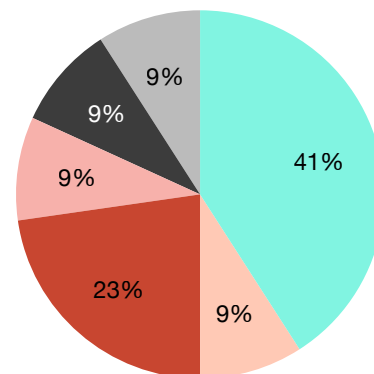
Two large opportunities for the Comics for Safety Foundation lie within (1) fire prevention education and (2) firefighter health & safety education. One way to investigate the enthusiasm for different uses of Comics for Safety, was to send out a survey to a network of people that have experience with fire safety education. On one hand, the outcome of the survey can help to make the decision for the direction of this project. On the other hand, the survey acted as a promotion for awareness and potential funding for the foundation. Therefore, the survey was designed in a more engaging way by including the Pyrotechnix characters. One goal was to make the survey more fun to complete and a second goal was to make the participants acquainted with the characters of Pyrotechnix. The survey was created in collaboration with the comics artist HuwJ (see Appendix A).

The open-ended question survey was completed by 19 people with experience in fire safety education in different places in the world. The respondents were largely positive about the concept and the use for both fire prevention education and firefighter health & safety education. The enthusiasm for fire prevention education was slightly bigger and a number of respondents pointed out that they assumed the comics would mainly work for a younger audience and therefore recommended to provide the education to school children.

For a summary of the results of the survey, see the figure on the right and on the next page. For a complete overview of the results, see Appendix B

## Comics for fire prevention education

● Electrical Devices      ● Cooking  
● Human Error          ● Candles  
● Lack of education      ● Chimney fires



Answers to the question: "In your opinion, what are the main causes of domestic fires?"



Average agreement to the statement: "Yes, I think that comics & support materials can help to improve education in fire prevention & safety"

**"Mainly for the education of young people"**

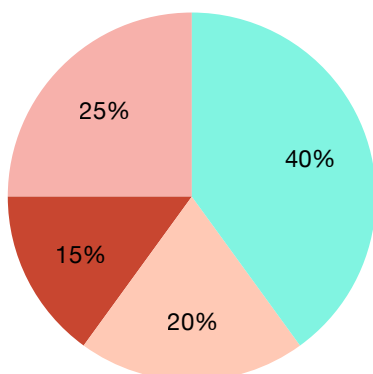
*F. Horta Correia, Red Cross*

**"The comics can help a big group of young people that don't like the traditional educational methods"**

*C. Benalcázar, Fire brigade Ecuador*

## Comics for fire fighter health & safety

● Toxic smoke 
 ● Cancer 
 ● Lack of education 
 ● Other



Answers to the question: "In your opinion, what are the biggest health & safety risks for fire fighters?"



Average agreement to the statement: "Yes, I think that comics & support materials can help to improve health and safe practice awareness for fire fighters"

*"I think it depends on whether it is required or not, or somehow used to refresh what they should already know"*

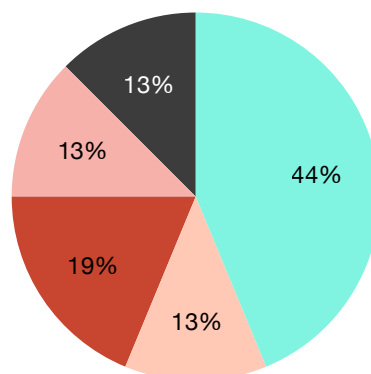
Anonymous

## 2. Effectiveness

Bartfay (1994) concluded that the earlier prevention and health promotion efforts are implemented in life, the more effective the results could be. Also, education that contains an entertainment narrative increases the motivation to learn (Slater & Rooner, 2002) and motivation to learn is lowest between 12 and 16 years old (Wong, 2013). Fire safety education seems most effective when it is conducted within a multifaceted approach including media campaigns, product availability, improved and enforced building codes, and leg-

## Best audience for comics for safety

● School children 
 ● General public 
 ● Firefighters 
 ● Everybody 
 ● Other



Answers to the question: "Which audience would benefit most, from our development of these materials?"

*"We have many unnecessary fatalities and injuries among young children caused by domestic fires in South Africa"*

C. Smith, Impact fire & safety services

*"It is very important to have prevention education among citizens as soon as possible"*

F. Horta Correia, Red Cross

*"Humor and theatre mechanics always carry a message better than just the plain facts"*

Anonymous

isolation (McLoughlin, E. & McGuire, A., 1990). Also, Japhet (1999) claimed that having the EE content distributed in a multi-media strategy would increase the effectiveness. It is therefore recommended to combine the EE implementation with content via different channels to rehearse the information.

Shen & Han (2014) conducted a meta-analysis of published studies on the effect of EE to find a significant increase in knowledge, attitude, intention and behaviour. A significant moderator for this effect was the exposure time to the EE (multiple episodes vs. one episode), because 'multi-

ple episodes provide participants with repeated opportunities to learn and rehearse the intended [health] messages, leading to larger effect sizes'. It is therefore recommended to launch the comics in different volumes where different topics can be integrated and repeated.

A group that consumes EE content is significantly more likely to adjust behaviour compared to a group that doesn't receive any education. However, the effectiveness of EE compared to regular education is far less straightforward and only shows marginal effective results (Shen & Han, 2014). It can thus be estimated that the Comics for Safety application is most effective in an environment where there is no education on fire safety yet. Looking at Dutch schools, there is currently only fire safety education in place for primary schools and not for secondary schools. As mentioned above, prevention education is more effective when implemented early in life. Also, in the chapter 'Comics - popularity' it can be found that the average comics consumption of children is much higher than adults, the most consuming group being children between 12 - 15 years old. In addition, most professionals from the survey about Comics for Safety saw a better fit for the comic books to be aimed at school children.

### 3. Conclusion

Looking at the aim to reach the most effect in overall fire safety, the recommendation would be to focus this project on the fire prevention education. The age group of **12 - 15 years old** will be the central focus, because (1) prevention communication is more effective on young people, (2) this age group is the most likely to be positive about comics, (3) it was recommended by fire safety education professionals and (4) a practical reason for this project: it is not allowed to include children under the age of 12 in a research without a special permission from the TU Delft and from the parents.

The regional focus will be **the Netherlands**, because it is the most realistic option in terms of budget. However, concluding from the research, there are a lot of possibilities to increase the effectiveness if the Comics for Safety Foundation would focus on countries with higher fire-related death rates and lower literacy level. Therefore, a possible expansion towards different countries will be included in the roadmap and the business model.

In the next chapter is about the qualitative research which is performed with the target audience, to determine their values and needs for their entertainment consumption.



Figure 29. Images of Dutch children between 12 and 15 years old from the NRC column Jong! (NRC, 2018)

# Research I

## Target Audience

### Behaviour

The first research of this graduation project is an explorative research with the target audience (Dutch children between 12 and 15 years old). The goal of this research is to know the latent needs of this group, know what they like about the entertainment that they consume and know how they would want to be taught about fire safety. When this knowledge is acquired, it can function as a fundament for further designing the Pyrotechnix stories (i.e. recommendations to the comics artist), deciding on the best way of distribution of the content, deciding on the different channels to reach the target audience and it helps with the design of other elements in the campaign like posters, games and advertisements.

Before the research was performed, information was collected about the general behaviour of the target audience. In the chapter 'EE - a literature review' and 'EE - behaviour change', a couple of theories, models and strategies for behaviour change have been discussed. However, the studies and literature were all based on the behaviour of adults. Since the target audience is in a period of life, puberty, that is known to heavily affect the behaviour, this chapter is aimed to discuss the difference between adult behaviour and the behaviour of the target audience.

The target audience is in the Netherlands often referred to as 'pubers' and some English literature refers to them as 'tweens' (in-between a child and a teen) or 'early adolescence'. In the Netherlands, there are almost 600.000 people between 12 and 15 years old (CBS, 2019).

The target audience is also part of the generation referred to as Gen Z, which is the generation that follows up the Millennials. The exact split between these generations is often unclear, but Generation Z is often referred to as the people that were born between 1997  $\pm$  3 and 2012  $\pm$  3 (Dimock, 2019).

In this chapter, the main focus is the behaviour of specific target audience. The insights below are mainly based on an in-depth interview that was conducted during this project with behavioural scientist G. de Haan, who is specialist in youth behaviour. She studied orthopedagogy at the VU in Amsterdam.

From the age of twelve, the grip that parents have on their child weakens. The child may show either internalising behaviour (emotional and

psychosomatic problems) or externalising behaviour (extreme expressions of emotions). These problems are a result of the struggle that the child faces in slowly becoming independent. When the child is younger, all the responsibilities lie with the parents, but now the child also takes own responsibilities, which often causes friction with their environment. The two most important things children are looking for during this period are **trust** and **appreciation**. In the relation with their parents, this results in the desire to be treated as equal. In the relation with their friends, this results in the desire to be popular and accepted.

They are slowly discovering their own identity and for this they look a lot at their peer group: people from their own age. They copy behaviour from their friends and people they appreciate in their direct surrounding. In their search for identity they can become obsessed with the life of others. They might be obsessed with celebrities that they adore and want to know more about their lives. Nowadays, they might look at 'vloggers' on Youtube to dive into someone else's life to compare it to their own life. They use this information to indicate whether their own behaviour is normal and cool.

In the Ajzen's TPB and most other behaviour theories, 'subjective norm' is an important predictor for behaviour. De Haan stretched that this factor is even more important for the target audience. A child might know that smoking is bad, might have an uncle that got lung cancer and might have sworn to his parents that he would never smoke, if he sees a cool kid do it, he might still be triggered to copy the behaviour.

Another difference in this subjective norm is that adults are often better to think in more abstract patterns and can easier project someone else's behaviour on themselves. For children, this is harder to do, especially with other people that they don't know. A method that is often applied to nudge into a certain behaviour is to show a poster of someone performing the desired behaviour. For example, to place a poster of someone throwing garbage in a bin next to a garbage bin increases the amount of people that throw their garbage in the bin. However, this increased result will be lower for children, because they don't project the behaviour of the person on the poster on themselves. A strategy to still reach the desired effect is to show someone on the

poster that is easier for the child to relate to: someone they know and appreciate. Therefore, a role model works better in youth campaigns to stimulate a certain behaviour. For example, the 2018 campaign that aimed to make children wear more protection glasses while playing with fireworks, appeared to have been very successful (Roorda Reclame-bureau, 2019; see figure 30). The campaign included a song recorded by the artist Donnie, who is very popular among the

target audience. In this song, the artist sings about the protection glasses, how responsible it is (“when the flare kisses the sky, protection, light it consciously”) and how much it would fit the fashion trend (“gleaming accessory, I bought a few”).

This focus on the importance of peers and popular characters is something very useful for the design of the campaign. In the next chapter, the qualitative research will be explained.



Figure 30. An image from the videoclip of the song ‘Knalplanga’ by Donnie (TopNotch, Youtube)

# Research I Target Audience

## Method

To align the entertainment content for the Comics for Safety campaign, the interest of the target audience must be found. To determine why the group is attracted to certain entertainment, one method is to look at the different values they get from other entertainment content that they like and the different channels where they consume this content. Although there are a number of studies about entertainment consumption and entertainment channels, there is no research for the specific behaviour of the target audience of Dutch 12 - 15 year olds regarding their entertainment consumption. In addition, behaviour around entertainment consumption is constantly changing and older studies therefore lose their credibility very quickly.

Therefore, qualitative interviews will be conducted in this research to get a better understanding. This can be used as a fundament for designing the campaign in two ways: (1) the content of the story can be aimed to trigger the same values as the target audience gets from other preferred types of entertainment and (2) the channels that the target audience uses most to consume entertainment can be used in the campaign.

Moreover, the participants in the research will be asked a couple of questions about their behaviour on fire safety and what drives them to have this behaviour. The results of these questions will be mainly used to substantiate the outcome of the quantitative research.

### Main question

What are the main values that Dutch 12 - 15 year olds get out from their entertainment consumption?

### Sub questions

What does their entertainment consumption look like? (which channels, which artists, which programs, etc.)

What do they like and dislike about different types of entertainment and why?

What is their opinion and experience with education-entertainment?

What is their knowledge and motivation about fire safety activities?

Because the research is mainly explorative about certain topics like entertainment content and entertainment channels, a *semi-structured interview* method is chosen to get in-depth insights of the target audience. These interviews are conducted on a number of children between 12 and 15 years old. While Guest et al. (2006) concluded that there are around 12 interviews needed to reach saturation, in this research less participants will be used because of time constraints. The aim is to find a representative group of participants. If 6 participants are interviewed, a large quantity of the possible data will already be gathered (see figure 31). A cinema voucher of 10 euros is given as a reward for the interview.

During the interview, two different techniques will be used to generate relevant results.

### 1. Laddering

This technique is mainly used to get from the different types of entertainment that the participants like, to the attributes that they like, the benefits that they get from those attributes and eventually the values that they get out of those benefits (Reynolds & Gutman, 1988). For example, an interviewee might like to watch Game of Thrones on TV. The reasons of liking this series might be that unexpected things happen (attribute). When asking why it is positive that unexpected things happen, the answer might be that it gives a high level of adrenaline (benefit). When asking why it is positive that entertainment gives you adrenaline, the answer might be that it

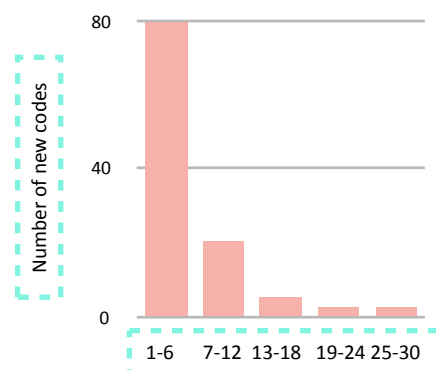


Figure 31. Code creation over the course of data analysis. The X-axis shows the amount of interviews conducted (Guest et al., 2006)

lets you escape from your daily routine (value). The results of this research will be used to create appealing entertainment concepts for the target audience. Therefore, it is important to know which existing entertainment concept is appealing for each interviewee and why. That's why the laddering method is very suitable to generate this information. The subjects for these laddering questions are determined by the interviewee's favourite entertainment concept from each individual entertainment platform. See the example questions below.

What is your favourite **TV show**?

Why do you like TV show X?

Why?

Why?

What is your favourite **Youtube channel**?

Why do you like channel Y?

Why?

Why?

With the laddering technique, the main values for consuming entertainment will be generated (see figure 32). However, there is more to learn about the entertainment consumption of the target audience. The laddering technique mainly answers the 'why' question. Other interesting questions revolve more about the 'how', 'when' and 'where'. To make statements about these questions, the grounded theory approach will be used.

## 2. Grounded theory approach

This methodology involves the construction of theories through methodical gathering and analysis of data using inductive reasoning (Mar-

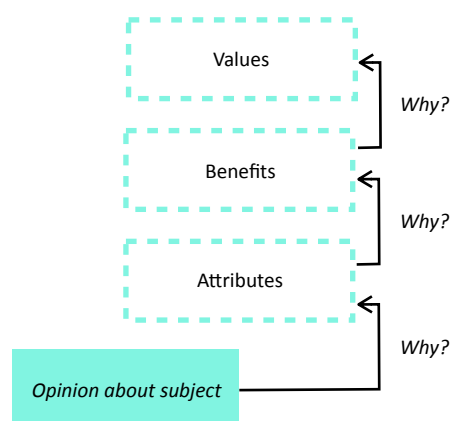


Figure 32. A schematic view of the laddering technique

tin & Turner, 1986). Inductive reasoning means that a number of observations are combined to make an assumption for a generalised theory. This approach mainly focuses on the process after the data is gathered. Therefore, there are no specific questions needed for this approach, but the objective is to gather a lot of relevant data around the topic that is used in the research. In this case, this will thus be questions about 'how', 'when' and 'where' interviewees consume entertainment. Note that the answers for the 'why' questions are used to generate conclusion for the laddering technique, but the answers on those questions will also be used as data for the grounded theory approach.

To convert the gathered data into a theory, the first step is to code the data, which identifies anchors that allow the key points of the data to be gathered. The second step is to create concepts, which are collections of similar codes that can be grouped. Then, categories are created consisting of grouped concepts and showing a broad subject that is used for generating a theory (Bernard et al, 2016). Note that this theory is an indication of a trend, development, principle or state regarding entertainment consumption and assumes that this theory can be generalised to the entire target audience (see figure 33).

The full list of questions for the interview can be found in Appendix C. The approval letter for the research ethics application can be found in appendix D. In the next chapter, the results of the interviews will be discussed. The results will be divided in results from the laddering technique and results from the grounded theory approach.

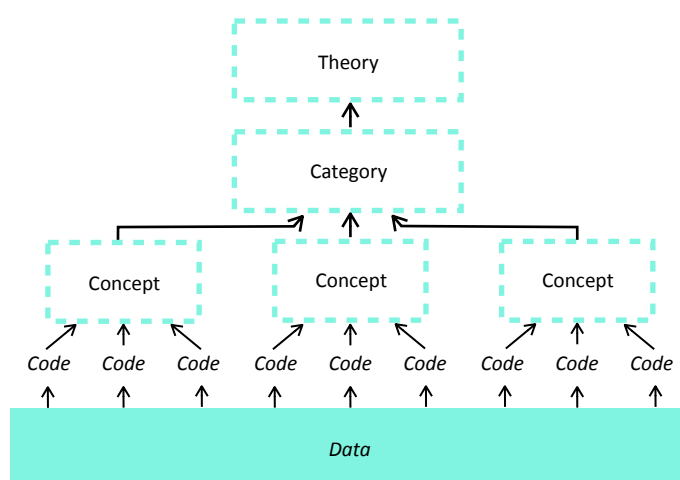


Figure 33. A schematic view of the grounded theory approach

# Research I

## Target Audience

### Results & Conclusion

During the execution phase of the research, a total of seven interviews of approximately one hour were conducted (sex: ♂ = 3, ♀ = 4; age: 12 (1), 13 (2), 14 (2), 15 (2)). The interviewees partly lived in small cities (4) and partly in large cities (3) in the Netherlands, spread across Zuid-Holland (1), Noord-Holland (4) and Noord-Brabant (2). Most interviews were conducted at the interviewees home (5), others were conducted at the office (1) or at a friend's home (1).

The first 4 interviews were conducted without any reflection at the data in-between. After the 4th interview, the transcribed data was coded and clustered. Assumptions were made and formulated into confirmative questions which were added in a 5th single-person interview and a two-person interview with the last two interviewees. Also, in-vivo data from 8 relevant interviews about entertainment consumption, published in NRC in 2018 and 2019, were used as extra data input (sex: ♂ = 3, ♀ = 5; age: 13 (1), 14 (6), 15 (1)).

After all interviews were conducted, the remaining interviews were coded and final conclusions were drawn. The full transcribed interviews can

be found in Appendix E. The interview codes overview can be found in Appendix F.

The main methods that were used in the interviews were (1) laddering, with the goal to find the attributes, benefits and values behind the different entertainment content that is liked by the interviewees and (2) the grounded theory approach with the goal to find categories for which a theory can be created about a trend, development, state or principle about that category.

#### 1. Laddering

For the laddering technique, it can be concluded that all different entertainment content was appreciated for three main benefits: being amused, getting a thrill and/ or feeling immersed. These three benefits, dependant of the combination of the benefits result in five different values (see figure 34). All these values are a direct result of the target audience's needs and wants which are fulfilled at different moments and through different channels. Comparing the results of the laddering method with the results of other studies, show a number of similarities. For instance, Leitner et al. (2008) used the means-end theory

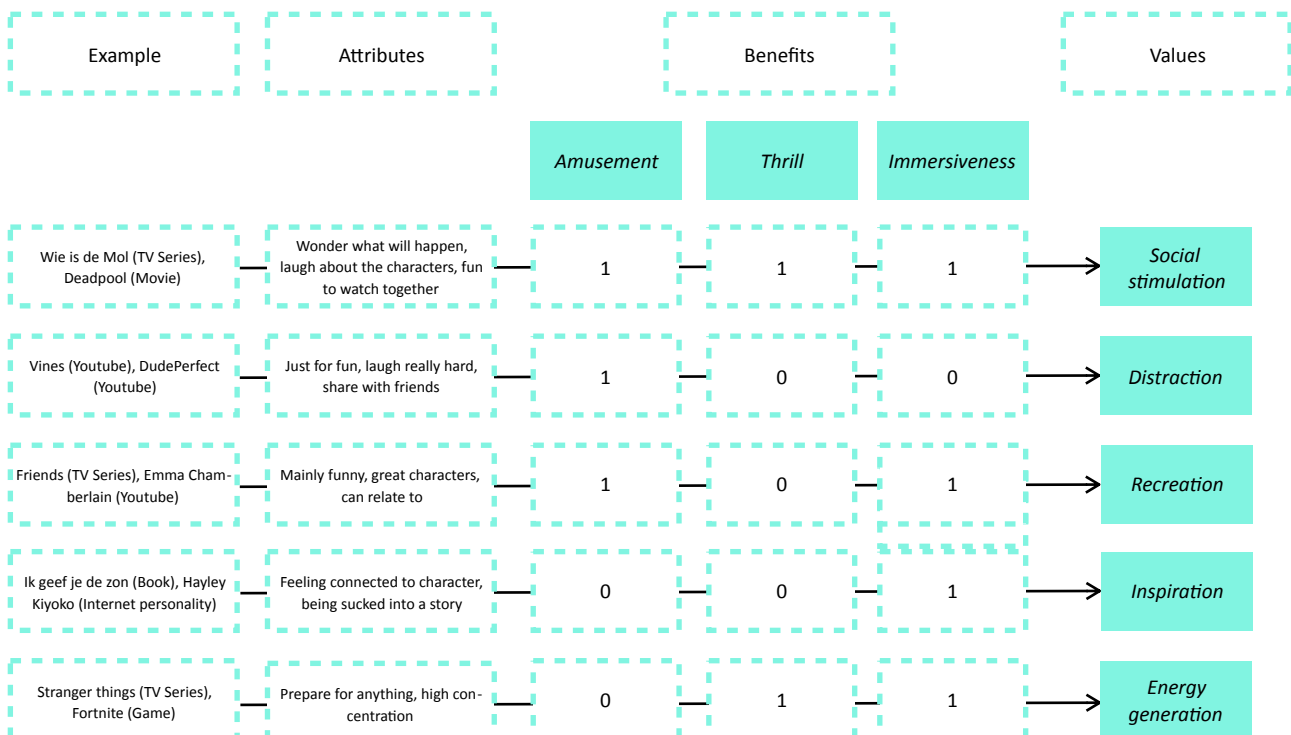


Figure 34. A summary of the outcome of the laddering technique, showing the corresponding attributes, benefits and values.

for finding the underlying values of the usage of mobile multimedia content for people between 20 and 30 years old and called their values 'leisure/ relaxation', 'happiness/ pleasure/ cheerfulness', 'social recognition' and 'capable/ ambitious'. These values largely correspond with respectively: 'recreation', 'energy generation', 'social stimulation' and 'inspiration'. The 'distraction' value is not included into the compared study, which might have two reasons. (1) The study was performed eleven years ago. Last decade, the amount of stimuli that is received from different social media and other addictive apps have largely increased and have created a new necessity for stimuli during dull moments (Leung & Liang, 2015) and (2) the necessity for distraction might be larger for the younger target audience, who are often described as having a shorter attention span and a higher need for a larger variety of content (Seemiller & Grace, 2018).

Below, the exact meaning of each value is described, together with a quote from one of the interviewees:

### 1.1 Social stimulation

Entertainment Content can have the function of enjoying your time together with others (either physically together or connected online). When content is fun, gives a thrill and is also immersive, it is most suitable for social stimulation, because that gives a ton of angles to enjoy the content together with friends.

*"... that makes it more enjoyable, because you can have a little discussion about it. That's just social and cozy." (Female, 15)*

### 1.2 Distraction

Sometimes the target audience is in need of short and simple entertainment content. This can be out of boredom, out of need for triggers, out of avoidance of other activities (like homework) or out of addiction to social media like Instagram or Youtube. The involvement is low and the main criteria for this content is the fun and the amusement.

*"It's very much happening by itself and I receive a little bit of distraction. It works like having a break for me. After, I have to switch a lever to continue working, because I've been distracted for a little while." (Male, 14)*

### 1.3 Recreation

Most often, the target audience uses entertainment for recreation. This content requires medi-

um engagement, shouldn't be too long and the main benefit of most of this content is the amusement factor. The content is most often consumed on a moment that energy is low, for example right after school.

*"...but I always need another series as well, something lightly, for when I saw a 'dark' series and I need a 'break' series that I can watch afterwards which is just funny." (Female, 14)*

### 1.4 Inspiration

Some content is watched because the target audience wants to be inspired (e.g. a book or documentary). This type of content is the least occurring, because they have to be high in energy and highly engaged with the content. The main requirement from the target audience is to feel identified with a character from the content.

*"I love books that contain a small mysterie or something needs to be solved. [...] Then I can also think about it. I like it when it's written from a first person perspective. That I can immerse in the person and stand in his shoes to make decisions. Sometimes, well... regularly... I recognise myself in the main character." (Male, 14)*

### 1.5 Energy generation

When the target audience is very low in energy, they often choose content for recreation. When they are a bit higher in energy and they want to get excited, they might choose for entertainment that stimulates them, where they get adrenaline from and get excited. This type of content needs to be immersive and thrilling. It often includes gaming (alone) or a thrilling film or series.

*"A game makes you more happy and more excited than a movie or series, but after playing a game I sometimes feel so excited that I can hardly sleep for example." (Male, 13)*

The video in Appendix G shows the different content that is watched and liked by the target audience, organised by the 5 different values (see also QR code).



## 2. Grounded theory approach

For the grounded theory approach, six categories were found for which an indication of a trend, development, state or principle is given: self-identification, uniqueness, togetherness, the new gaming, the image of comics and the power of familiarity.

## 2.1 Self-identification

The biggest predictor for general liking of entertainment content is self-identification. The target audience is uncertain about their own behaviour and is searching for their own identity. They use entertainment content as a source for deciding who they are, comparing whether their own behaviour is normal and learning by looking at other people's lives.

*"Emma Chamberlain [vlogger] just does very normal stuff, but it just certain traits she has and she brings it very funny, in a way that I think 'sick', you know? like 'I feel you!'. I recognise myself in it. Or in any case, I think a little bit like she does."*  
(Female, 14)

## 2.2 Uniqueness

In their search for identity, the target audience looks for characters to identify with, but at the same time, they also look for a way that makes them unique from the rest of their environment. They constantly compare their own behaviour and entertainment consumption to their peers and try to find the right spot where they both stand out from the crowd, but blend in enough to fit in the group. Having different behaviour in entertainment consumption than the rest of their environment, often gives them a positive feeling.

*"I read a lot of books, but I'm the only one of my friends. Almost nobody still really reads."* (Female, 14)

## 2.3 Togetherness

The target audience is in a generation where they can be in contact with their peers at any-time. While new technology and media might have replaced some of the physical activities, the target audience often claims that it is more like an addition to their normal friendships. Thanks to the digital possibilities of modern times, the target audience has a big preference for consuming entertainment content together, by being physically together or online. Everything is better when together.

*Sometimes we watch the same movie while we're calling each other. Or you go on Facetime and watch a movie along with that person.* (Male, 13)

## 2.4 The new gaming

The same need for togetherness can be found in the way that people are gaming. Gaming is seen as a social activity. There are three main ways to play games: (1) the small free games that are

often only temporarily played on a mobile phone, (2) gaming alone on a computer or game console (often while talking with friends online) (3) gaming physically together with friends on a game console. These ways of gaming correspond to different values, respectively: distraction, energy generation and social stimulation. Especially the second type of gaming is more performed by boys than by girls.

*Well, I mainly like it to play with friends. While gaming, I'm meanwhile talking to friends and we are in the same game. I think it's boring to game on my own.* (Male, 14)

## 2.5 The image of comics

The target audience was asked about their opinion around comics and almost every interviewee responded with the fact that comics are something that they read more when they were younger. However, they don't proclaim that comics are too childish, more often it is because of a switch towards other entertainment like books or games. Also, the most read and best known comics series for every interviewee is the Donald Duck, which has a target audience averagely aged between 8 and 12 (Sanoma, 2017). Therefore, it seems logical that people aged 12 to 15 speaks of a decline in reading comics.

*It's not that comics are not for my age, but I don't read them anymore, because I don't feel like reading. I rather go gaming.* (Male, 13)

## 2.6 The power of familiarity

During the interviews, the target audience got the task to rank a number of celebrities and a number of comics characters from the most disliked to the most liked. Often, this resulted in ranking them from least known to best known. The reason for liking someone was often because they know that person well, instead of talking about personality traits. Also, knowing a certain character, triggers to watch new entertainment content featuring that character. Another sign of the power of familiarity is the eager to watch entertainment content that they already know again and again.

*I think Deadpool [movie character] is very funny. I saw the movie and I laughed really hard, so funny. I think Deadpool comics will also be very funny. I definitely want to read those as well.* (Female, 14)

A more elaborate explanation of all the results of the qualitative research with more quotes from the interviewees can be found in Appendix H. Next chapter, implications for the project will be discussed based on these results.

# Research I

## Target Audience

### Implications for project

All the conclusions from the previous chapter can be used as a fundament for thinking of the implementation of the Comics for Safety project. What is the best way to reach the target audience? How to be relevant for the target audience? And how to get the target audience engaged?

This chapter tries to convert the conclusions from the previous chapter into implications for the project and getting closer to the answers of the questions above.

#### 1. Values

The target audience mostly likes content that is amusing, thrilling and immersive. However, different occasions and different channels cause the target audience to focus more on some of these benefits.

For instance, if the target audience wants to be inspired by entertainment, the most important factor is the immersiveness. If a comic book is made about the Pyrotechnix which provides information about fire safety, it would be positive to trigger a sense of inspiration by making a very immersive story. However, if the comics would be distributed by providing fire safety lessons at school, another aim would be to start a discussion and trigger the target audience to talk about the content together. In this case, it would also be important for the story to be amusing and thrilling.

In addition, there will probably be more occasions where Comics for Safety will try to reach the target audience. For example, a social media campaign could be launched to create awareness. This content would reach the audience on a moment that they are for example in-between activities and scanning through their Instagram story in need for some distraction. This content needs to be very amusing and so hilarious that the audience would want to share it with their friends. A more immersive or thrilling story will probably not work here. Figure 35 shows a table with some examples of which type of content can be created to trigger certain values for the target audience.

#### 2. Self-identification

In the chapter about 'EE - a literature review' it was already discussed that self-identification is a

very important factor for the absorption into the story, but also for the likelihood of causing behaviour change.

In the conclusion of this research, it was found that self-identification is also the most important factor for causing immersiveness for the target audience, but also for causing general affection towards entertainment content. This makes it very clear that the possibility for the target audience to identify themselves with the characters of Pyrotechnix is the first priority for creating the content. As can be concluded from the interviews, self-identification can be achieved by for example having similar experiences, similar personality traits and similar opinions. Note that the target audience often feel a lot of self-identification with personalities that are seen as 'ordinary'. This means that these personalities also show their flaws and mistakes, because it makes them more human (see figure 36).

This knowledge is definitely a point of attention for the Pyrotechnix characters who have initially be designed as heroic. Whether additional 'ordinary' characters should be added to the story or the original characters need to be made more humane, is up for discussion.

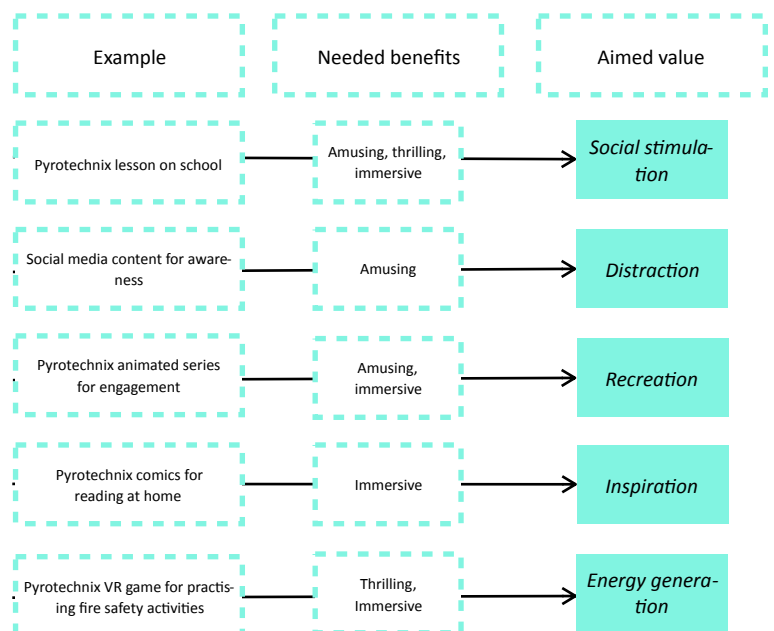


Figure 35. Examples of possible Comics for Safety content that could be created to full-fill the different needs and wants of the target audience.

### 3. Togetherness

The target audience wants to be together 24/7 and modern apps make this possible. Entertainment content that doesn't have the ability to be shared or consumed together is decreasing in popularity. Also, they are continuously comparing themselves to others.

For all content created by Comics for Safety, there need to be a way to share it or enjoy it together. A mobile app might be developed starring the Pyrotechnix characters. This app would probably only be played if they can see the high scores of their classmates, if they can share their own high scores and if they can also enjoy the app when they are physically together. Looking at comic books, which are hard to fit into these requirements, there is still room for adjustments. For example, certain panels in the comic book might be scannable with your phone to see extra content of the character, there might be a link between the comic books and a mobile game or the entire comic book might be distributed digitally with apps that try to show comics in a renewed way, like the app Madefire (see figure 37). When developing a mobile app, a careful decision need to be made on how to engage the target audience for a longer period of time, since it can be concluded from the interviews that the target audience all play mobile games sometimes, but almost never play them longer than two weeks before moving on to the next game. When developing a console game, it needs to be taken into account that there is a significantly lower amount of females that will be attracted to it.

### 4. Comics and familiarity

Although almost all interviewees claimed to read less comics than they did when they were younger, they generally don't claim to be too old

for comics. A likely reason for the decline in reading comics is the fact that the widely popular Donald Duck magazine is aimed at the age of 8 - 12. More adult looking comics like the Pyrotechnix could still trigger interest.

However, the target audience often has a big preference for entertainment content which is already familiar to them. Especially when it comes to comics. One strategy might be to create (online) awareness around the Pyrotechnix characters, before releasing the comics. Another strategy is to change the core channel of Comics for Safety towards an animated series. Interviewees predict to be more engaged with an animated series than with comics. However, the disadvantage is that the investment costs will be much higher.

### 5. Limitations

Since this research was a explorative qualitative research, the outcomes are only based on vales and indications of trends. Some of these trends, like consuming more entertainment together, are very clear and will most likely hold in a large quantitative research. However, whether all outcomes within this research are applicable for the entire target audience is not entirely certain.

In addition, the number of participants for this research was only large enough to say something about the group as a whole. To make any statements about differences within the target audience (i.e. gender differences, age differences), a lot more interviewees would have been needed, but this was outside the scope of this thesis. The next chapter will contain another research. This one will be a quantitative research about the effectiveness of EE.



Figure 36. The video 'My Horrible Nightmare Group Project' from the Youtube channel 'Jaiden Animations' showing Jaiden's struggles and insecurities with the social contact she has with fellow students. The video has almost 20 million views.

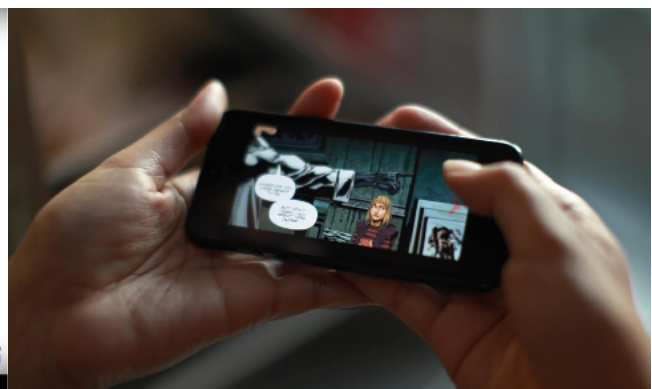


Figure 37. Madefire is an app that aims to show comics in a renewed way. It has the possibility to let comics panels move, show special effects and it has also developed a VR app to show comics.

# Research II Effectiveness

## 1. Introduction

The goal of the Comics for Safety Foundation is to improve fire safety. This can be done by changing human behaviour (Miller, 2005). The method of changing human behaviour that the Comics for Safety Foundation aims to use is through Entertainment-Education (EE), which is seen as an effective way to engage and educate people towards behaviour change (Singhal & Rogers, 2012).

During this thesis, a second research study will be executed with the goal to (1) test the effectiveness of using comic books as a tool to change behaviour on fire safety and (2) add an extra stimulus to the comic book to measure the increased effect on behavioural change.

## 2. Literature review

To learn about other studies in the field of EE, look at the chapter 'Entertainment-Education - Examples' to see the findings and limitations of existing research. This research adds to the current knowledge by applying the strategy (EE) to a new field (fire safety) for a new target audience (Dutch children aged 12 to 15).

As it was discussed in earlier chapters, the different stimuli that determine a certain behaviour are very complex. The most commonly used theory of explaining behaviour is the Theory of Planned Behaviour (Ajzen, 1985). In this theory, the behaviour is explained by the behavioural intention, the attitude, the subjective norm and the self-efficacy.

According to the Protection Motivation Theory, in the area of fire and health prevention, the relation between behavioural intention and actual behaviour is mainly determined by the perceived vulnerability and the perceived severity (Rosenstock, 1974).

In the Extended Parallel Proces Model (Witte, 1992) it was seen that the best predictors for danger control (i.e. taking preventive action/ changing behaviour) was the self-efficacy and the response-efficacy.

By measuring the different factors from these combined theories, a clear understanding of the effect of the EE should come out of this research. Therefore the following dependent variables will be measured during the research

study, both prior to consuming the education-entertainment content and after:

- V1. Perceived severity
- V2. Perceived vulnerability
- V3. Knowledge
- V4. Attitude
- V5. Self-efficacy
- V6. Response-efficacy
- V7. Subjective norm
- V8. Behavioural intention
- V9. Behaviour

## 3. Method

For the research, the target audience will be used to test the effect of EE in a quantitative way. The variables mentioned above will be measured at two different points in time: before receiving the EE content and two weeks after receiving the EE content.

In order to measure a change in behaviour, a certain desired behaviour should be shown in the EE content which is tangible to measure and relatively easy to perform. The EE content which will be provided in the research will contain information about correctly installed smoke alarms and about closing doors to prevent the spreading of smoke in case of fire. These are the two most important points of improvement for the chance of escape in the Netherlands (Eysink Smeets et al., 2015).

The story will include knowledge about the subject and will show the required behaviour for fire safety: (1) checking your smoke alarm every month and (2) closing the doors in your house to prevent smoke to spread quickly through your house in case of fire. These actions are also chosen because it is relatively easy to measure the self-reported behaviour by asking questions like:

*Did you test whether your smoke alarm is functioning properly somewhere last month?*

*How many nights did you close the door of your bedroom last week?*

In a questionnaire, questions will be asked to test knowledge about the subject. Examples of these questions are:

*Which of these smoke alarms is placed on a proper location on the ceiling?*

*What is the best fire alarm to place in your kitchen?*

Also, questions about the other predictors of behaviour will be included. Ajzen (2013) wrote a paper on the best way to formulate questions in a questionnaire for measuring behaviour.

The second goal of the research is to find an extra stimulus that increases the effects of the EE content on behaviour change. One of the biggest problems with fire safety education is that the education does lead to increased knowledge, but not necessarily to behavioural change (Knudson et al., 2009). One way to increase the actual change in behaviour is the EE approach. The entertaining factor of the content has the power to cause absorption into the story and identification with the characters, which eventually leads to adoption of the character's behaviour (Slater, M. D., & Rouner, D., 2002). In addition, other studies suggest that implementation-intention (Eysink Smeets et al., 2015) and reciprocity (Cialdini, 1993) also increase the chance of behaviour change.

Therefore, two physical stimuli have been designed to give to the participants with the invitation to use it for their own fire safety and to help

them remember to actually execute the intended behaviour.

For checking the smoke alarm once a month, the 'smoke alarm approved' sticker was designed. This sticker can be placed on a smoke alarm after confirming that it functions properly. The verification date can be written on the sticker to help the participant remember when the smoke alarm needs to be checked again.

For closing the doors in house at night, the 'close your door hanger' was designed for the participant to put on the door of the bedroom to help them remember to close it every night. This concept was copied from the Dutch fire brigade as was shown in the chapter 'Fire Safety - Prevention Campaigns'.

To test (1) the effectiveness of EE and (2) the effectiveness of an extra stimulus on (3) two different points in time, a 2 x 2 x 2 between group experiment was designed. For the effectiveness of EE, there is one independent variable 'educational material'. One group receives a comic book about the above mentioned subjects and the other group receives the same educational information, but without any entertainment included. The educational content for this last group will be called the 'dry education'. To test the effectiveness of the extra stimulus, there is another independent variable 'physical elements'. One group will be given the 'smoke alarm approved' sticker and the 'close your door hanger' next to the educational content and the

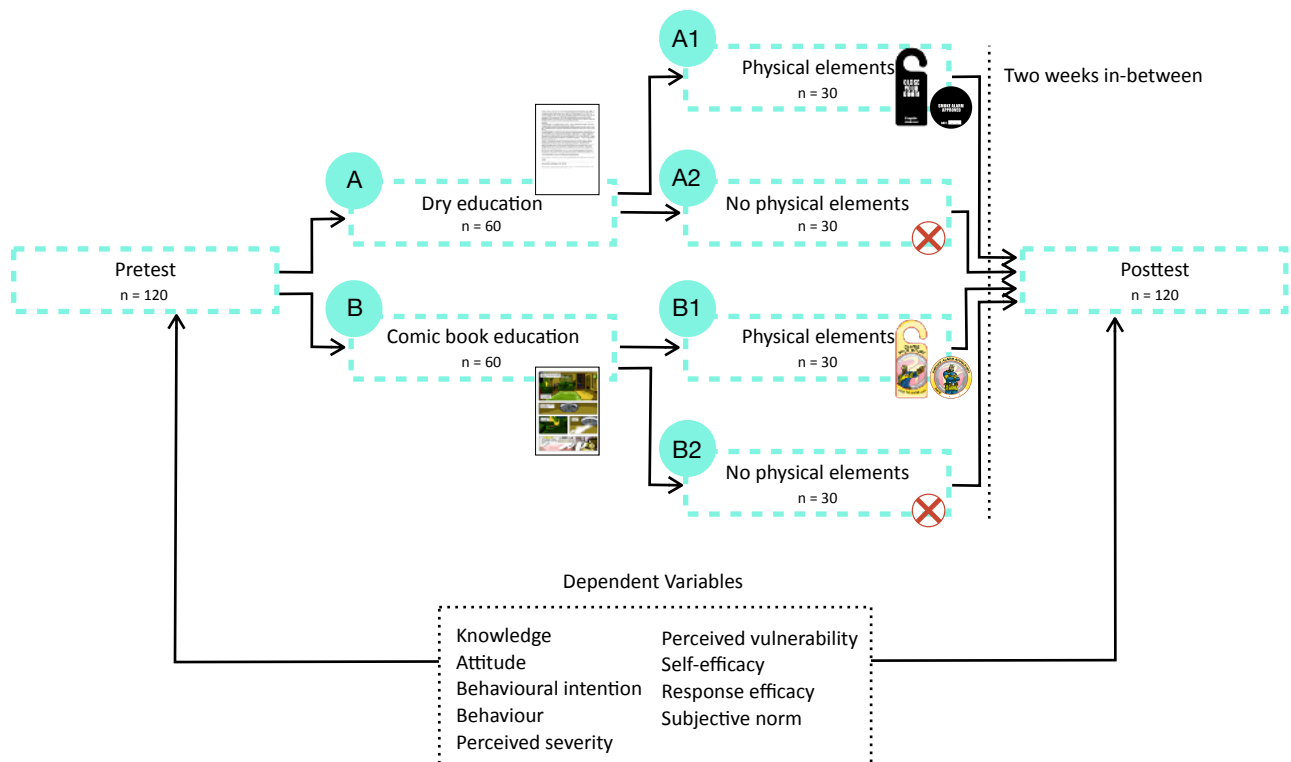


Figure 38. The overview of the research design

other group will only be given the educational content. The group that receives the comic book, will also receive their sticker and door hanger thematised in the same style as the comic book. The group that receives the dry education, will receive their sticker and door hanger without any theme, but in a very plain design.

The different variables are measured with a questionnaire both before receiving the educational content and after. The second questionnaire will be given to the participants one or two weeks after receiving the educational content. This is done because (1) the questionnaire includes questions about the self-reported behaviour of the participant from the last week and by having a delay between the two questionnaires, a change in self-reported behaviour can be found as correlation with the educational content. (2) The questionnaire included questions about the knowledge of the participant to which the answers can be found inside the educational content. Asking the questions again more than a week after reading the answers, will reassure that the participant has actually remembered it.

The overview of the research can be found in figure 38. Images of the two versions of the 'smoke alarm approved' sticker and the 'close your door hanger' can be found in figure 39.

The participants for this experiment will be mainly found via scouting clubs. These organisations have relatively large groups of children between 12 and 15 years old and it is relatively easy to reach the same participants two weeks after the first visit, because they have recurring gatherings. During the first visit, an introduction will be given that the participants are taking part in a

research about educational material for fire safety. They will first be given a questionnaire about fire safety. This questionnaire can be found in appendix I. After completing the questionnaire, the participants receive the educational material. This material can be found in appendix J. Then, the participants have the time to read the material and afterwards they can take the material home.

The educational layer of the comic together with a storyboard were designed and then briefed to the American artist HuwJ. The artist created a comic, based on the storyboard, in the same style as the Pyrotechnix concept. When the comic book was created, it was first tested on different aspects of the extended elaboration likelihood model which measures the aspects that determine where entertainment content is likely to change behaviour (Slater & Rouner, 2002). These aspects include:

- Level of character identification (identifying in general with character)
- Level of homophily (feeling similar to character)
- Level of para-social identification (seeing character as a (possible) friend)
- Level of wishful identification (wanting to be the character)
- Unobstructiveness of persuasive context
- Storyline appeal
- Quality of production
- Absorption

One or two weeks after the first visit, a second visit will be made to the same participants. This time, only a questionnaire will be given which



Figure 39. From left to right: the Pyrotechnix themed 'close your door hanger', the Dry Education 'close your door hanger', the Pyrotechnix themed 'smoke alarm approved' sticker and the Dry Education 'smoke alarm approved' sticker

measures the difference in variables between the first and second visit. The differences are expected to conform the following hypothesis.

*H0. There is no significant difference for any of the variables for any of the groups between the pretest and the posttest.*

*H1. According to the pre-test effect (All, 2017), all variables will be slightly higher in the posttest, for all four groups.*

*H2. Assuming the effectiveness of EE, the positive differences in the posttest for all variables are higher for group B than for group A.*

*H3a. Assuming the effectiveness of an extra stimulus, the positive differences in the posttest for variables 5, 6, 8 and 9 are higher for group A1 than for group A2.*

*H3b. Assuming the effectiveness of an extra stimulus, the positive differences in the posttest for variables 5, 6, 8 and 9 are higher for group B1 than for B2.*

Since this experiment contains 2 categorical independent variables ('educational content' & 'physical element') and 9 different ordinal dependent variables, the statistical analysis will be the repeated measures MANOVA. To measure differences for a single group between the pre- and post-test, a paired t-test will be used. In addition, The approval letter for the research ethics application can be found in appendix K.

#### 4. Data collection

The data was collected at four different scouting clubs located in Delft, Den Hoorn and Hilversum. A fifth scouting group cancelled the meetings a day before the first meeting, which made it impossible to gather enough data for the four different research groups within the time scope of the project. Therefore, it was decided to leave out group A1 from the research. This is the group that would have received the dry education together with the door hanger and the stickers. This was the least important group for the data. Without this group, there can still be made two different comparisons: (1) a comparison between group A2 and B2 (dry education without physical stimuli vs. comics education without physical stimuli) and (2) a comparison between group B1 and B2 (comics education with physical stimuli vs. comics education without physical stimuli).

The two smallest scouting clubs (N = 16 and N = 9) were combined to be group B2 (comics education without physical stimuli). Another club (N = 21) was group A2 (dry education without physical stimuli). The last club (N = 29) was group B1 (comics education with physical stimuli). This gave a total of 75 participants.

During the data collection, there were a number of complications that should be kept into account when evaluating the data:

- Although the goal was to have 14 days in-between the two meetings, schedule difficulties made it only possible to have two groups with 14 days in-between, one group with 7 days and one group with 21 days.
- Some of the participants attended the first meeting but didn't attend the second meeting (N = 10).



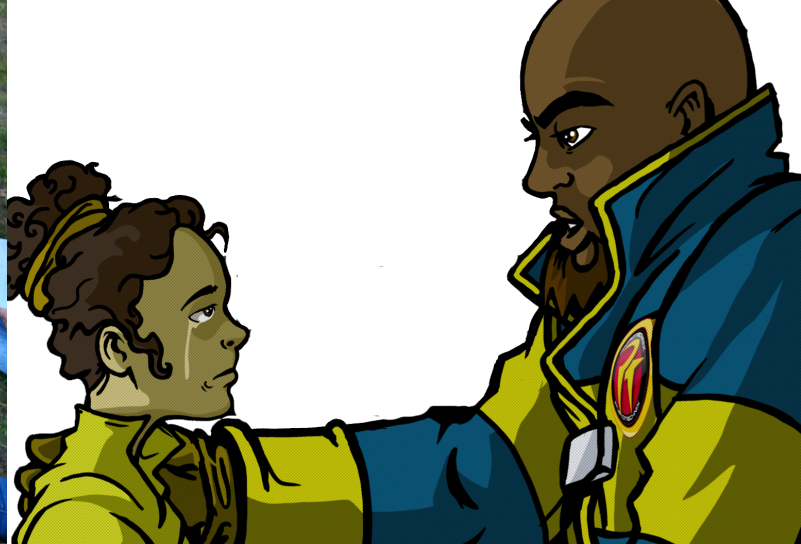


Figure 41. Left: Paulien. Right: Vulcan (Pyrotechnix)

- Some of the participants discernibly filled in the survey(s) without taking notion of the questions. During the visits, surveys who were seen to be blindly completed, were marked with a cross. Also, surveys that were later found to only be answered with one and the same answer on every question were marked with a cross. These participants were excluded from the research (N = 11).
- The meeting of two groups took place on a Friday evening, the meetings of the other two took place on a Saturday afternoon. Whether it was a causal effect or not, it was found that the groups on Saturday afternoon (the smaller part of B2 and group B1) were significantly less motivated, which also resulted in lower outcomes.

Aspect	Score	
General liking	5.4	
	Paulien (see figure 41)	Pyrotechnix (see figure 41)
Character identification	3.2	4.8
Homophily	2.7	3.8
Para-social identification	4.8	4.9
Wishful identification	2.8	4.8
Unobstructiveness of persuasive content	3.4	
Storyline appeal	4.9	
Quality of production	5.8	
Absorbtion	4.1	

Figure 40. Table that shows the results of the Pyrotechnix comics evaluation. The score shows an average (N = 9) of the participants that rated the different aspects on a 7 point likert scale.

After the exclusions according to the criteria above, the total number of participants at t = 1 was N = 64 (A2, N = 19; B1, N = 23; B2, N = 22) and at t = 2 was N = 54 (A2, N = 19; B1, N = 15; B2, N = 20).

The data for the evaluation of the Pyrotechnix comic was gathered by sending an online survey with the comic to 9 participants aged 12 to 15.

## 5. Results

The results of the evaluation of the Pyrotechnix comic are shown in figure 40. These results will later be discussed.

Figure 42 shows the distribution of age and gender across the different groups. The distribution of gender is not significantly different across the groups ( $\chi^2(2) = 4.94$ ,  $p = .09$ ). However, the average age does show significant differences ( $F(2, 51) = 12.81$ ,  $p < .001$ ). The age of group B2 is significant higher than the other groups.

Therefore, a one-way ANOVA was conducted to measure the effect of age on all the dependent variables for both t = 1 and t = 2. At t = 1, there were no significant differences between different

Aspect	A2	B1	B2
Total (t = 2)	19	15	20
Male	8	7	15
Female	11	8	5
12 years old	12	7	4
13 years old	7	6	4
14 years old	0	2	6
15 years old	0	0	6

Figure 42. Table that shows the distribution of gender and age across the different groups. The age significantly differs across the groups, the gender doesn't.

ages, except for the perceived severity ( $F(6, 47) = 2.95, p = .02$ ). It indicates that younger participants have a higher perceived severity of a fire treat than older participants. At  $t = 2$ , there neither was a significant difference between different ages, except for knowledge ( $F(6, 47) = 2.59, p = .03$ ). Surprisingly, the data indicate that younger participants have a significantly higher knowledge about the provided information than the older participants.

To get an indication of whether the target audience likes to read comics, all participants were asked at  $t = 1$  to rate their general attraction to comics. The results indicate that younger participants like comics significantly better than older participants. There was no significant difference between gender and the general liking of comics, see figure 43 and 44.

It was meant to measure the differences between group A2 and B2 to see the effect of the educational material and the differences between group B1 and B2 to see the effect of the physical stimuli. However, group B1 was asked a couple of extra questions at the end of their survey at  $t = 2$ . Namely, whether they used the door hanger or not and whether they used the sticker or not. None of the 15 participants at  $t = 2$  reported to have used either the door hanger or sticker. Therefore, comparing group B1 and B2 won't give any insight in the effect of the physical stimuli.

A more relevant comparison is that between group A2 and B2. Since the comparison is more

reliant when the two groups have equal sizes, the data from group B1 is not used in this comparison and is from here on excluded from the results of this research.

When looking at the results of the surveys, it was easy to conclude that participants often close the door of their bedroom every night, but almost none of them did this because of fire safety reasons. Questions on for example the attitude of participants towards closing his or her door might not be as relevant when taking into account that this participant doesn't link the action to fire safety (often participants closed their doors because of other reasons like keeping heat inside or privacy). Therefore, not only the results of the total outcome of each dependent variable will be taken into account, but also a separate outcome that only includes questions about the behaviour of checking the smoke alarm. This resulted in the behaviour variable being split up in two and adding a variable for attitude, behavioural intention, self efficacy, response efficacy and subjective norm which all only look at this variable specifically for checking the smoke alarm.

At first, for both the dry education and the comics education group (A2 and B2), a paired t test was performed to measure differences between the pre-test and the post-test. Secondly, a repeated measures ANOVA was performed to measure the differences between the groups with different educational material. The results can be found in figure 45.

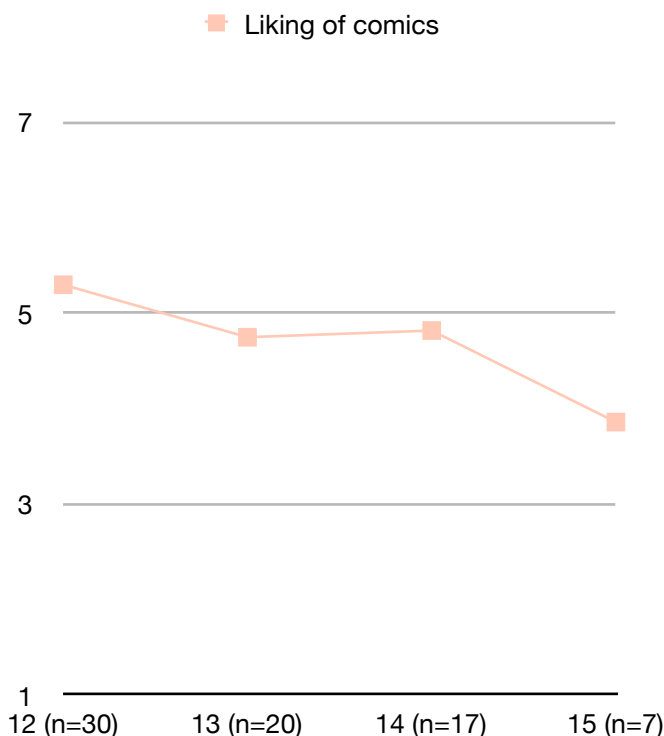


Figure 43. Graph that shows the significant difference between age and the liking of comics

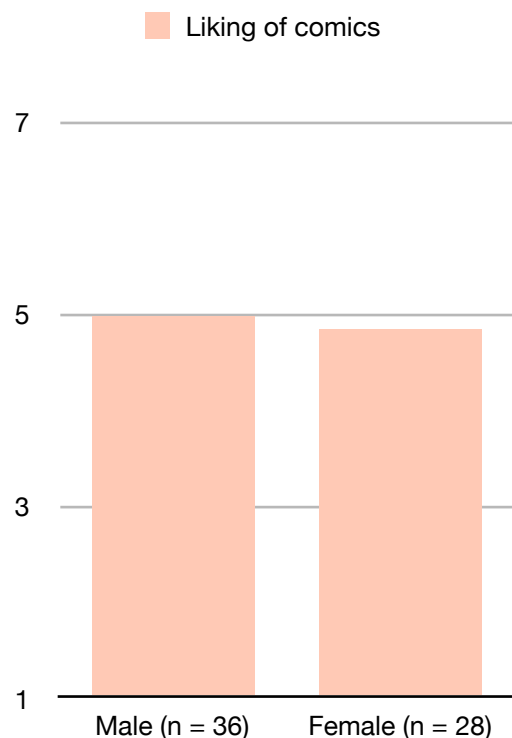


Figure 44. Graph that shows the insignificant difference between gender and the liking of comics

Aspect		N	Mean t = 1	Mean t = 2	Std. Devi- ation	t	Sig. (2- tailed)	Contrast time*group F	Contrast time*group Sig.
Knowledge	dry education	19	37.5%	32.1%	.23	1.07	.297	4.78	<b>.035</b>
	comics education	20	35.9%	42.9%	.17	-2.02	.056		
Attitude	dry education	19	4.0	4.0	1.20	.00	1,000	1.44	.238
	comics education	20	4.6	5.1	1.28	-1.55	.135		
Attitude Alarm	dry education	19	3.9	3.7	1.30	.56	.581	2.13	.153
	comics education	20	4.2	4.6	1.57	-1.06	.300		
Behavioural Intention	dry education	19	3.2	3.2	1.08	-.15	.882	.85	.362
	comics education	20	3.3	3.8	1.56	-1.40	.176		
Behavioural Intention Alarm	dry education	19	3.0	2.6	.95	2.06	.052	2.54	.119
	comics education	20	2.6	2.9	1.89	-.83	.418		
Behaviour Alarm	dry education	19	4.7%	4.7%	-	.00	1,000	.95	.336
	comics education	20	8.7%	21.7%	.46	-1.37	.186		
Behaviour Door	dry education	19	3.7 / 7	4.8 / 7	2.41	-2.17	<b>.042</b>	1.94	.172
	comics education	20	5.9 / 7	5.9 / 7	1.86	.00	1,000		
Perceived Severity	dry education	19	4.4	4.8	.90	-1.70	.105	.032	.859
	comics education	20	4.0	4.4	1.98	-1.05	.305		
Perceived Vulnerability	dry education	19	2.4	2.2	1.47	.45	.660	.040	.842
	comics education	20	2.5	2.3	1.27	.41	.685		
Self Efficacy	dry education	19	4.3	4.0	1.65	.60	.558	.175	.678
	comics education	20	4.6	4.6	2.27	-.05	.964		
Self Efficacy Alarm	dry education	19	3.1	2.6	1.72	1.40	.178	.190	.666
	comics education	20	3.8	3.5	2.95	.50	.625		
Response Efficacy	dry education	19	4.0	4.1	1.46	-.37	.712	2.30	.138
	comics education	20	3.8	4.5	1.79	-1.86	.076		
Response Efficacy Alarm	dry education	19	4.7	4.4	1.30	1.09	.288	3.67	.063
	comics education	20	3.7	4.1	2.01	-.94	.360		
Subjective Norm	dry education	19	3.3	3.3	1.39	.00	1,000	.95	.337
	comics education	20	3.8	4.1	1.01	-1.30	.207		
Subjective Norm Alarm	dry education	19	3.0	2.7	1.69	.90	.378	1.36	.251
	comics education	20	3.3	3.4	1.54	-.36	.721		

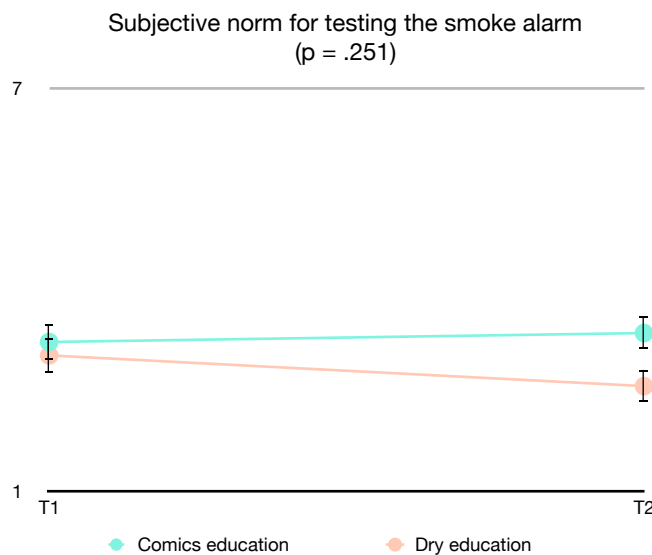
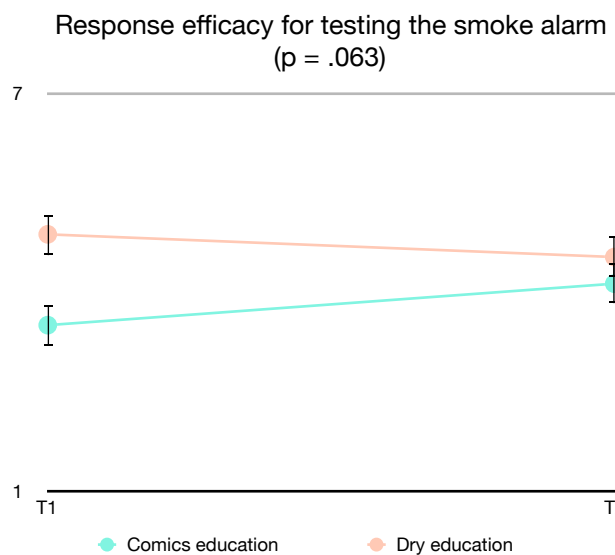
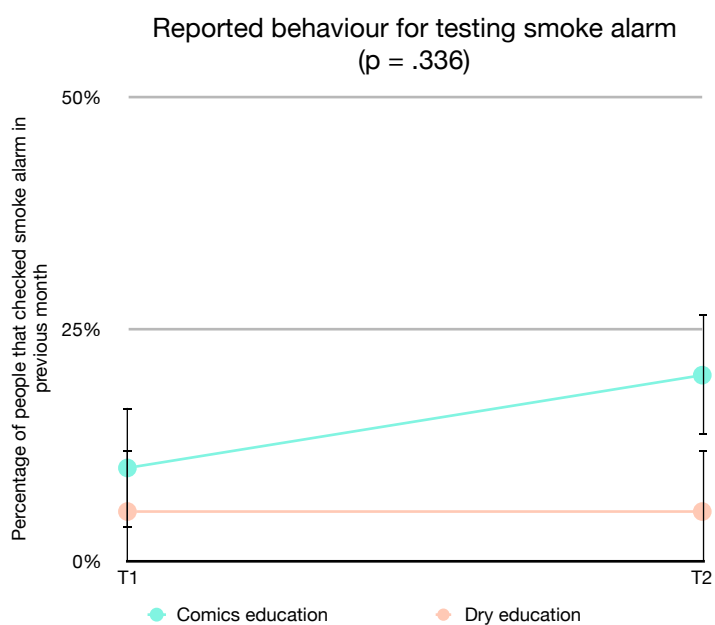
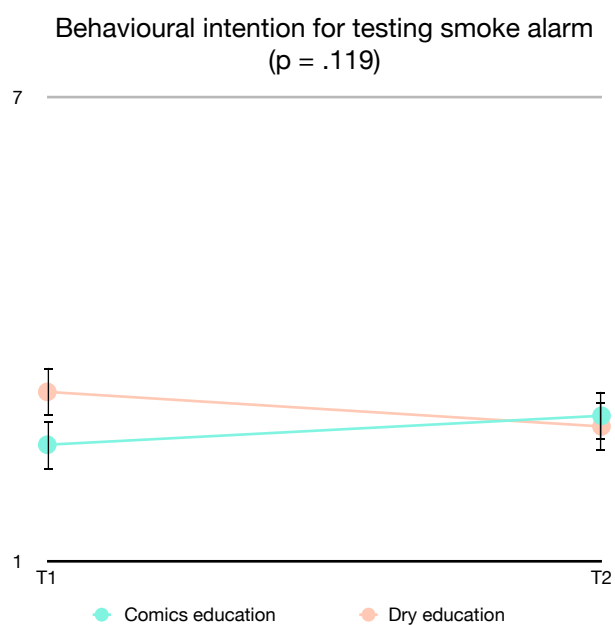
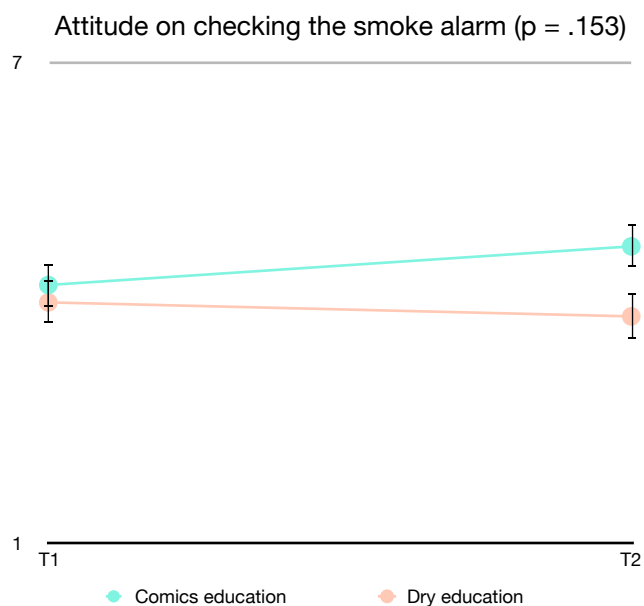
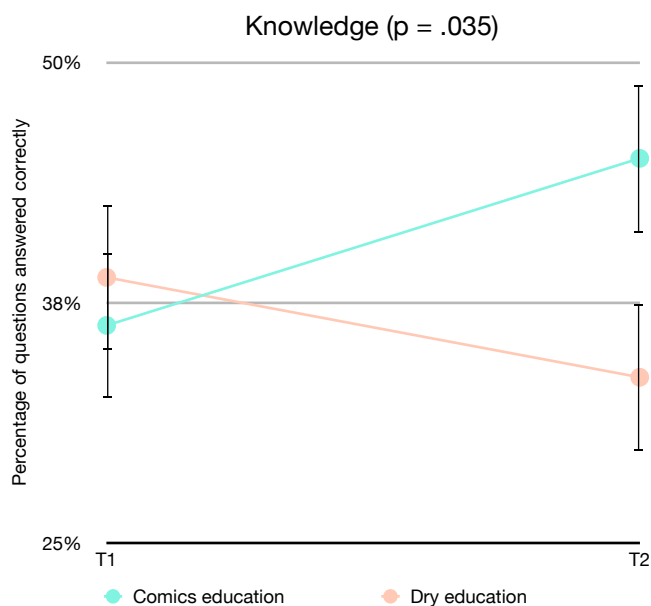
Figure 45. Table that shows the results of a paired t-test between the pre-test and the post-test for the different types of education material. The last two columns show the result of the repeated measures ANOVA which compares the differences for both groups.

When looking at the group with the comics education, the results show that all the variables have increased during the post-test relative to the pre-test, except for the perceived vulnerability of the fire threat and the self efficacy to monthly test a smoke alarm. None of the differences are significant.

Looking at the differences for the group with the dry education, various variables slightly increase where others slightly decrease. This group does show a significant increase in the amount of days they have closed their door at night over the past seven days ( $t(20) = -2.17$ ,  $p = .042$ ).

For the repeated measures MANOVA, it indicates that the group with the comics education has a significant larger increase in knowledge than the group with the dry education (Wilks'

Lambda = .89,  $F(1,37) = 4.78$ ,  $p = .035$ ). While knowledge is the only dependent variable that shows a significant difference between the two groups, five other dependent variables are also shown in graphs on the previous page. These variables gave the following results: attitude for testing the smoke alarm (Wilks' Lambda = .95,  $F(1,37) = 2.13$ ,  $p = .153$ ), behaviour intention for testing the smoke alarm (Wilks' Lambda = .94,  $F(1,37) = 2.54$ ,  $p = .119$ ), reported behaviour for checking the smoke alarm (Wilks' Lambda = .98,  $F(1,37) = .95$ ,  $p = .336$ ), response efficacy for testing the smoke alarm (Wilks' Lambda = .91,  $F(1,37) = 3.67$ ,  $p = .063$ ) and the subjective norm for testing the smoke alarm (Wilks' Lambda = .97,  $F(1,37) = 1.36$ ,  $p = .251$ ).



## 6. Discussion

The results of the comic evaluation are gently positive about comic. The participants gave a positive rating to the general liking (5,4 / 7) and to the quality of the story (5,8 / 7), but they are not really absorbed into the story (4,1 / 7) and they find the persuasive content rather obstructive (unobstructiveness: 3,4 / 7). In general, the identification with the Pyrotechnix is higher than the identification with the girl Paulien in the comic. These results indicate that there is a potential for the concept to be liked by the target audience, but some of the results might be relatively low, because the comic is very short and therefore doesn't have the time to absorb the reader, doesn't introduce characters properly and it can't spread out the information over more pages to make it less obstructive.

The unequal distribution of age across the different groups might have influenced the results of the research. However, when examining whether the dependent variables were influenced by the age of the participants, this was only true for the perceived severity of a fire threat at  $t = 1$  and for knowledge about fire safety at  $t = 2$ . These results suggest that (1) younger participants initially perceive a fire threat as more severe than older participants and (2) younger participants remember more from education about fire safety than older participants. Especially the second result is surprising, since it is to be expected that older participants have further developed cognitive skills and can more easily remember information. An explanation for the result might be that the younger participants have a higher general liking for comics and therefore paid more attention to the Pyrotechnix comics which eventually led to a better score on knowledge at the second test.

Since the results show that younger participants score better on knowledge at  $t = 2$ , it must be taken into account that a normal distribution of age would have increased the knowledge score for the group that now has the oldest participants. This is group B2, the group with the comics education and no physical stimuli. It is very positive to realise that this group would thus have an even higher knowledge score in case of normale distribution of age. Especially because this group already shows a significant difference in knowledge opposed to group A2 (the group with dry education and no physical stimuli).

The results of the research show that younger participants are more likely to be positive about comics than older participants. This doesn't necessarily signify the ineffectiveness of a comic for the older participants. It only states their initial thoughts about it, which is probably largely shaped by the comics characters they know.

Like discussed in chapter 'Comics - popularity', Dutch children mainly know the Donald Duck and other comics that are aimed at a younger target audience than for example American comics like Batman and Spiderman.

The results also show that there is no significant influence of gender in whether the participants like comics or not. This is very positive for the project, because it aims to engage everyone in the target audience (boys and girls) with comics in order to teach them about fire safety.

In the results it was stated that the data of group B1, the group with the comics education and the physical stimuli, were excluded from the research because none of the participants reported to have used either the door hanger or the stickers. This disappointing result indicates that the addition of physical stimuli has no effect on the target audience at all. However, it doesn't signify that physical stimuli will never have a positive effect. It must be taken into account that using a door hanger or a sticker for its purpose has a certain threshold. For the target audience to use it, it requires a certain amount of engagement with the Pyrotechnix. In this research it can be found that the target audience sees no reason to use the physical stimuli, when they have little or no engagement yet. A lack of engagement is understandable, since the only touch point with the Pyrotechnix is one short comic that mainly provided information and didn't offer a lot of page to entertain the audience. A longer comic, additional classical education and/ or multiple volumes/ lessons about the Pyrotechnix would not only increase the chance of finding an effect for the physical stimuli, but it also increases the chance that the comics themselves will increase the dependent variables of this research Shen & Han (2014).

Although the difference in results between the pre-test and the post-test for the group with the comics education weren't significant, almost all dependent variables increased. The two variables that didn't increase can also be explained. The perceived vulnerability might have decreased a bit, because the acquired knowledge about fire safety gave the participants more self-assurance about their fire safety which can decrease the perception of their vulnerability of a fire threat. The self efficacy for testing the smoke alarm might have decreased a bit, because they were asked again whether they tested their smoke alarm last month and when they realised they forgot to test their smoke alarm, their hopes on succeeding to do it the next month might be lost.

The fact that all other dependent variables have increased between pre- and post-test suggest that there is indeed an effect, but this effect isn't

significant yet, because the number of participants in each cell is relatively small.

The outcome of the repeated measures MANOVA shows whether the group with the comics education increased significantly more between pre- and post-test than the group with the dry education. This is true for the knowledge variable. Most other variables show a graph with a similar shape, but without a significant difference. The same can be said as stated above: the positive difference indicates a significant difference when the number of participants would have been larger.

The key variable that the comic aimed to increase was the behaviour for participants to test their smoke alarm at home, because this variable actually increases the fire safety of that participant. While this variable also didn't show a significant difference, 13% of the group with the comics education reported that someone in their home tested the smoke alarm between the pre- and the post-test compared to none of the participants in the group with the dry education.

## 7. Research Limitations

The current research shows some significant results and a number of indications for effects. However, the research knows a number of limitations that might have influenced the results either positively or negatively.

- The number of participants per cell wasn't big enough to have a low variance, which impacts the significance of the results. This was mainly because of participants that didn't attend the second meeting or didn't complete one of the surveys earnestly. Also, if the thesis project's time scope would be bigger, more scouting clubs could have been visited.
- The different groups didn't have an equal distribution of age. The group with the comics education was significantly older. Older participants scored significantly lower on knowledge, which might have decreased the difference in knowledge between this group and the group with the dry education.
- Not every group had the same time between the two visits (seven, fourteen or twenty-one days), not every group was visited on the same time of the week (Friday evening or Saturday afternoon) and not every group was visited at the same time of

the academic period (first, second or third gathering after the summer holidays). Although the direct effects of these variations are hard to predict, it might have created some effect.

- The research contained only a small comic with seven pages and the participants had only one touchpoint with the Pyrotechnix concept, instead of having a longer story and different volumes. This likely caused a lower increase of the independent variables for the group with the comics education at the post-test compared to the pre-test.
- Due to schedule difficulties, one group got canceled and there were no participants to receive dry education with physical stimuli, which made it impossible to do a 2 x 2 x 2 research, but limited the research to comparing group B1 to B2 in 2 x 2 and B2 to A2 in 2 x 2.

## 8. Future implications

The results of this research hint to an effect that is far stronger than the conclusions that can be drawn directly from the data. Therefore, it is strongly recommended to follow up this research with a new study that aims to discover all the effects that are there.

The following implications need to be taken into account when following up this research:

- The size of the participant groups need to be increased, preferably tripled.
- Preferably, the research will be executed on secondary schools in comparable classes. These classes are estimated to have more homogeneous groups which can be reached in a more similar context than with scouting clubs.
- Instead of having two visits to each group, it would be better to have four visits. This would allow to provide each participant with a volume of the comic on three different points in time, which allows the research to measure the effect of multiple volumes and hopefully an increased engagement.
- In terms of the educational content, more topics could be added which might be more relevant for the target audience (e.g. fire works safety, charging mobile phones at night/ in bed, don't leave the stove unattended, etc.)

## 9. Conclusion

From this research, the following can be concluded:

- The target audience (Dutch, 12 - 15 years old) significantly learns and remembers more knowledge about fire safety when receiving the information in comics format than receiving the information in plain text format. The group that received information in comics format scored a 24% higher mark on their second test, while the group that received information in plain text format scored a 13% lower mark on their second test.
- The younger part of the target audience (12 years) is more likely to be positive about comics than the older part (15 years). Gender doesn't play a significant role in the positivity about comics.
- The younger part of the target audience (12 years) initially has a higher perception of the vulnerability for a fire threat than the older part of the target audience (15 years).
- After receiving information in comics format, the score on attitude about fire safety behaviour increased more than the score of the group with plain text format. This effect was not significant. (0.4 increase on a 7 point likert scale versus 0.3 decrease).
- After receiving information in comics format, more people made sure somebody in their home tested the smoke alarm compared to the group with plain text format. This effect was not significant. (13 p.p. increase versus 0%)

# Ideation

## Starting point

With the literature research, the target audience research and the effectiveness research as fundament, a first brainstorm was done to think about elements to enhance the Comics for Safety campaign besides the Pyrotechnix comics. Note that comics is a medium and not a format and whether the platform will be printed comic books, phone comics or VR comics, is yet to be decided.

The content of these comics will be both entertaining and educational. In the scenario where the entire target audience would read all the comics, it is assumed that there will be a significant increase in knowledge, attitude and behaviour in fire safety (see chapter 'Research II - Effectiveness').

The reason of existence for the campaign around the comics is two-sided:

- (1) The assumption above states that the entire target group will read the comics. The other elements of the campaign will aim to make this happen by creating awareness and engagement with the campaign and with the Pyrotechnix characters to lower the threshold for the target audience to read an entire comic book.

- (2) Other elements in the campaign can increase the effect on knowledge, attitude and behaviour. While the comics can only ask the reader to perform certain behaviour, other elements might be able to trigger the target audience even more to perform actions and make those actions become habit.

The goals of these campaign elements are broadly based around the AIDA-model for the customer journey (awareness, interest, desire and action), see Figure 46 (Lewis, 1903), but adjusted for this project to be better applicable to fire safety behaviour.

Another starting point for the ideation is the conclusion from the target audience research. Out of this research came five different values for which the target audience is looking during their entertainment consumption (social stimulation, distraction, recreation, energy generation and inspiration). When these values come back in the different elements of the campaign, the target audience is more likely to engage with it.

The goal of the ideation is to have a diverging brainstorm which takes into account the different aspects of (1) EE, (2) the customer journey and (3) the values for entertainment consumption. See figure 47.

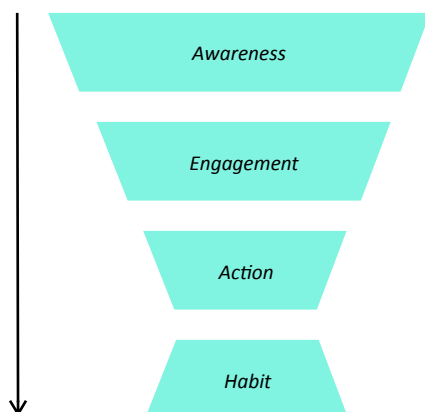


Figure 46. A model based on the old AIDA and Customer Journey model, but adjusted towards fire safety action instead of necessarily a purchase of any product or service. The goal is to make the target audience aware of the Pyrotechnix, let them engage with the story and characters, let them execute fire safety actions (behaviour) and let those actions become habit.

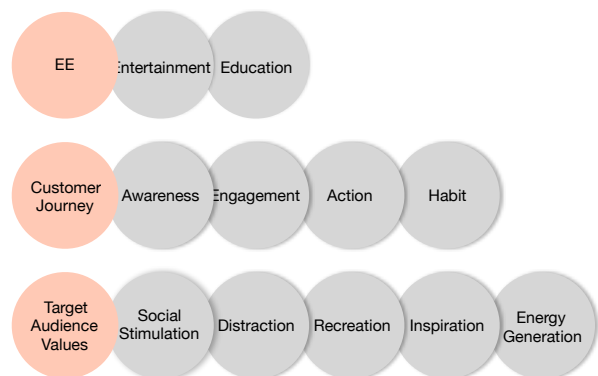


Figure 47. Overview of the starting point for ideation. The ideas that come up in the brainstorm are free to diverge widely as long as they serve a certain goal of EE, a goal from the customer journey and contain a value for the target audience.

# Ideation

## Process and methods

### 1. Diverging

With the starting point set in the previous chapter, the main ideation was done by having three different brainstorm sessions. The first brainstorm session took place shortly before the midterm evaluation meeting to come up with a first direction for the ideas. The second brainstorm session took place in the beginning of October and was purely aimed to create a big quantity of ideas. The method used during this session was the 'how-to' method (van Boeijen et al., 2014), together with the starting points from previous chapter:

- **How to educate** the target audience about fire safety? (EE)
- **How to** create **awareness** for the Pyrotechnix characters? (Customer journey)
- **How to** create content that offers **social stimulation** for the target audience? (Target audience values)

A broad overview of the outcome of this session is shown in Appendix L.

The third brainstorm session was aimed to build further on the ideas from session one and two. This was mainly done with the SCAMPER method (van Boeijen et al., 2014). The examples below show the use of the SCAMPER method with the following initial idea: to create an Instagram page for each Pyrotechnix character with different types of content to create a segmentation among the target audience:

- **Substitute**; does the segmentation need to be done with the different Pyrotechnix characters or can you also use other characters/ account names?
- **Adapt**; can you adapt this idea to apply segmentation in other campaign elements where it would be useful?
- **Eliminate**; can you eliminate a few of the profiles to still reach the wanted segmentation?

Another part of the third brainstorm session was to present the ideas to peers and ask for feedback. This gave a better insight in the relevance,

innovativeness and the attractiveness of the ideas.

In the end of the third session, the ideas were clustered into groups of ideas with different variations. Most ideas appeared to be either app ideas, game ideas, physical ideas, comics ideas, social media ideas or activation ideas.

### 2. Visualisation

To make clear decisions about the ideas on which concepts do have potential and what can be eliminated, three ideas were chosen for each group of ideas. These ideas were converted into concepts. For each concept an elaborate description was given about the possibilities and about the reason why it works beneficial for the campaign, based on the results of the literature research, target audience research and effectiveness research. The visualisation of each concept can be found in the next chapter.

### 3. Converging

With 16 visualised concepts as a starting point, it was time to converge towards a set of concepts which can be recommended to be developed for the Comics for Safety campaign. During the literature research, it became clear that the effectiveness of the campaign will be improved if its multi-faceted, spread across different channels and it uses a combination of digital and physical elements (McLoughlin, E. & McGuire, A., 1990; Japhet (1999); Eysink Smeets et al., 2015). However, during the midterm evaluation meeting of this project, A. I. Keller specifically stated that the deliverable of this project shouldn't be a wide set of concepts that value quantity over quality: that would be the 'scatter-gun approach'. This would undermine the skill of 'strategic design thinking' which is the very existential core of the Strategic Product Design master: what to design?, and equally important; what **not** to design? It is better to exclude an idea from my final set of concepts with a strong reason, than to include them with a weak reason.

Therefore, close attention is paid to the converging part of the ideation. This part was kicked off with a creative meeting with A. I. Keller. During this meeting, all visualised concepts were put on

the wall and a rough strategy for eliminating ideas was created:

- **Step 1** What is the core of the campaign and what should a concept add to the campaign?
- **Step 2** Which of the concepts answers to the criteria **the most**?
- **Step 3** Which other concepts can be complemented with this concept while (1) increasing the potential effectiveness and (2) still preserving a homogeneous perception of the set of ideas, together with the comics.

### 3.1 Step 1

As stated in the previous chapter, the core of the campaign is comics. Other campaign elements should increase the chance that people will read the comics or increase the fire safety effects the comics aim for. As concluded from the literature research, social incentives, immediate rewards and progress monitoring work as katalysators for behaviour change. As concluded from the target audience research, togetherness and share-ability are very important during their entertainment consumption. Traditional printed comic books naturally lack most of these advantages. Print comics can't be read together, it can't be shared, there is no immediate reward for reading it, etc.

Therefore, it is decided that the very essence of the campaign elements should be to bridge the gap between traditional comics and modern day's wants and needs.

### 3.2 Step 2

Among the concepts, there are two ideas that use new technologies to increase the share-ability of the comics and adds a new layer of entertainment. These concepts called 'making comics partly digital' and 'AR fire safety actions' can be found in Appendix N.

For the development of these concepts, it needs to be closely considered whether the added features really add something to the comic, instead of just making adjustments. Secondly, when it involves new technologies, it needs to be considered if the technology adds something to your experience as a reader, instead of being technology which is just cool to use for one or two times.

During the consideration of what a comic defines and how it can be enhanced using modern day technology, it was decided to devote another chapter to it called 'Reinventing Comics', inspired by the eponymous book from Scott McCloud (2000).

### 3.3 Step 3

It was decided that the homogeneous perception of the campaign should be the reference to comics, which make the campaign recognisable and let it stand out. In the meantime, the elements should try to change the social norm about comics. In the chapter 'Ideation - Decision' the different concepts will thus be tested on their estimated contribution.

## 4. Persona

During the initiation of the ideation phase, a persona was created based on the outcome of the target audience research. The idea was to come up with ideas while being immersed into the persona.

However, the persona didn't prove to be very useful during the ideation, because the ideation was mainly build on the direct conclusions of the research, instead of using those same conclusions indirectly by first packing them into the persona. It was therefore decided not to spend a lot of attention on the persona and move it to Appendix M.

# Ideation

## Concepts

An overview of all the concepts is shown below. The concepts are divided in mobile game concepts, physical objects, comics concepts, social media concepts, app concepts and

activation concepts. The explanation of each concept can be found in Appendix N. Next chapter, the converging phase will start, by looking at the core of the campaign: comics.

Mobile game concepts

Physical objects

Comics concepts

Social media concepts

App concepts

Activation concepts



# Ideation

## Reinventing comics

By looking closely at the essence of what comics are and what it can be, this chapter hopes to shine light in the different possibilities on how modern technology could enhance the medium. This chapter will look for answers on the following questions:

- What is the essence of a comic and where does something stop being a comic?
- Should the Comics for Safety Foundation still use printed comic books or should the comics be completely digital?
- Which benefits can a (partly) digital comic offer and do these benefits add value to the reading experience?

### 1. Essence of comics

In the chapter 'Comics - sequential art' McCloud's definition of comics was used: 'Comics are juxtaposed pictorial and other images in deliberate sequence, intended to convey information and/or to produce an aesthetic response in the viewer'. In his book 'Reinventing comics' (2000) McCloud goes more into depth about the definition of juxtaposed images. The most important feature of comics is that it shows the portrayal of time through space (see figure 48). This might raise the question whether figure 49 is also a comic. In the end, it also shows the evolution of time in spatial order. However, the music bar shows a continuous time course, while juxtaposed images purposely show a contrast between image A and image B. This indicates that there is something distinctive for a comic to be grouped within its category, because it shows a time gap between two images. This gap between two panels (an image placed in a frame) is called 'the gutter'. The combination of two panels and a gutter create one single idea in the reader's mind. To create this idea, the reader needs imagination. And that is where the essence lies: the heart of comics lies within the **stimulant for imagination** by having space between the panels (see figure 50). When comics are reinvented to suit the modern day needs, this essence always needs to be preserved to make sure the medium does what it's supposed to do.



THIS IS A COMIC

Figure 48. The left image shows a man with a hat. The right image shows that same man, but at a different point in time. A comic shows the evolution of time in spatial order (McCloud, 1993).



Figure 49. Is this a comic?



Figure 50. An example of the important role of the space between the panels, also known as 'the gutter' (McCloud, 1993).

## 2. Digital versus Print

Reading a comic on your phone definitely enables possibilities, but it will always be a trade off. With mobile comics, the story can be made more immersive by making the images move, adding different sounds to each panel and the text balloons can even be spoken by voice actors. This might at first instance look like an improvement of the immersion. However, “if more movement, sound and music is what you want in a story, isn’t a movie doing a far better job to serve you?” (McCloud, 2000).

More accurate would be to search for innovations that fit the core of the medium: stimulate imagination. A few examples:

- A mobile comic could offer you choices on how the story might progress. This triggers the imagination to be forced to think about possible future events.
- Moving from panel to panel isn’t bound to the physical limitations of paper and could be performed in any way. The new panel could be zoomed from inside the panel, could be hidden behind an object in the current panel or could look like it is a mile away from the other panel.
- The size of a panel is neither limited by the paper and can be much bigger or it can even be a 360° image.

On the other hand, there are also difficulties for portraying a comic on mobile. For example, the phone isn’t big enough to show an entire page at once. It should show any panel separately (see figure 51. This destroys a lot of art that can be put into the design of a comics page: a bigger pannel to show the scenery, a long horizontal panel to indicate the passing of time, a cliff hanger on the end of each page to make you want to keep reading or very flashy diagonal panels to indicate action.

It is generally known that the target audience prefers their mobile phone over any other device. They spend on average 4 hours and 15 minutes on their phone every day (Moussavi & Mander, 2019). However, this doesn’t prove that the target audience would want to do everything on their phone. They often speak to their friends via the phone, but they prefer to see each other face-to-face and if they play piano, they probably don’t want to exchange their piano for a mobile application that let’s them hit the keys.

The same consideration needs to be made for comics. At this moment, the extra features of a comic which is purely mobile don’t weigh up to the features that are lost. Furthermore, the estimation is that if the target audience can choose, they find it more comfortable to read from a

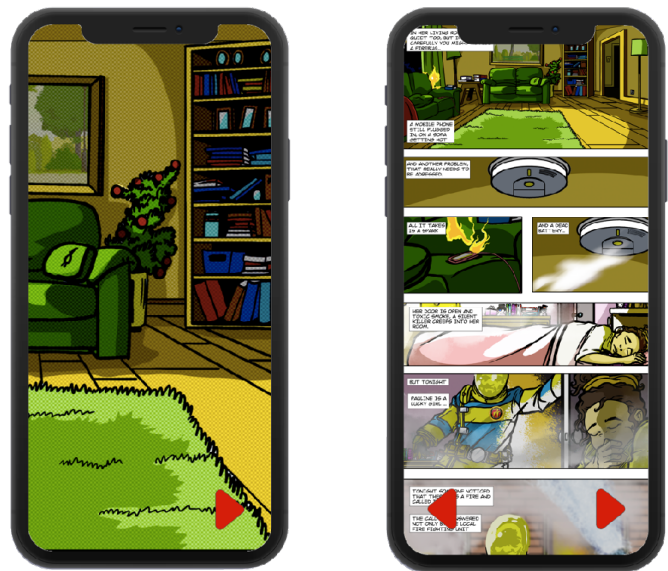


Figure 51. Different ways to show a comic on a phone. Left: one panel per screen; right: one page per screen.

printed comic book than from their phone. That’s why the campaign will use printed comics, which could potentially be read without any phone. However, the reader will be invited to use their phone together with the comic to enjoy the comic even more.

## 3. Possible features for partly digital comics

When the comics would be distributed in print, but enhanced with a mobile app, the focus of this app would be to (1) increase the togetherness/ share-ability of the comic and (2) trigger the imagination of the reader to stay true to the essence of comics. The main concept is to bundle these new features in an app that functions as a digital reading environment, where a timeline shows the activities, comments and creations from classmates that also read the comic. The app could include the following features to interact between the phone and the comic book. These different features are evaluated on a number of relevant aspects in figure 52.

- **Comic tags** To relate the comics more to the friends of the reader and enable the reader to share experiences, the reader can look at a specific panel with their phone to ‘tag’ a friend on that panel. The tagging doesn’t just give a message to that person when it’s shared online, but it also incorporates the face of that person in the comics story, like that person is the protagonist.
- **What ifs** To trigger the imagination of the reader, the comic could ask a question to the reader. This could be: ‘what should the

fire fighter use?'. With your phone you can aim on the answer 'water' or 'foam'. On your phone you can see a panel or an animated video of what would happen if the fire fighter used water/ foam.

- **Customised panels** Some of the panels could not yet be completed. For example, the last panel of a page where a fire fighter shows how his new fire truck looks. The fire truck is missing in the panel, but if you aim at the panel with your phone, you are able to draw the fire truck, add elements from the library like wheels and ladders or adjust the colours. The reader can share the result online.
- **AR tasks** At the end of a comic where a domestic fire started because a smoke alarm malfunctioned, a fire fighter can order the reader to check their smoke alarm: '...and know it's your turn'. If you look at the panel with your phone, the AR application starts to look for smoke alarms on your camera and you can test it with the instructions from your phone. You can also choose to record the test and share that video (with fire fighter-themed filters) online afterwards.
- **Panel expansion** Some panels might show a scenery or a large city where a lot hap-

pens. The printed comic can show this image, but when looking at the image with your phone, the borders will vanish and you can see the full image in a 360 view. You navigate through the image, just by moving your phone.

- **Panel zoom** Some panels might contain very subtle clues for the progress of the story. For example, on the other side of the room you see a phone on a charger. By looking at the panel with your phone, you can zoom in on the image 30 times and you can even see very small damage on the charger cable, which will later on catch fire.
- **AR investigation** When a fire has happened, a fire fighter might find a burned object in the room, but he doesn't know what it is. By looking at the panel with your phone you can pull out the object as a 3D object which you can examine more closely. You'll find out that is a burned iron which must have fallen on the ground and caused the fire.
- **Missing word** In some of the panels words could be missing. If the reader looks at that panel with a phone, he can enter the missing word and share that comic page online. Entering a specific word could make the comic extremely funny if the reader comes up with something good. Example: 'The only thing we can do save her is \_\_\_\_!'.

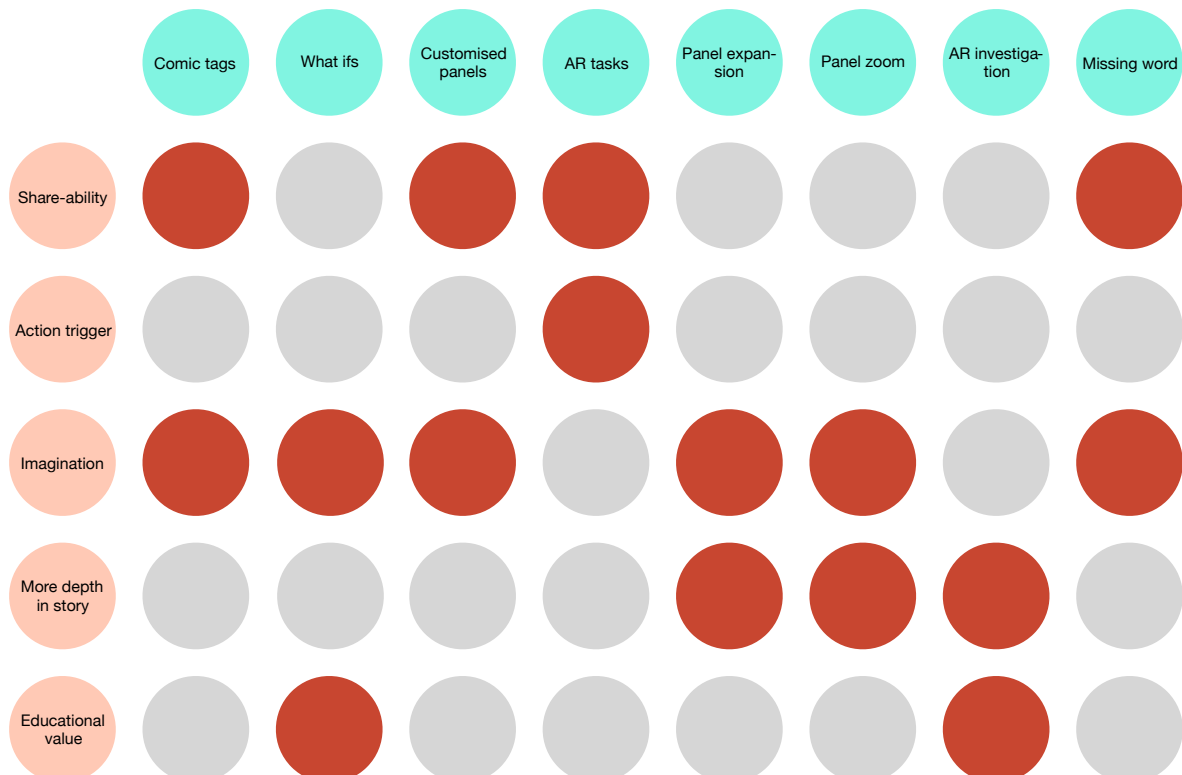


Figure 52. Advantages of the different integrations of the mobile phone into the printed comics.

# Ideation

## Decision

In this chapter, a decision will be made on the set of concepts that will be used during the campaign. A number of concepts shown previously will be eliminated and others will be adapted. Note that some ideas are not included in the current set of concepts, but might still be valuable for the future or for an expansion abroad. These ideas might return in the chapter 'Global expansion' and 'Roadmap'.

Moreover, the decision made in this chapter is an ideal decision for a first implementation, based on all the prior research and the creative process. During this process, the decision was consciously made to give priority to the purpose of the Comics for Safety Foundation: use entertainment to improve fire safety. After this chapter, attention will be paid to the business plan of the foundation. When eventually a lower budget is available to develop the educational program, some of the ideas would need to be cut, but costs are not taken into consideration yet in this chapter. For a non-profit foundation it seemed no more than just to primarily look at realising the purpose, before including any financial concerns.

### 1. The core

As is stated in previous chapters, the campaign will primarily include printed comic books with mobile technology to reinforce it and improve the reading experience. Most importantly, these mobile additions need to (1) tap into the togetherness and share-ability which is currently missing in comic books and (2) trigger the reader's imagination like comics intend to do by letting the reader imagine what happens in-between two panels.

For this reason, a mobile app will be developed with a set of features built in, which can be activated by aiming the phone's camera at a panel. While any new feature can be added to this mobile app with new software ideas, the following features, described in the previous chapter, will be initially included:

- **Comic tags** Tagging a friend in a comic is an ideal way to trigger the reader to trans-

late the storyline to the real world and relate it to their friends. As a result, the reader can share their experience with friends in a fun way.

- **Customised panels** This feature also stimulates both the share-ability and the imagination. It lets the reader decide whether they want to customise the panel in a serious attempt or just make a funny joke out of it. As long as it is worth sharing, it doesn't matter!
- **AR tasks** This feature can both create a hilarious video to share, but it also immediately hits the goal of the entire campaign: performing fire safety actions. If the app succeeds to let the reader perform these tasks while the reader experiences it as fun to do, the goal will be accomplished.
- **Panel expansion** This feature doesn't necessarily adds to the share-ability, but it's chosen to be included because it can add a lot of depth to the comic. Hopefully the feature can cause more absorption into the story and intensify the reader's attention to the story and thus to the educational content.

### 2. The app

The features will be bundled in a custom made mobile app. The goal of this app will not only be to store these features, but it will mainly function as an **online reading environment** where you can share your experiences with your classmates. All the comic tags, customised panels and AR tasks videos will not only be share-able via Instagram, Facebook, etc., but they will also be placed on the 'class timeline', where classmates can react and like different posts. The goal is to make it feel like you are reading the comic together with your entire class.

When a secondary school receives the Comics for Safety educational program, it will include the printed comics, but also a classroom code and a personal code for each student. The students will be grouped in the digital reading environment where they have their own profile. One of the concepts was the inclusion of 'fire safety

points' into the app to create instant reward, progress monitoring and social incentives when looking at the points of classmates. However, since the app doesn't include any game, assigning points is less useful.

Instead, an adapted version of the 'fire safety points' will be implemented. It will not assign any score, but offers tons of different medals, cups and character cards which you can collect. These prizes are earned for different activities: 'Customise your first panel', 'Get 5 likes from classmates on your post' or 'Discover all digital panels in one of the comics'. These prizes don't directly rank different classmates, but still have the advantage of providing instant gratification, progress monitoring and social incentive.

### 3. Social media

Being active on social media by both maintaining a profile and actively targeting the audience with sponsored posts is seen as a very effective way to create awareness among the audience and therefore make the probability higher that they feel affected towards the Pyrotechnix on the moment they receive the comic books in class. This also builds on the conclusion about 'power of familiarity' from the target audience research.

The social media targeting can also easily be scaled. When the campaign would start in only one municipality, sponsored posts can only be targeted on people in that area. Segmentation of the target audience was one of the concepts and will be implemented into the strategy. Yet, the concept will be bundled in only one social media account to prevent complications and increase the potential size of this account. There will be made four segmented profiles from the target audience. On the account, posts targeted to all four profiles will be published in turn. A post aimed at one segmented profile will then be sponsored to be shown to all people that are categorised in that profile.

Like another concept suggested, the social media posts will mainly include 4-panel-pun-comics. These very simple comics with the main intention to be funny, are easy to read on a mobile phone and answers to the target audience's main demand from social media: to be distracted with fun content for a just a short moment.

### 4. Physical objects

Providing physical objects to the target audience is believed to make a message more memorable and the audience might return more atten-

tion thanks to the reciprocity rule (Cialdini, 1993). Conversely, during the effectiveness research there was no effect measured from the physical probes whatsoever. The idea of adding physical probes like door hangers and stickers is therefore eliminated on the short term. Other physical elements might still be used.

Mainly, the tear-off calendar is seen a potential useful object. The chance that everyone who receives a tear-off calendar will put them on their wall and use it all year is very small. This will thus not be the way of implementing it. Instead, one tear-off calendar will be placed in every class room and students are free to tear off a page and read whenever they enter the classroom. This object might engage the class as a group for a longer period of time to the campaign. Different pages on the calendar might also have the same digital possibilities as the comic books, so the students can share the pages with their peers via the app.

Another physical object that might increase the engagement and especially 'the coolness' of the campaign is small apparel that can easily be distributed together with the comic books, namely the fire hose shoe laces. The fact that the target audience might declare this as cool, is based on the CRUSH-model, which indicates different aspects that make a brand or product cool (van den Bergh & Behrer, 2016). This model includes the following factors:

- **Coolness** It must be innovative and appealing. Strange apparel is definitely present in fashion trends for the target audience. The uniqueness of having jewellery-like gadget screwed to your shoe laces has the potential to be 'cool'.
- **Realness** The brand must feel real and honest. With a non-profit organisation with a clear purpose with which you can hardly disagree, the target audience will probably perceive it as real.
- **Uniqueness** They must feel unique with it. Although, the entire class receives the shoe laces, no one else in their surrounding will probably have something like it. Eventually, customisation of different shoe laces might increase the uniqueness.
- **Self Identification** Since all of the research points out that this factor is the most important aspect for a successful EE campaign, a lot of effort will be put into the fact that the target audience need to identify with the story.
- **Happiness** It must make you feel happy. The fun part of the bright red shoe laces

definitely bring a happy note to the campaign which in the beginning already tries to avoid the fear appeals strategy.

## 5. Activations

One activation, the idea to have a ‘sound-the-alarm day’, has a powerful strength because it frames a very brave and responsible activity as something rebellious. This rebelliousness fits the age and mood of the target audience far better. Instead of trying to communicate a national day for sounding the alarm, a slightly different strategy will be implemented. The first day where the campaign will be presented in classes, the stunt will be launched school-wide. Every class that receives the fire safety lesson is invited to perform this stunt at their own home after school to shock their parents. They are also invited to film it and share their ‘sound-the-alarm video’ online.

## 6. The exclusion of a game

It is decided to eliminate the game from the campaign on the short term. The development of a game would cost a huge amount of effort and cost, while the game doesn't necessarily increase the attention to the comic books. It does increase the engagement with the characters, but it will be too much investment for this campaign with the only goal to let the target audience know the characters better.

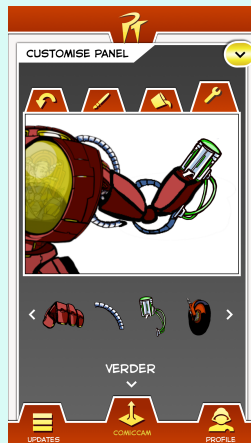
In conclusion, the comics together with the on-line reading environment will be the core of the campaign. The awareness will be created via social media and engagement will be enhanced with the shoe laces and will be extended with the tear-off calendar. Next chapter will show the final visualisations of the core of the campaign.



# Final concepts



The QR code above shows the promotional video. It can also be found in Appendix O.



The user interface of the app can be found in Appendix P.

## CAN YOU IMPROVE FIRE SAFETY USING COMICS?

**RESEARCH, DESIGN AND IMPLEMENTATION FOR MAXIMUM EFFECTIVENESS**

### THE METHOD

Entertainment Education is a communication strategy which is purposefully designed to increase knowledge, create favourable attitudes and change behaviour. It is most effective when the reader is absorbed into the story and identifies with the characters.

### TARGET AUDIENCE

During a qualitative research, it was concluded that the target audience wants to be **together** at any time and likes to consume entertainment together with friends.

### IMPLEMENTATION

The Comics for Safety Foundation aims to develop an educational program for Dutch secondary schools. On one thematic fire safety day, the fire brigade will visit the schools to tell about fire safety, hand out the comics, other accessories and offer a free subscription.

### EFFECTIVENESS

During a quantitative research, 75 children from Dutch scouting clubs received fire safety education while their knowledge, attitude, behaviour and other relevant values were measured before and two weeks after the education. Results showed a positive effect.

### COMICS

The essence of comics lies in the space between two panels: "the gutter". This is where **imagination** is triggered and where the reader gets absorbed into the story.

### FINAL CONCEPT

The comics are reinforced by an online reading environment: a mobile app that lets the reader interact with the comic using AR features aimed to trigger imagination and to share with classmates, to enjoy the reading of the comic together.

**Student:** Jeroen Hellebrand

**Project name:** Entertainment Education - a strategic implementation for fire safety

**Graduation date:** December 15, 2018

**MSc course:** Strategic Product Design

**Committee:** Prof. Dr. Erik-Jan Nuijten (Chair)  
Dr. J. Jans Koller (Mentor)  
Dr. Willeke Boonstra (Company Mentor)

**Company:** Comics for Safety Foundation (COSHOP BV)

**TU Delft**  
Delft University of Technology

Faculty of Industrial Design Engineering
Delft University of Technology

The presentation poster can be found in Appendix Q..

# Business Model

## Revenue

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The previous part of this thesis report revolved around the purpose of the Comics for Safety Foundation: use entertainment to improve fire safety. To make a purpose credible, it should be put before profit (Hieatt, 2014). This is of course a no-brainer when it comes to a foundation which doesn't make any profit, but since the foundation might intensively collaborate with profit-aimed companies, the order of purpose before profit is still important to take into account.

In this chapter, different options for generating revenue will be evaluated to decide how the foundation can become financially stable in both short- and long-term and how all the proposed concepts from previous chapters can be realised in the campaign.

### Implementation

The source of revenue with its different possibilities depends on the way of implementing the campaign. While the implementation will be explained in detail in the next chapter, a rough direction is already decided to use as a starting point.

To reach the target audience, the Comics for Safety Foundation will distribute an educational program via secondary schools. Because these schools have busy schedules and no room to implement a fire safety course in their default curriculum, the education will probably take place in one annual fire safety theme day. On this day, the class will receive educational material, a comic book and a class code for the application that comes with the comic. After this day, the app will try to maintain the engagement with the target audience and the target audience can receive the monthly Pyrotechnix comic book three months for free. A source of revenue need to be found to fund the development, execution and maintenance of the educational program.

### Option one: government

Since the foundation improves the fire safety of the target audience and teaches them extracurricular important knowledge, the government

might want to stimulate the initiative with subsidy.

The way this works in the Netherlands is quite complex and inconsistent. Subsidy might be distributed via the national government, the province, the municipality or the safety region.

The most straight forward and most stable source in long-term would be the safety regions. In a meeting with Veiligheidsregio Utrecht (VRU), fire prevention specialist Jurriaan van Wakeren confirmed that Dutch safety regions are lately putting more attention to younger people (12 - 18 years old). A recent study performed by Kantar indicated that within this group, the younger people (12 - 14 years old) have the most potential to learn about fire safety (Meinema et al., 2019). A few years ago, all Dutch safety regions invested together in an educational program from a third party aimed at primary schools. Now there are plans to make a new collaborative investment in an educational program for secondary schools in the coming years, primarily for children aged 12 to 15. The Comics for Safety Foundation would potentially be highly suitable to fill that place to provide this educational program.

The advantage of receiving money from the safety regions is the fact that this would be a stable reassurance of revenue for a certain amount of years, which will provide the foundation with time to properly develop and launch the campaign in the Netherlands.

Another advantage is that this is a non-commercial way of exploiting the concept, which will increase the chance that secondary schools will want to have the educational program and it also increases the credibility of the information itself, since Dutch teenagers will mainly accept information about fire safety from fire brigades (82%) and not from commercial companies (Meinema et al., 2019).

A disadvantage would be that the Dutch safety regions only provide money for developing the campaign in the Netherlands and will not fund future expansion to other countries. If the foundation would want to expand, a new source of revenue has to be found in the new country.

Another existing lead for the Comics for Safety Foundation is to create a campaign for the Belgian ministry of the interior to take care of the communication towards children about their new regulation for 2020 to make smoke alarms mandatory in every house. This would definitely be a possibility for the Pyrotechnix concept, but since it would be a one-off campaign for communication, it would require a different way of implementation.

### **Option two: non-governmental organisations**

Another potential sponsor is a large non-governmental organisation that shares the purpose to increase worldwide safety. The fact that these organisations are not bound to governments is both an advantage and a disadvantage. This type of organisations can make it a lot easier to expand the campaign to different countries, but there is also a small chance that this organisation wants to start the campaign in the Netherlands, because the problem is relatively small when looking from a world's perspective. In this case, the credibility of the research in this thesis which is based around Dutch people as target audience would lose some of its value.

One example of such a company could be the Bill & Melinda Gates Foundation. Their purpose is to change inequity in the world and they do that with tons of different projects on a broadly varying spectrum from HIV prevention to gender equality to tobacco control. They also try to "enhance education through innovation", which may be a great fit with the innovative AR features that are included in the campaign to combine education both with entertainment and with technology.

### **Option three: commercial sponsor within the sector**

A potential sponsor could be a commercial company within the fire safety sector who might see an advantage in the investment. The campaign could carry the name of the insurance company and the positive image of the company will attract new customers. For example, insurance company Aegon sponsors the research to Alzheimer's disease and annually enable the 100+ day, where mentally healthy elderly from hundred years and older come together.

Also, an insurance company that sells fire insurances might save money if their customers take preventive actions. Willem van Oppen, advisor of Centrum voor Criminaliteitspreventie en Veiligheid (CCV) confirms that fire damage is a huge expense for insurance companies (Dubbeld, 2019). Secondly, companies that sell fire alarms or fire prevention equipment might see benefit to

fund the project and get to link their name to it in return. Examples of the companies could be insurance companies Aegon or Allianz or fire safety equipment companies like Kidde or Alecto.

An advantage of this method is that the company might also be active in other companies with larger fire safety issues, which makes an international expansion easier.

The fact that the company is commercial might make it harder to find a way into the secondary schools. On the other hand, the image of these companies are not necessarily very commercial. Similarly, the commercial company ANWB is also providing educational lessons about road safety on secondary schools.

### **Option four: commercial sponsor outside the sector**

A partnership could also be made with a company from a totally different sector. The incentive would not be the direct effect on sales, but the indirect effect of having a more positive image. These days, a lot of consumer goods brands are looking for a purpose with a positive impact on society to link to their brands (Hieatt, 2014). Examples could be a brand like KitKat or L'Oréal, who have a similar target audience as the Pyrotechnix. One example is McDonald's, who collaborated their magazine in the United States with the National Fire Protection Association (NFPA) to create a few fire safety magazines.

Partnering with a commercial sponsor would have the same consequences as mentioned above for sponsors within the sector, only the image of these brands are perceived a lot more as commercial and therefore it might be really hard to get secondary schools to adapt the program.

A huge benefit from these consumer goods sponsors would be the possibilities for new ways of distribution. For example, the new volume of the Pyrotechnix comic could be handed out when buying two packs of KitKat in store. This might seriously increase the awareness and popularity of the campaign.

While all four options are possible and one option is not necessarily better than the other, in the following chapter the implementation will be worked out for only one of the options, which will provide a more focused result for this thesis. This will be the option where the Comics for Safety Foundation is funded by the Dutch safety regions to develop a new education program, because there is already contact with the safety regions and the demand for such a program is known to exist.

# Business Model

## Implementation

This chapter offers a chronological view of how the ideas for the campaign can be implemented in the Netherlands. In some cases, multiple options are suggested and further investigation will find the most suitable options. In other cases, merely the option which is perceived as most desirable, feasible and viable is presented. Note that this is not the only option to use and when the context changes on the way, other options might be more suitable.

### Funding

The creative company Pummie Productions is the stakeholder who is already assigned to create all the creative content for the comics. Pummie Productions holds the rights over the Pyrotechnix concept. From the moment that the funding for the Comics for Safety Foundation reaches a certain amount, Pummie Productions' artist HuwJ is ready to drop his current work and start full time on the development of the campaign.

Before this point is reached, finding a sponsor to fund the Comics for Safety Foundation is the first priority. Different options for this sponsor were addressed in the previous chapter.

One option would be to develop the educational program for all the Dutch safety regions to be nationally implemented. This options seems feasible because the fire safety region in Utrecht

told that they are currently in need for a fire safety education program for secondary schools. Providing the education at secondary schools seems like the best way to distribute the comic books, because of a number of reasons.

- (1) A secondary school is the place where the largest part of the target audience gathers, since it is mandatory and free. All other places where the target audience gathers, like sport clubs and scouting clubs, have a certain threshold where children with lower motivation or with parents with lower incomes might be underrepresented. In the chapter 'fire safety - problem definition' it was found that people from the lowest social class have a 16 times higher chance of dying in a domestic fire than people from a rich family (WHO, 2014). Therefore, it is important to aim the campaign at an inclusive representation of the Netherlands.
- (2) It is very useful to reach the target audience when they are in a group. Other ways of distribution could be to give the comic book for free in supermarkets or at events, but in that case, there would be no social incentive to read the comic, to talk about the subject or to perform fire safety behaviour. The Pyrotechnix app is designed as a digital reading environment where the comics can be en-



Figure 53. Presentation of this thesis about Comics for Safety to the Ministry of the Interior in Brussel.

joyed together as a group. This idea would come out best if it's distributed in a group environment.

- (3) In 2006, the Dutch government formulated 58 core objectives for the first three years of secondary school (onderbouw voortgezet onderwijs). Core objective 35 is to 'learn how to influence safety in a positive way for him or herself and for others' (Rijksoverheid, 2006). The objective of the Comics for Safety Foundation is in line with this objective and it would therefore be likely for schools to be positive about spending time on the subject of fire safety.

The first step in reaching the safety regions as a potential sponsor would be to present the ideas and discuss the possibilities with Brandweer-Nederland, the umbrella organisations of the safety regions. Then, individual safety regions must agree to invest in the development of the Comics for Safety educational program. Therefore, these regions must have a favourable attitude towards Comics for Safety. It will be useful to visit these individual regions, present the ideas and the possibilities and provide them with example material.

Another option would be to develop the campaign for the Belgian ministry of the interior, because the Belgian government will oblige all Belgian residents to have smoke alarms installed from 2020. The first contacts have been made with functionaries from general directorate for civil security with the ministry of the interior (see figure 53). If this progresses, Comics for Safety can provide educational material for Belgian secondary schools. For this option, it might be needed to adjust some of the content of the campaign, since (1) the current campaign is designed to be fit for the Netherlands and although the difference might be subtle, further research must determine whether adjustments need to be made and (2) since the new Belgian law is applicable for all residents, the ministry might be in need of a campaign that aims at a wider target than just the children between 12 and 15 years old. Whether the Comics for Safety campaign can be adjusted to suit a wider audience or the campaign should be launched in parallel with other campaigns aimed at other audiences, is up for debate.

## Development

After the funding is settled, the development of the campaign can start. The development can roughly be divided in three segments. The comic books, the educational program and the application development. These three segments inter-

fere on certain points and therefore need to be developed with close alignment.

The educational program is largely dependent on the sponsor that funds the project. In the situation where the Comics for Safety Foundation provides a program for secondary schools for the Dutch safety regions, the safety regions will most likely provide a large part of the educational layer. They already perform research on the different fire safety problems that are most urgent to address for the age category of 12 to 15 years old. For the development of the education itself, the fire safety information will be provided by the safety regions and the fire brigades in different regions, the artwork will come from Pummie Productions, but there will probably also be a party involved that looks into the didactical methods to teach the fire safety information to the target audience in an engaging way. Most companies who offer their services for education development, offer a full educational program including all the corresponding (online) materials. This service is presumably costly and will likely result in a program which doesn't stand out from existing programs. Therefore, a better option would be to hire an employee within the Comics for Safety Foundation who is experienced in the development of education and wants to participate in the new way of teaching with entertainment. This may be someone who studied educational sciences.

The comic books will be developed by Pummie Productions. The content of these books will mainly be entertaining. The columns between the stories will have a more educational layer. The source of this education will again be the safety regions and the form of these columns on how to educate the reader, will be developed in collaboration with the education development professional. During the development phase, artwork will be created by Pummie Productions for the education, for the digital application, for social media, for other materials like the tear-off calendar and for the most important asset: the comic books. These materials will be developed for one year in advance, to make sure that the campaign can run for at least twelve months. Pummie Productions already has experience collaborating with their own trusted print companies in the UK. These will likely be used for the Comics for Safety campaign.

The development of the app will be best to co-create with a company that has experience with AR. In contrast to the education development professional, this will be more cost efficient to develop externally, because a large part of the desired features in the app consists of existing technology that is already used in other apps and only needs to be adjusted to the specifications of the Pyrotechnix app. Again, the artwork

will be provided by Pummie Productions, who also have experience working together with app developers. The most likely partner for the development of the app is BlippAR. They provide development solutions for combinations between print and AR. In a meeting with BlippAR, they already confirmed that the desired features for the Pyrotechnix app are easy to create with the self-build BlippAR Builder tool.

The time between the start of the development and the first day of execution will likely be approximately six months to one year. The estimations are based on discussions with the safety regions Utrecht, Pummie Productions, education developer ROV Oost-Nederland and BlippAR.

## Execution

Overlapping with the last months of the development, the social media activity will kick off, trying to create awareness within the regions where the educational program will first be provided. The maintenance of the social media account can be done by hiring a self-employed person for about one hour every day to upload content, target the different segments in the proper regions and give feedback to responses and posts.

Then, the educational program needs to find their way into the secondary schools. At first, the idea was to provide a monthly lesson for each class for six or twelve months, to be able to repeat certain information and give the target audience time to engage with the campaign. However, after consult from different secondary school department coordinators (Candea College Duiven, Stedelijk Dalton College Dordrecht) and a project manager from an educational program provider (ROZ Oost-Nederland) there was a strong consensus for preferring to have the education provided in just one thematic day. On this day, different classes can have the full attention for the campaign and the school doesn't have to fit the program in their curriculum, which is already very full. The campaign can still try to engage with the target audience for a longer period of time, but the subsequent touch points can not take place during school time. Therefore, the idea is to create a thematic day about fire safety in collaboration with the Pyrotechnix. During this day, the target audience will receive their first edition of the monthly Pyrotechnix comic book. When they sign a document with their address details, they will receive another free edition for two more months. Also, the class receives a 'class-code' for the digital reading environment inside the Pyrotechnix app. The target audience can log in with their personal 'Pyro-code'. All the AR functionalities that they use and share while reading the comic, will end up in

that digital environment where peers in class can respond to each other's shared items. The class will also receive a tear-off calendar, which can be placed on the wall in the classroom to still have a small touchpoint with the target audience at their school for the entire year. Lastly, each class member will receive the Pyrotechnix fire hose shoe laces, which come packed with their first comic book.

During the education that they, they learn about the importance of fire safety, the dangers of fire and the preventive actions to take, all assisted by Pyrotechnix themed artwork, small 4-panel comics that make a joke about a provided subject and games to play in class. At the end of the day, they can take the comic book and the shoe laces home and get the challenge to perform the 'rebellious act' of testing their smoke alarm at home, without their parents knowing. They can create and share videos of the 'alarm test stunt'. The providers of this education will likely be fire fighters from each safety region. Since the idea is to work together with safety regions, it seems logical that the fire brigades can cooperate and carry out the campaign. Also, from a Dutch research it was found that children between 12 and 18 years old are most likely to take fire safety information from fire fighters (Meinema et al., 2019).

After the thematic day at school, the campaign will still try to engage with the target audience by social media, the Pyrotechnix app and the two extra volumes of the comic book, which they receive for free. After these months, together with the third volume of the comic, an offer is included to keep receiving the monthly comic book for the general price. While some people might be so engaged with the comics that they want to keep reading it, it is anticipated that the majority will not be interested to keep reading the comic for money, because in that case it not only has to compete with other education, but also with other entertainment like Playstation games and Netflix series. Especially when the Pyrotechnix are still only mildly known by the target audience, chances for a large distribution are small. After the campaign has run for multiple years, this chance will likely increase.

## Evaluation

During the entire implementation of the campaign, it is very important to constantly evaluate the results and the process. In the first few years of running the campaign, the shape of the campaign will most probably alternate significantly, because new results will change the direction. At the end of the thematic days in schools, it would be good to ask the class members to fill in a survey about their perception of the day. Also, a

survey two months later (when they have received their last free volume of the comic book) would be very useful to see if the target audience kept being engaged with the campaign.

In the app, the activity of the users can automatically be tracked to draw conclusions about the number of class members that keeps using the app, keeps sharing posts and whether there is a discussion about the comic going on in the digital reading environment.

Qualitative interviews with the audience need to be done to determine what they liked and what they didn't like about the campaign.

These results can be used by Pummie Productions to improve the stories about the Pyrotechnix to better fit the audience, they can be used to iterate the educational program and they can be used to make changes in the app to make the app more convenient and fun to use.

### **Alternatives**

There are a lot of assumption made in this chapter for the direction that the Comics for Safety Foundation will take. This doesn't necessarily mean that this direction will be the ultimate and most effective one. Therefore a number of alternatives are briefly stated below to show that there are also other ways to create an effective campaign. Moreover, next chapter will look into the expenses of the campaign. If only a part of the funding will be raised, the implementation could be forced to be adjusted to cut costs.

- The campaign might start in Belgium to address the fact that an installed smoke alarm is mandatory from 2020. Pyrotechnix could help teach about the importance of the smoke alarm.
- The campaign might be distributed among scouting clubs instead of secondary schools. While this would mean that the campaign doesn't reach the entire audience, the experience with scouting clubs during the effectiveness research was very positive and the fire safety lessons would perfectly fit the learning goals provided by Scouting Nederland (Scouting Nederland, 2018).
- The campaign could be funded by a commercial organisation, which might change the focus a bit from educational programs at secondary schools to reaching the target audience via the existing distribution channels of the commercial organisations. For example, giving a Pyrotechnix comic book for free when buying a certain product from the company.
- Instead of creating a Pyrotechnix comic book every month, the comics could only be developed to support the educational program and maybe a few months after the thematic day. This way, costs can be cut for the creation of these comic books, since it will be hard for the comic books to compete with other entertainment content, if they have to pay for the comics.

# Business Model

## Expenses

In this chapter, the main expenses for the campaign are estimated by looking at the different stakeholders that will provide services for the campaign. The expenses are roughly divided in four segments: comic books, education development, app development and other expenses.

### Comic books

All the artwork will be created by the creative company Pummie Productions, mainly by the comic artist HuwJ. Pummie Productions therefore made most of the cost estimations below. The goal is to create a monthly Pyrotechnix comic book with 32 pages, of which 20 are story and the other 12 are educational games and columns. The creation of the artwork would cost €13.000 each month. With a circulation of 10.000 copies, the printing would cost €5.500 and the distribution would cost €2.000 (PostNL, 2019). Since this would already count up to almost €250.000 per year, this monthly comic book has been reconsidered. The initial idea was to provide each student with one volume during the education program and two additional free volumes delivered at home. Afterwards, the student receives the option to buy a subscription. However, since the rate of students that will buy a subscription is estimated to be low, the effectiveness of creating nine extra editions each year is rather small. Therefore, it is decided to create only three volumes per year in the first two years. These ones are all provided for free to the students. If students decide to buy a subscription, they will also receive the comic books the subsequent year. From the third year of execution on, the annual number of volumes could be increased to six, to receive a comic book every two months.

Other artwork would include the 4-panel-pun-comics for social media. Posting three of these comics a week would cost €700 a month. Creating artwork for a tear-off calendar with comic strips on it would cost €6.000.

### Education development

To develop the educational program, an employee with a background in educational sciences will be hired to develop the program in collaboration with the Dutch safety regions for to find the important educational content and in collaboration with Pummie Productions to create artwork to assist the program. In the first year, it is estimated that this employee will be able to develop the full program by working 0,6 FTE. The costs of this employee will be approximately €33.000 (Berekenhet, 2019). An additional €10.000 can be used in the first year to assist the education development. In subsequent years, the employee will stay active for 0,3 FTE to evaluate and iterate the program.

The costs for providing the education will in the scenario with the safety regions be carried by these regions and the education will be provided by local fire fighters.

### App development

The app mainly consists of two parts: the digital reading environment and the AR features. Two consults were held to learn more about the best way of developing this app. One meeting with Guido Helmerhorst, chief growth of WarpVR and one meeting with Jason Hadjioannou, AI research scientist and senior developer at BlippAR. Also, comics artist HuwJ gave some estimations on app development, based on earlier collaboration with developers. Prices below are based on these three sources.

It was advised to let an external party create the application and acquire the BlippAR software BlippAR Builder and BlippAR Script for €11.000. This package includes the main development of the AR features by the BlippAR team. The external development team can then adjust the features to the requirements for the app and combine it with the rest of the features. Maintenance will be done by the external party. The costs for an external development party vary widely, but the monthly costs for full time development are estimated on €10.000. Based on all the proposed features, it is estimated that the app can

be build to work properly in two months. After the app is built, monthly maintenance costs are estimated to be €400. After two years, new features could be added to the app. In year four and five of the campaign, €10.000 is reserved to improve the app.

## Other expenses

The following expenses have yet to be included in the overview:

- **Social media maintenance** The creation of the artwork was already included. Monthly maintenance cost are estimated to be €300 and to reach 10.000 students, €750 is monthly reserved for sponsored Instagram post for four different segments (Karlson, 2018).
- **Fire hose shoe laces** These materials can be imported and are estimated to cost €2 a piece.
- **Management wages** The wages are calculated on an estimation based on 1 FTE during the entire campaign: €55.000 a year.
- **Other costs** Still, there will be unexpected costs. 15% of the total annual expenses is added to the sum.

## Reach

The expenses of the campaign logically depend mainly on the number of people that will be reached. The estimated reach is based on the number of thematic days which will be conducted on secondary schools. Each thematic day is aimed at all classes from one year at a school, around 100 students. If 100 of these days are conducted in the first year, 10.000 students will be reached. This will be enough to make print affordable. After the first year, the number of student reached will gradually grow, where different safety regions can implement the education program at different schools in their region. This estimation is based on (1) the amount of secondary schools in the Netherlands (651), (2) the amount of students in the first three years of all secondary schools in the Netherlands (600.870) and (3) experience with other educational programs from the safety region Utrecht.

Figure 54 shows a full overview of all expenses for the first five years of the campaign. After five years, 130.000 students could potentially be reached at a cost of

approximately €12 per student (€1200 per school visit). The goal of this table is only to provide an indication of the costs and it should be taken into account that these costs have a high level of uncertainty. The following factors contribute to this uncertainty:

- It is uncertain how much work is involved in the campaign in terms of management and development of the educational program. Since labor is a large expense, changes can influence the total expenses significantly.
- It is uncertain how fast the campaign can scale up and how many school visits is feasible to do within one year.
- It is uncertain how difficult it will be to develop the app, how much time it will cost the developer and how expensive the app developer is.

In figure 55, an overview is given for the different provinces. It shows the estimated costs in the scenario where every student from the target audience is reached within each province. The total cost for all provinces is estimated to be €7,3 million. In comparison, the annual budget for the Dutch safety regions is €170 million. In the scenario where a safety region would aim to reach the entire group in a time span of 5 years, the annual cost of the campaign would be 0.9% of the total budget.

After a certain investment, there is also a possibility that the campaign needs to be developed with a lower budget. The following savings could then be applied:

- The amount of people reached can be decreased to a smaller part of the total target audience.
- The educational program could be provided by the secondary school itself and the Comics for Safety foundation would only provide the materials.
- Some of the features of the app could be excluded to cut development costs.
- Only one volume of the Pyrotechnix comic book could be create to use during all the thematic days for multiple years.
- Physical items like the shoe laces and the tear-off calendar could be excluded from the campaign.

Next chapter will show an overview of the entire business model, based on the results of the different business model chapters.

	Year 1 (development)	Year 2 (execution)	Year 3	Year 4	Year 5
<b>Campaign estimations</b>					
Estimated number of education days	0	100	300	400	500
Estimated number of reached student	0	10.000	30.000	40.000	50.000
Total cost per student (incl. inv. costs)	-	€ 37,80	€ 17,74	€ 14,19	€ 12,31
Annual number of comic book volumes	0	3	3	6	6
<b>Comic Books</b>					
Artwork	€3.000	€0.00	€39.000	€78.000	€78.000
Print	€0.00	€16.500	€33.000	€39.600	€47.520
Distribution	€0.00	€6.000	€18.000	€24.000	€30.000
<b>Social Media</b>					
Artwork	€2.100	€8.400	€8.400	€8.400	€8.400
Maintenance	€900.00	€3.600	€3.600	€3.600	€3.600
Sponsored posts	€6.750	€9.000	€27.000	€36.000	€36.000
<b>Extra materials</b>					
Fire hose shoe laces	€0.00	€20.000	€60.000	€80.000	€100.000
Tear- off calendar artwork	€6.000	€0.00	€6.000	€6.000	€6.000
Calendar print	€0.00	€1.200	€2.400	€2.880	€3.456
Calendar distribution	€0.00	€350.00	€1.050	€1.400	€1.750
<b>Education development</b>					
Wage employee	€33.000	€16.500	€16.500	€16.500	€16.500
Other costs	€10.000	€3.600	€3.600	€3.600	€3.600
<b>App development</b>					
Development and maintenance	€20.000	€4.800	€4.800	€4.800	€4.800
Development AR features	€11.000	€0.00	€0.00	€0.00	€0.00
Development additional features	€0.00	€0.00	€10.000	€10.000	€10.000
<b>Management</b>					
Wages management	€55.000	€55.000	€55.000	€55.000	€55.000
<b>Other</b>					
Other costs (15%)	€27.562	€21.742	€43.252	€55.467	€60.693
<b>Total</b>					
Annual total	€211.312	€166.692	€331.602	€425.247	€465.319

Figure 54. The figure shows the full overview of the estimated expenses within the first five years of the campaign. The first year is only development. The execution will start in year 2.

Province	Safety regions	Number of secondary schools	Number of children	Cost to provide entire target audience with education
Noord-Holland	Noord-Holland-Noord, Zaanstreek-Waterland, Kennemerland, Amsterdam-Amstelland, Gooi en Vechtstreek	113	104.298	€ 1.283.814
Zuid-Holland	Haaglanden, Hollands Midden, Rotterdam-Rijnmond, Zuid-Holland-Zuid,	140	129.219	€ 1.590.565
Zeeland	Zeeland	14	12.922	€159.057
Flevoland	Flevoland	17	15.691	€193.140
Utrecht	Utrecht	54	49.842	€613.504
Noord-Brabant	Midden- en West-Brabant, Brabant-Noord, Brabant-Zuidoost	89	82.147	€ 1.011.145
Friesland	Fryslân	29	26.767	€329.474
Groningen	Groningen	22	20.306	€249.946
Drenthe	Drenthe	14	12.922	€159.057
Overijssel	IJsselland, Twente	38	35.074	€431.725
Gelderland	Noord- en Oost-Gelderland, Gelderland Midden, Gelderland Zuid	80	73.840	€908.895
Limburg	Limburg-Noord, Limburg-Zuid	41	37.843	€465.808

Figure 55. The figure shows the overview of each province and how much it would cost to reach every student within the target audience in the entire province.

## KEY PARTNERS

The following key partners will work together with the Comics for Safety to create the required resources:

- (1) Pummie Productions. This creative company will create the artwork for all the Pyrotechnix products (comic books, tear-off calendar, etc.)
- (2) A software development company (t.b.d.). This company will create the Pyrotechnix app and implement the AR functionality with the BlippAR builder tool.
- (3) A print company (t.b.d.). This company will print the comics.
- (4) A distribution company (e.g. PostNL). This company will deliver the physical products to the secondary schools and to the homes of the target audience

The following key partners will collaborate with the Comics for Safety Foundation by investing in the development and execution of the educational program.

- (1) An organisation to invest in the Dutch campaign (t.b.d.). It can be a governmental organisation (e.g. safety regions, Belgium ministry of the interior), a charity organisation (e.g. United Nations, Bill and Melinda Gates Foundation) or a commercial organisation, either from within the sector (e.g. Kidde, Alecto) or from outside the sector (e.g. KitKat, Liga)
- (2) An organisation to invest in the expansion of the campaign towards other countries (could be the same company as above).

## KEY ACTIVITIES

The following key activities will be performed by the Comics for Safety Foundation:

- (1) Develop an educational program to provide at secondary schools in a thematic day
- (2) Develop and maintain the app which is the mobile digital reading environment
- (3) Maintain the social media channel and target sponsored posts at different customer segments
- (4) Import and distribute the physical products: comic books, tear-off calendars, etc.

## KEY RESOURCES

The following key resources will be needed by the Comics for Safety Foundation to provide the education:

- (1) Comic books
- (2) The Pyrotechnix app
- (3) Management capacity
- (4) Education development capacity
- (5) Investment money for the development

## VALUE PROPOSITION

For anyone between 12 and 15 years old, the Comics for Safety Foundation offers a fire safety course which is both informative and entertaining. The comic books together with the mobile digital reading environment offer a great reading experience with AR technology and the ability to share story elements with classmates. The entire class will feel socially stimulated to dive into the comics and get inspired while learning how to stay safe.



## CUSTOMER RELATIONSHIP

The target audience needs to perceive the Pyrotechnix as entertainment. The educational layer needs to be unobstructive. The customers will not generate any main revenue. The more customers reached, the higher the needed investment costs are. In return, the customers will improve their knowledge, attitude and behaviour towards fire safety. These results will be beneficial for both the image of the Comics for Safety Foundation as the image of the investment partner.

## CHANNELS

The channels through which touch points with the target audience are created are:

- (1) The thematic day at secondary schools to educate
- (2) Social media (mainly Instagram) to create awareness
- (3) The Pyrotechnix comic books to create engagement
- (4) The Pyrotechnix mobile app to maintain engagement and trigger action

## CUSTOMER SEGMENTS

There are two different customers involved in the business model.

- (1) Secondary schools in the Netherlands. They need to order the educational program for their classes.
- (2) Dutch children between 12 and 15 years old. They get in touch with the Comics for Safety Foundation via social media, via the educational program and might later on become a customer by purchasing subscriptions to the Pyrotechnix comics. This target audience will also be divided in four different segments, based on personality and interests.

In the long term, the goal is to expand towards other countries, which will automatically add a new customer segment. This new audience will likely be of the same age as the Dutch audience, but located in a different country.

## COST STRUCTURE

The main costs for the Comics for Safety Foundation will include:

- (1) Creation, print and distribution of the comic books
- (2) Development of the mobile app
- (3) Creation of the education program for the thematic day
- (4) Execution of the educational program at secondary schools
- (5) Management costs for the Comics for Safety Foundation

## REVENUE STREAMS

The main revenues for the Comics for Safety Foundation will include:

- (1) Investment from key partner to develop the educational program
- (2) Compensation from key partner to provide the educational program at secondary schools
- (3) Revenue from subscriptions on the Pyrotechnix comic book

## ECO-SOCIAL COSTS

There are no reasonably foreseeable social costs involved from the activities of the Comics for Safety Foundation.

These are the ecological costs involved from the activities of the Comics for Safety Foundation:

- (1) The print and distribution of the comic books will have an environmental impact.

## ECO-SOCIAL BENEFITS

These are the social benefits from the activities of the Comics for Safety Foundation:

- (1) The fire safety of the target audience (and their environment) will increase.
- (2) The solidarity among the school class will improve and it will stimulate social bonding

There are no reasonably foreseeable ecological benefits from the activities of the Comics for Safety foundation.

# Global Expansion

In the chapter 'Fire Safety - Problem Definition', the global situation of fire safety problems was discussed. The Comics for Safety campaign aims to start in the Netherlands, because it is financially and practically the most feasible way of implementation. However, like discussed in the other chapter, the severity of the fire safety problem in the Netherlands is not significant in comparison with other countries: approximately 47 people die annually as fire victim (0.17 out of 100.000 inhabitants).

This chapter will discuss a number of countries that are most suitable to expand towards. In the earlier chapter, a map was shown with the number of fire deaths per 100.000 inhabitants per country. This map mainly showed African countries and Russia as regions where there is a large number of fire deaths. In this chapter, a new map will be created that does not only take into account the number of fire deaths, but also the other causes of death and the relative severity of the problem in each country. This factor is taken into account because of the following reasons:

- In a country where the fire safety problem is larger in comparison to other problems, it is estimated that the cooperation of the inhabitants and local authorities will be bigger.

- The national governments of these countries are more likely to fund a project that solves a relatively bigger problem in their country.
- Humanitarian organisations could be possible investors in developing countries, but these organisations try to improve life expectancy as much as possible with the limited budget they have. Therefore, the funding would more likely go to projects that address more severe problems in that country.

The same data on fire deaths per country from Brushlinsky et al. (2015) was combined with data from other causes of death per country from the Institute for Health Metrics and Evaluation (IHME, 2015). For each country, a ranking was made of the number of deaths per cause for 29 different causes of death. From those causes of death, fire is in the Netherlands the 25th biggest cause. The biggest causes are cancer, cardiovascular diseases and dementia. Figure 56 shows all countries that have fire related deaths among the 15 biggest causes of death. The table shows the annual number of fire deaths per 100.000 inhabitants.

This image gives a rather new perspective on the problem. A number of rich developed countries

## Personal note

At the start of the project, I had in mind that the best implementation for the project would be in the countries where the problem is the most severe, where the most people die from fire. My first research on this topic indicated that the fire problem in the Netherlands is relatively small, and that the problem is the biggest in a number of African countries. Therefore, I anticipated to create this chapter on how to expand the Dutch fire safety campaign to an African country like Ivory Coast or Angola.

However, in September I was listening to a podcast from the news paper NRC about the difficulties that humanitarian organisations experience while trying to vaccinate Congolese people against Ebola. The big-

gest problem was that the population mostly didn't cooperate. I was especially triggered by the following:

For the inhabitants of Eastern Congo, Ebola is just one of the disasters that threatens their life: 'our first priority is safety'. (Vermeulen, 2019)

This gave me the realisation that the most suitable country to expand the fire safety campaign to, might not be the country where the absolute problem is the most severe, but where the problem is most severe relatively to the other problems in the country.

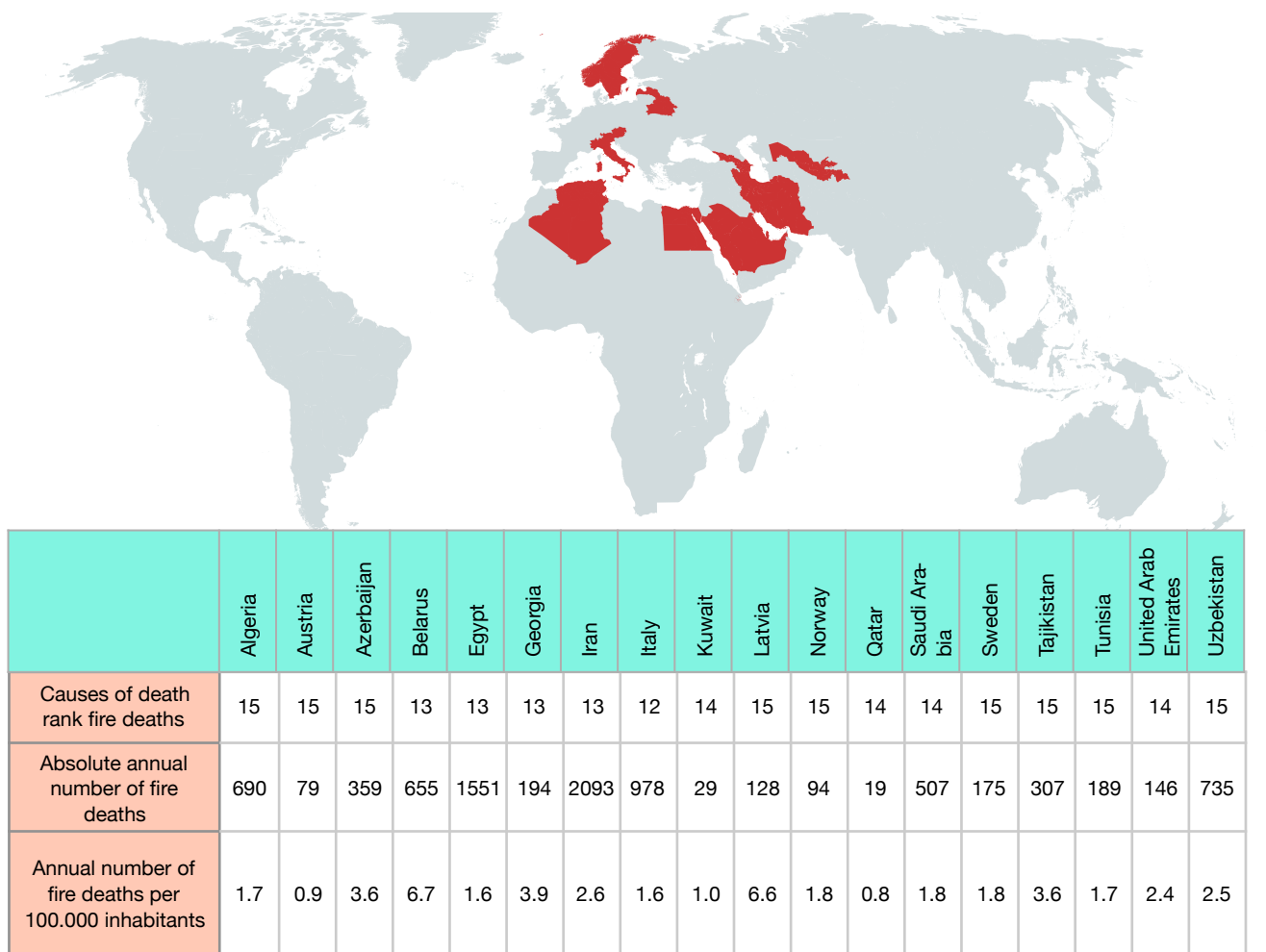


Figure 56. The map shows all countries where fire as a cause of death belongs to the 15 biggest causes of death. The table also shows the absolute number of annual fire deaths and the number of annual fire deaths per 100.000 inhabitants.

appear in this list, but mostly with a relatively low amount of fire deaths corrected for inhabitants. Noticeably, a relatively large number of countries from the middle east belong to the list. Looking at the relative severity of fire deaths in combination with the absolute number of deaths corrected for the inhabitants, the European countries Latvia and Belarus are the countries with the most severe fire safety problems.

The fact that Latvia and Belarus are both European countries, might make it easier to translate the Dutch campaign in the new context, because the cultural differences might be smaller than with countries from different continents.

Before deciding which country is really best to roll out the Comics for Safety campaign, more research needs to be done by retrieving more data about causes of fire, performing qualitative research on the target audience in the new country and exploring the existing fire safety education in that country.

Based on the brief research in this chapter, the criteria (1) causes of death rank fire deaths and (2) annual number of fire deaths per 100.000 inhabitants show that Latvia is the most suitable

candidate. Other countries to further investigate would be Belarus, Georgia and Azerbaijan. Also, multiple countries in the Middle East like Iran, Saudi Arabia, Kuwait, Qatar and United Arab Emirates show a potential for improving fire safety. Translating the campaign to the Arabic culture might therefore also be a direction to investigate, because the differences between these countries might be smaller and could potentially be managed with similar measures.

### Cost of expansion

By looking at figure 54 from the chapter 'Business model - expenses', a rough estimation can be made on which costs will increase and which costs will stay the same for the expansion. For example, app development, social media content and management costs will roughly stay the same. On the other hand, translation costs, education development and research costs will increase. To reach 70.000 children in a second country in year four and five of the campaign is estimated to cost about €350.000 or €5 per child.

# Conclusion

This chapter will look back on the entire thesis and collect the main conclusions of every part. Since the thesis has become quite a long read with a lot of different facets, this chapter aims to show the common thread and explain how the conclusions of each part have contributed to the final result.

## Project definition

The name of this thesis is 'Entertainment Education - a strategic implementation for fire safety' and is commissioned by the Comics for Safety Foundation. Although comics are the heart of the assignment, the title purposely mentions Entertainment Education instead of comics, because (1) the comics artist would mainly be in charge of the comics while the thesis could also work towards concepts for different kinds of entertainment and (2) Entertainment Education is the commonly used term in scientific research, which emphasises that this thesis aimed to approach the matter in a critical and scientific way. During the project definition, the purpose of the Comics for Safety Foundation was defined as:

To improve worldwide fire safety by creating content that is both entertaining and education.

This purpose is used throughout the thesis as a main guidance for decision making.

## Entertainment education and behaviour change

At first, the communication strategy Entertainment Education was investigated. Quickly the link was drawn with knowledge, attitude and behaviour. A lot of campaigns that have used this strategy aim to have an effect on one of these or all of these factors, this thesis being no exception. According to Slater & Rooner (2002) the effect of Entertainment Education on knowledge, attitude and behaviour is mainly explained by the level of absorption and the level of character identification in the content. These two factors have continued to be highly important in the final designs of the thesis.

Other predictors for the effectiveness of Entertainment Education were to use multiple channels to reach the audience and also to try to engage with the audience for a longer period of time and therefore create multiple episodes/ volumes of the entertainment.

During the investigation of Entertainment Education it was impossible to neglect the general subject of behaviour change. In this field, there is a lot of discussion between behavioural scientist about the credibility of different theories. For this reason, the commonalities between different theories were used to filter the most important aspects. This showed that the social norm, the influence of friends, family and celebrities someone identifies with, is one of the strongest predictors of behaviour. Secondly, triggering someone to perform a desired action on a relevant moment is very effective. Lastly, while intuition might tell otherwise, the attitude for doing something is often formed after the behaviour. This gives the insight that the focus of a fire safety campaign should be on performing behaviour and not on why to perform the behaviour.

All relevant aspects from the behaviour theories were later used as independent variables during the effectiveness research.

## Fire Safety

Looking at the severity of the fire safety problem, the problem in the Netherlands is relatively small compared to other countries. A number of countries, mainly in Africa, have the most annual fire deaths. However, later in the thesis the relative severity compared to other death causes was included and this pointed more towards countries in Eastern Europe and the Middle East.

The fire safety problem is most severe for people younger than 4 and older than 65. However, the solution for these age groups is believed not to be the fire prevention education, but education towards other groups in how to save these vulnerable groups in case of fire.

During the analysis of fire safety campaigns, the importance of implementation-intention and self persuasion was found. Also, an extensive analysis was made on fear appeals research.

The conclusion is that this strategy, using a persuasive message to arouse fear, is rarely effective and sometimes even causes the opposite effect.

## Comics

Comics are defined as sequential art or juxtaposed images. Different regions in the world use different styles, but they all try to create a high self identification between the reader and the character. In American style comics, characters often wear masks which give the illusion that any reader could be behind that mask. In European style comics, the style 'klare lijn' is often used where the environment is very detailed to create absorption and the character is drawn very simplistic to create identification.

The popularity in the Netherlands is slowly decreasing over the past decades, while the popularity of Marvel movies make comics nowadays very populair again in the United States. A research in the US showed showed that children between 12 and 15 years old are most favourable towards comics. In the Netherlands almost every child between 9 and 12 years old read the Donald Duck magazine, but the slightly older age group will potentially be very positive towards a new type of comic.

## Target audience

During the start of the research, the target audience was still unknown. This audience could be children, grown-ups, fire firefighters or any other group. Also, the country to implement the campaign wasn't decided yet. It was decided to make this decision after collecting more information about the relevant topics and after a survey with professionals who have experience with fire safety education. Both sources pointed towards the use of comics for fire prevention education at schools. It was therefore decided to focus on the age group 12 to 15 years old. This conclusion was later on confirmed by a research from the safety region Utrecht, which stated that fire prevention education for the age of 12 to 14 years old could be most effective and should get more attention.

The Netherlands was chosen to launch the first campaign because of practical and financial reasons. While the severity of the problem is relatively small compared to other countries, the government still invests well in fire safety. In the near future, options will be examined to expand the campaign towards other countries.

## Research I: target audience

During this qualitative research, seven interviews were held with Dutch children between 12 and 15 years old to ask them about their entertainment consumption and determine the underlying values that they seek in entertainment. The target audience mainly consumes entertainment for recreation, social stimulation, inspiration, distraction or energy generation. These values are tried to fit into the concepts during the ideation. The target audience also puts a lot of value in identification with characters. Another interesting result was the aim for the target audience to consume entertainment together as much as possible. All content needs to be share-able via their go-to social media platforms and things like console gaming, mobile gaming and watching Netflix are all done together by connecting with each other online. This last result became especially important during the ideation for enhancing comic books, because the original format of comics doesn't include the possibility to be easily share-able and you can't easily read it together.

## Research II: effectiveness

During the quantitative research, 75 Dutch children between 12 to 15 were used to measure their increase in knowledge, attitude, behaviour and some other relevant variables after reading either a comic book about fire safety versus a booklet about fire safety with the same information, but without any entertainment included. Also, it was tested whether the target audience would be triggered to perform behaviour if they received a door hanger and a sticker to place on a smoke alarm to remind them of the behaviour. There is found to be a significant positive difference in knowledge about fire safety for children that read the comic book versus children that read the same information in a non-entertaining way. Because of the relatively small group sizes, the other variables didn't turn out to be significant, but the same trend can be found for almost all independent variables, where the value increases more within the group with the comic books. For example, 13 percent of the people that read the comic made sure that somebody checked their smoke alarm at home versus none of the people that read the dry education. Unfortunately, none of the participants reported to use either the door hanger or the sticker and thus there was no effect found for including these physical stimuli. Yet, there might be an effect for these stimuli if the participants were provided with educational content for a longer period of time. This could have led to a larger

engagement with the comics and therefore a larger willingness for using the objects.

The fact that the effectiveness of the comic books turned out to be very positive, defends the assumption of this thesis that the Comics for Safety Foundation can improve fire safety with comics. It also influenced the decision in this thesis to keep the comics as the heart of the campaign instead of replacing it with a more modern way of entertainment.

## **Ideation**

During the ideation, concepts were created in the field of apps, games, physical objects, social media and activations. This brainstorm was meant to diverge to all the available options. Then, the converging started by looking at the core of the concepts and how they contribute to the bigger picture of the campaign. It was decided that the core would be the comic books and that the other concepts should be added to mainly enhance the effect of the comics. This meant that modern day technology could be used to improve the reading experience and also make the comics answer to the values and needs of the target audience (i.e. share-ability and togetherness). By looking back at the core of comics and using Scott McCloud's book *Reinventing Comics*, it was decided that the enhancements should not try to make the comic more like a movie, by adding movement, sounds and voices, but to make the comic excel in its own strengths. This way is mainly to trigger the reader's imagination in the most creative ways.

The final set of concepts include an app which is a digital reading environment, where a school class can experience and discuss the different facets of the comic together. These facets will be co-created by the reader, because AR functionalities let the reader add, adjust, tag and contribute to the story in the comic books. These additions are shared in this digital reading environment, which aims to create a positive social norm about the comics. This concept taps in to the earlier discussed self identification, togetherness, share-ability, social norm and imagination.

Before the comics and the apps are provided to the target audience, the aim is to get them already acquainted with the comic characters, by targeting the audience in four segmented groups via Instagram. On the Instagram page, a lot of really short comics of only four panels are uploaded with the goal to make the audience laugh and to distract them from their serious school day for a minute.

During the education, the audience will receive not only the comic book and the app, but also a pair of fire hose shoe laces and a tear-off calen-

dar to hang in the classroom. The shoe laces are meant to be perceived as cool by the audience and increase the engagement and the tear-off calendar is meant to engage the audience for as long as possible. Also, during the education, they are taught about fire safety and about the importance of testing a smoke alarm every month. To move the class to action, testing the smoke alarm is framed as a rebellious act to scare their parents and the class is invited to try it at home that afternoon, film it and share the video with their classmates in the app.

## **Business model**

There are different ways to realise the funding for the activities to improve fire safety. Different options have been discussed for governmental organisations, charity organisations and commercial organisations either within or outside the sector. On this moment, the most promising option is that the Dutch safety regions will collaboratively invest in the Comics for Safety Foundation to develop an educational program for secondary schools.

The best way to implement this educational program seems to reach secondary schools via the different safety regions and to offer a thematic day about fire safety. The education can be provided by firefighters from the fire brigade. Like mentioned above, the class will receive a comic book, the app, a tear-off calendar and a pair of fire hose shoe laces. After the thematic day, the target audience has the ability to receive two more volumes of the comic book for free to keep the audience engaged for a longer period of time. After that period, they receive an offer to purchase a subscription to the comic books.

An estimation is made of the total cost of the campaign, based on prices found online, consults from experienced professionals and comparisons with similar examples. These estimations result in the possibility to reach 130.000 people from the target audience within 5 years, costing €12,31 per student. Note that these estimations still contain a large amount of uncertainty and can also be influenced by different decisions about the way the campaign will eventually be implemented.

A business model was made to show the viability, feasibility and desirability of the implementation.

## **Global expansion**

A number of countries were found to have a fire safety issue which is relatively large compared to other countries. Within the scope of this thesis, only brief quantitative data was used to decide on the most suitable countries for expansion.

Further research need to be done on the different options. After a country is chosen for expansion, the new target audience need to be observed and interviewed to determine how much of the Dutch campaign can be copied to this new context. The goal for the campaign is to reach another 70.000 children in a second country within the first five years. Because a lot of costs made in the Netherlands for the development don't have to be repeated, the estimated costs will be €5 per student.

## **Roadmap**

On the next page, the roadmap for the next five years will be visualised to show the possibilities for the Comics for Safety Foundation to implement the campaign in the Netherlands and abroad.

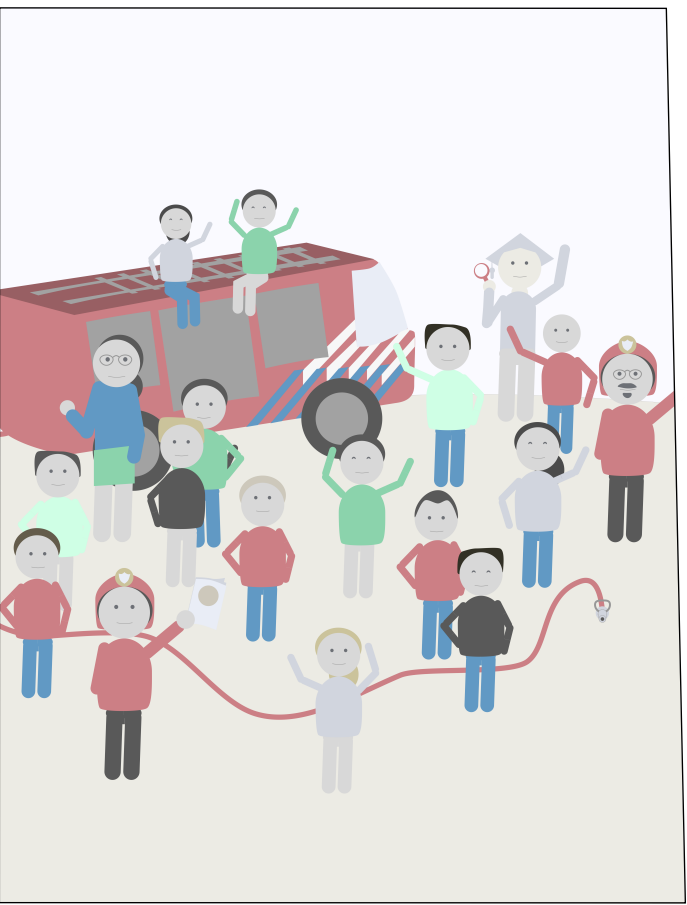
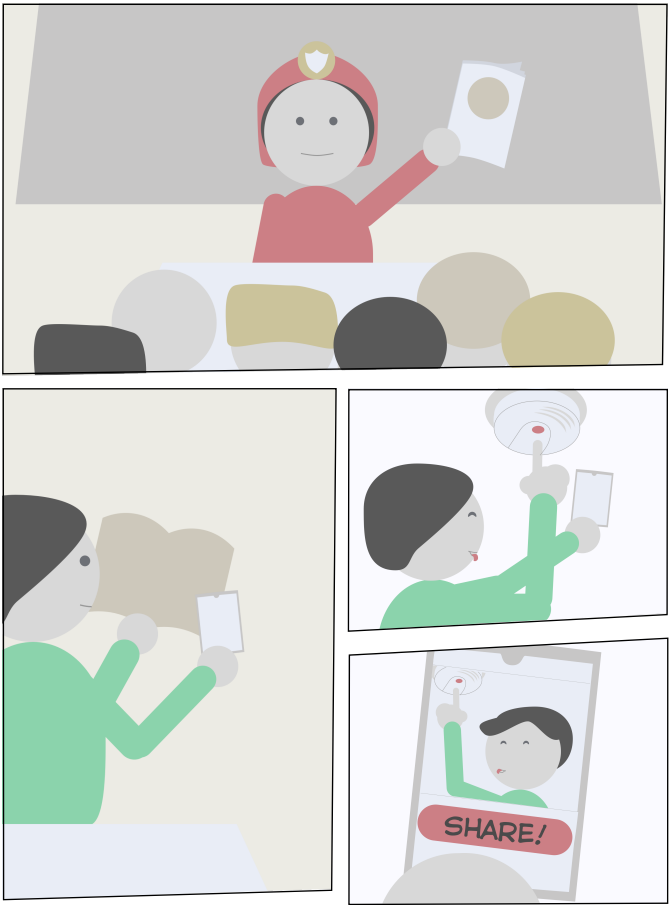
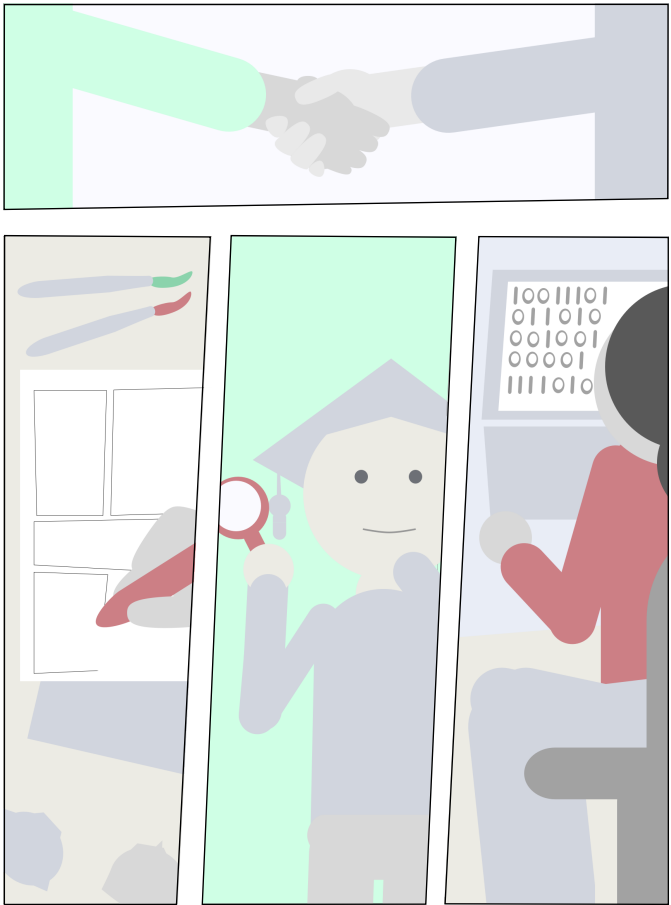
Roadmap

Development

Execution

Expansion

Vision



Company development

Product development

People reached

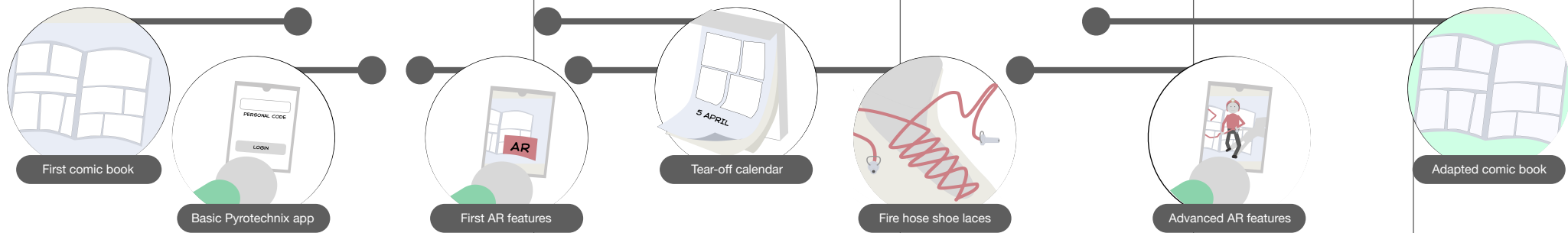
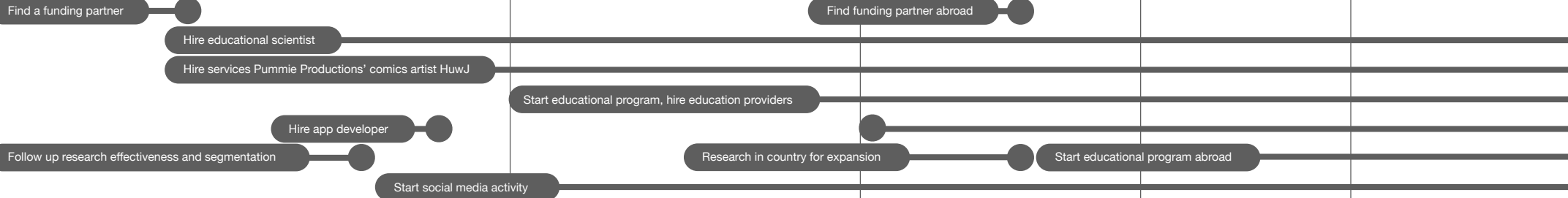
2020

2021

2022

2023

2024



200.000

100.000

Improve fire safety by reaching  
**200.000**  
children in at least  
**2**  
different countries within  
**5**  
years

## Next Steps

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After this thesis, a number of actions can be taken to follow up the outcomes of this report. The most important ones are stated below.

- The effectiveness research can be redone at secondary schools with a larger amount of participants. There is a reasonable chance that the results will mostly be significant, which would strengthen the claim even more that the Pyrotechnix concept is very useful to improve knowledge, attitude and behaviour about fire safety.
- Based on more data on the personality and interests of the target audience, four different segments can be made to split them and see how the content for the campaign can be developed to engage with all four different segments. These segments can also be used to target sponsored post more specifically via Instagram.
- Different potential sponsors can be approached to pitch the concept and show the potential of the campaign.
- When more is known about the exact implementation (which is largely dependent on the funding party), a better estimation of the total costs can be made to have more insight in the total amount needed for the development of the campaign.
- A more extensive research can be done in the different potential countries that are applicable for the campaign's expansion. Within these countries, the target audience can be observed to find out about characteristics and similarities with the Dutch target audience.
- Research can be expanded towards other safety related areas that could potentially be relevant for the target audience as new education subjects (e.g. road safety education, health education, drug education).



# Evaluation & Reflection

## Evaluating Personal goals

At the beginning of the thesis, three personal goals were set to focus on within the project: impact, critical view and fun & creative. In general the results of the past months look very positive in both an evaluative and reflective way.

- **Impact** When the decision was made after the first research of the thesis to implement the campaign in the Netherlands, it was already known that the impact wasn't able to be massive, because the severity of the problem isn't massive. Still, the results of the effectiveness research showed that the idea of Comics for Safety definitely has the ability to have impact. In the last phase of the thesis, countries were determined for expansion and to have a better view on the potential impact on the horizon. However, the extensiveness of this research was limited, due to the time scope of the thesis and a somewhat moved emphasis towards a more elaborate research phase. In retrospective, it would have been very interesting to learn more about the possibilities to go abroad with the campaign and compare the cultural differences to determine how the campaign should be adapted to the new context.
- **Critical view** One of the effects of the desire to have a critical view on different theories and strategies, was to put more emphasis on the research phase. After performing extensive research on the existing literature, the option to perform a large and comprehensive research study was very tempting and it really proved value to the results of the thesis. Therefore, it seems like a profitable decision to have increased the size of the research phase within this thesis.

- **Fun & Creative** Within the ideation phase a lot of attention is paid to come up with creative ideas and to create concepts that would create a campaign that is really fun for the target audience to experience. Especially the decision to stay really close with the core of existence of comics (triggering imagination) forced the ideation to go beyond intuitive ideas to enhance comic books with modern technology like adding movement and sound. By purely focussing on letting the target audience do the imagination a lot of interesting and more creative ideas came to be.

## Reflection

Since the start of my master program, I've been interested in the marketing side of design and the concept development. During the last couple of months I have specified my interest in marketing to a field which is far more interesting and probably far more complex than 'convincing someone to **buy** something', namely: 'convincing someone to **do** something'. This field of 'design for behaviour change' is something that captured my interest in both the research as the ideation phase of this thesis. It has convinced me to stay in this field and to find a job where I can practise these skills even more. In that sense, the project has been very useful for my personal development to acquire relevant skills and to find out where my interests lie.

In terms of the process, this thesis gave me a lot of energy when I was working on it, but it also cost me a lot of energy. My high ambitions to get everything out of this project also resulted in stressful periods, certainly when it accompanied a firm personal setback. Luckily, I can look back at a great period and I'm very happy about both my process and my final results. That's definitely worth a bit of stress!

# Special thanks to...

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for giving me the possibility to do this and investing his time, money and energy in the project.

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for creating the incredible Pyrotechnix artwork

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for being the faculty chair and triggering me to look critically at psychological theories

## **Ianus Keller**

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for spending time to answer all my questions about entertainment consumption

## **The 75 participants for my quantitative research**

for completing the long list of questions about their fire safety behaviour

## **The 19 respondents to the survey about**

### **Comics 4 Safety**

for sharing their experiences about fire safety education

## **The 9 respondents to the survey about the Pyrotechnix**

### **comic**

for giving their opinion about the absorption of the story and identification with the characters

## **Dean Smith**

for showing me around in the fire brigade and telling me about fire safety problems

## **Gusta de Haan**

for inviting me to tell about the specific behaviour of children in their puberty

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### **Polo & Scouting Athabasca**

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