Visual science communication

Scivil, 20 May 2019

Julie De Smedt
Caroline Masquillier


1903 FLIGHT TABULATION
DEC. 14
W. WRIGHT 105' 3.5 sec.
DEC. 17
O. WRIGHT 120' 12 sec. 27 mi
W. WRIGHT 195' 13 sec.
O. WRIGHT 200' 15 sec.
W. WRIGHT 852' 59 sec. 20 mi
In another moment
never once considering
to get out again.
and was just
about stopping
falling
to be a

Source: runzebra.run

Why communicate?

Source: runzebra.run

Why communicate in Citizen Science projects?

The questions

1. Why?
2. Who?
3. How?
4. What?

1. Why?
2. Who?
3. How?
4. What?

Source: runzebra.run

Ask yourself why you would like to communicate
in each step of your citizen science project.

1. Why?
2. Who?
3. How?
4. What?

Source: runzebra.run

Differentiate for each step of your project

The «broad audience» does not exist.

1. Why?
2. Who?
3. How?
4. What?

Subtle but Persistent Effects Following Adolescent Exposure of JWH-018 "Spice" on Learning and Memory Performance in Adulthood

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Palm Beach Atlantic University

PURPOSE

Little is known about the toxicology of (1-Pentyl-1H-indol-3-yl)-1-naphthalenylmethanone (JWH-018) and the related compounds reported used in Spice products. However, there is some evidence that these synthetic cannabinoids cause both dependence and withdrawal. Like many of the Spice compounds, JWH-018 strongly binds with CB_1 receptors, acting as a receptor agonist and influencing a number signaling pathways. According to Vardakou et al. the subjective effects associated with ingestion of Spice products are the result of JWH-018 and sister compounds action on CB_1 receptors. As the number of users has increased, so have reports concerning the side effects. For example, earlier in the past decade the American Association of Poison Control Centers reported that a total of 13 calls related to the use of synthetic cannabinoids and Spice products. However, by 2010 the number of calls exceeded 3,000 while in Sweden there is a marked increase in the number of cases of what has come to be known as "Spice toxicity".

The present study was conducted as a first step to examine the influence of the potent synthetic CB_1 agonist JWH-018 on learning and memory performance in Morris water maze (MWM) tasks of varying difficulty. Specifically, the animals were trained on a cued version of the MWM to evaluate whether nonassociative factors (e.g., sensorimotor/swimming deficits) affected place learning performance. A series of non-cued MWM tasks of varying difficulty were used to evaluate learning, memory, and via probe trials, retention. Finally, a simple response set learning task was employed to explore possible response perseveration and memory.

MATERIALS AND METHODS

The subjects consisted of 11 male approximately naive Long-Evans rats (Charles River, Wilmington, MA). The research protocol was reviewed and approved by the Institutional Animal Care and Use Committee of Palm Beach Atlantic University. The animals were used for in a manner consistent with the principles of animal care outlined in the *Guide for the Care and Use of Laboratory Animals*.

Assessment of Nonsensory/Learned Deficits

Activity Assessment. General locomotor activity levels were evaluated for 5 minutes in a 74" X24" chamber consisting of 5" squares (i.e., a checkerboard). Gross locomotors activity was determined by the number of squares crossed during the measurement period. The number of rearings was also recorded.

Sensorimotor Assessment - Rotating Rod Test. In the rotating rod test, a motor rotated a wooden dowel (20 cm in circumference & 142 cm long) at a speed of 2 revolutions per minute. The dowel will be wrapped with tape to help prevent the rat from slipping and elevated 100 cm above the floor. Approximately 15 cm of foam padding was placed beneath the apparatus to prevent injury in case one did fall.

Water Maze Navigation Tasks

In addition to tests of spatial learning and learning set performance, the water maze protocol employed in the present experiment was used to evaluate the possibilities that nonassociative factors such as motivational changes or sensorimotor disturbances might impact swimming performance. By changing the parameters of the place procedure to make the task more or less challenging, we hoped that the procedure would be sensitive to non-memory impairments should they exist.

With the exception of general activity, all behavioral testing occurred in a circular swimming pool 183 cm in diameter and composed of a white acrylic plastic. Water was filled to a depth of 30 cm and made opaque by the addition of a nontoxic tempera paint (Sargent Art, Hazleton, PA). The pool was located in a testing room approximately 3-4 M square meters in size. An escape platform (round, fat circle not 15 cm in diameter was located 28 cm from the wall of the swimming pool. For the cued water maze task, the platform protruded 15 mm above the surface of the water. For all remaining water maze phases the platform was submerged 13 mm below the surface of the water.

Cued Place Learning Task. Using a visible platform, the cued water maze task was included to assess task motivation/vigor (e.g., swimming ability), reliable sensory or motor deficits as well as familiarize the animals in the various elements of the water maze. This was done to assess or reduce non-memory processes that could influence performance during the spatial place and learning set tasks. Training on the cued water maze navigation task began when the rats were 75 days old, 30 days after the last drug exposure.

Place Learning Water Maze Tasks. The place learning tasks consisted of spatial reference memory-based tasks. The task involved learning the location of a submerged platform that remained the same across all trials within a given phase. Because of the potential confounding variables involving the behavioral effects of these psychoactive compounds (the demonstrated motor deficits using the standard version of the MWM test, we used two testing protocols labeled *Simple* & *Complex*) to determine if the complex version was more sensitive for detecting spatial learning / memory impairments over the post drug exposure period.

The Simple Place Learning Task. This protocol involved 6 trials per day for 2 days. In order to facilitate spatial learning, a number of salient spatial cues will be located around the room. The rats will be allowed to remain on the platform for 20 seconds after each trial. After daily training, retention was evaluated with probe trials, consisting of a single daily 60-second free swim with the escape platform removed.

The Complex Place Learning Task. In this task, all rats were trained four consecutive trials per day for 5 days. To increase the difficulty of the water maze task, the available extramaze cues were minimized and room illuminated by a single 60-watt red light bulb, thus leaving the rats to aid navigation. Similar to the simple version of the task, probe trials were administered after the completion of four days four and five.

Learning-Set Acquisition Testing. Learning-Set acquisition training requires the animals to learn a new location for the escape platform each day for 2 consecutive days. Testing began on post-drug exposure day 69 and continued through day 99. The averaged performance on Trial 1 of each day was used as an index of working (short-term) memory because on this task the animal is required to recall its response on the immediately preceding trial. The rats will be allowed to sit on the platform for 15 seconds at the completion of each trial.

RESULTS

Assessment of General Activity and Motor Ability

An ANOVA was used to explore the possible effect of the drug on motor performance. No drug associated effects were suggested in terms of quadrant crossings or rearings ($ps > .05$). When the rats were tested using the rotating rod, the rats improved across sessions but no drug effects were observed on either the number of slips or the number of falls.

Water Maze Navigation Tasks

Cued Place Learning Task. The learning ability of the rats during the initial phase of training was examined by analyzing the swim trials in blocks of five swims. Using the swim time to the escape platform as the dependent measure, the data were analyzed using a 1-Between (2-drug groups), 1-Within (4 blocks of trials) analysis of variance (ANOVA). Swim times to the escape platform were comparable for both groups. Escape times decreased as a function of training for all animals, but the drug group X trials interaction was nonsignificant.

Place Learning Water Maze Tasks

The Simple Place Learning Task. The relevant results associated with the simple version of the place learning task are presented in Figure 1. Analysis of the resulting data with a 2 (drug groups) X 2 (days) X 4 (blocks) ANOVA indicated a nonsignificant main effect of drug, but significant main effects of days, and blocks, suggesting that changing swim times generally improved with days as well as between days. In addition, significant drug X days, and drug X blocks interactions were found. The three-way interaction was nonsignificant. Decomposition of the two-way interaction revealed the following. Swim times were significantly higher for the JWH-018 rats than saline controls on day on but not on day 2. Similarly, JWH-018 rats were impaired on blocks one and two but not on blocks three and four.

When the probe trials were considered a JWH-018 mediated impairment was observed (see Figure 1, inset). Specifically, main effects of drug, and days were found and, as evidenced by the lack of a significant drug X days interaction, the difference between the groups remained.

The Complex Place Learning Task. For the assessment of the complex place learning data, the four daily trials were normalized and averaged, and the navigation performance was assessed over a five-day period. The results are presented in Figure 2. Using a 1-Between, 1-Within ANOVA, the analysis revealed main effects of the drug treatment and test days, suggesting that group swim times differed and that the swim times generally decreased across the five-day test period. However, as can also be seen in Figure 2, the drug group X test days interaction was nonsignificant.

When the probe trials were assessed, only the main effect of days was significant indicating that the rats spent more time in the target quadrant on later days but both groups responded in a similar manner.

Learning-Set Acquisition Testing. The swim time data associated with the MWM learning set task is presented in Figure 3. Data involved averaging each trial from the five days of testing. Although the main effect of drug group was nonsignificant, not surprisingly, the main effect of trials was significant. Thus, while across trials the swim times for the two groups were comparable, their performance improved with training. In addition, the drug group X trial interaction was detected suggesting differential changes in swim times as a function of trial position. Focusing on trial one vs. trial 2 performance in the decomposition of the interaction revealed significant reductions in swim times from trial one to trial two (see Figure 3, trials 1 & 2). Although trial 1 of Figure 3 suggests a difference in swim times, post hoc comparison of the two groups revealed that the trial 1 swim times were not significantly different. Conversely, saline rats found the escape platform on trial 2 significantly faster than the JWH-018 treated rats. The swim time results are consistent with the number of quadrants crossed, which was also higher in the drug-treated rats.

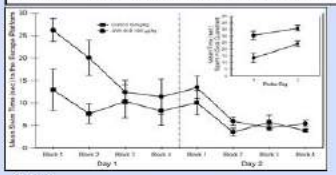

Figure 1.

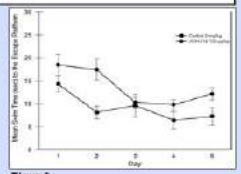

Figure 2.

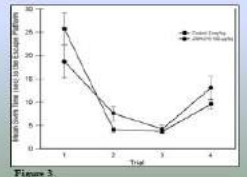

Figure 3.

DISCUSSION

Collectively, the cannabinoids include a number of compounds that act as agonists at endogenous cannabinoid receptors sites. Included in this group are the compounds derived from the *Cannabis sativa* plant which includes $\Delta 9$-THC and $\Delta 8$-THC, endogenous cannabinoids such as Anchidonoylethanolamine (Anandamide) and 2-arachidonoyl glycerol (2-AG) and a number of synthetic cannabinoids. The latter compounds were synthesized for research purposes at Hebrew University (HU compounds), Pfizer Pharmaceuticals, with a large group synthesized by J. W. Huffman in the 1980s (labeled JWH compounds).

Recently, a number of these synthetic cannabinoids have been detected in products labeled as Spice or K2 and include JWH-018, JWH-073, JWH-398, JWH-250 and HU-210. Although advertised as substances for nonhuman consumption, synthetic cannabinoids such as JWH-018 are mixed into a solvent and then sprayed on the plant as the delivering what was formerly a legal high. In fact, JWH-018 was the first synthetic cannabinoid ever reported through the "Early Warning System" utilized in Europe to monitor emerging trends. Since JWH-018 is a potent CB_1 receptor agonist, capable of activating multiple signaling pathways in the brain, the subjective effects of Spice are considered the result CB_1 receptor activation by JWH-018 in Spice and K2 preparations.

Of particular concern here is the possibility that adolescent exposure can lead to a number of disturbances in cognitive processes that persist long after abstinence. Consistent with this are reports of working memory impairments in adolescent but adult rats exposed to $\Delta 9$-THC when subsequently tested in adulthood. However, the issue remains open for further inquiry as the residual effects associated with adolescent exposures are not always found.

In summary, the results reported here provide that adolescent exposure of at least one common psychoactive constituent of K2 (Spice) compounds, JWH-018, can produce alterations in learning and memory performance in adulthood. To repeat, during adolescence a number of areas of the brain are undergoing developmental changes with higher levels of novelty and sensation-seeking considered a common fea… perisynaptic CB, cannabinoid receptors have been … glutamatergic, and GAB Aergic synapses in … accurate responses and memory processes … examined in greater detail. Doing so … with adolescent use.

SELECTED R…

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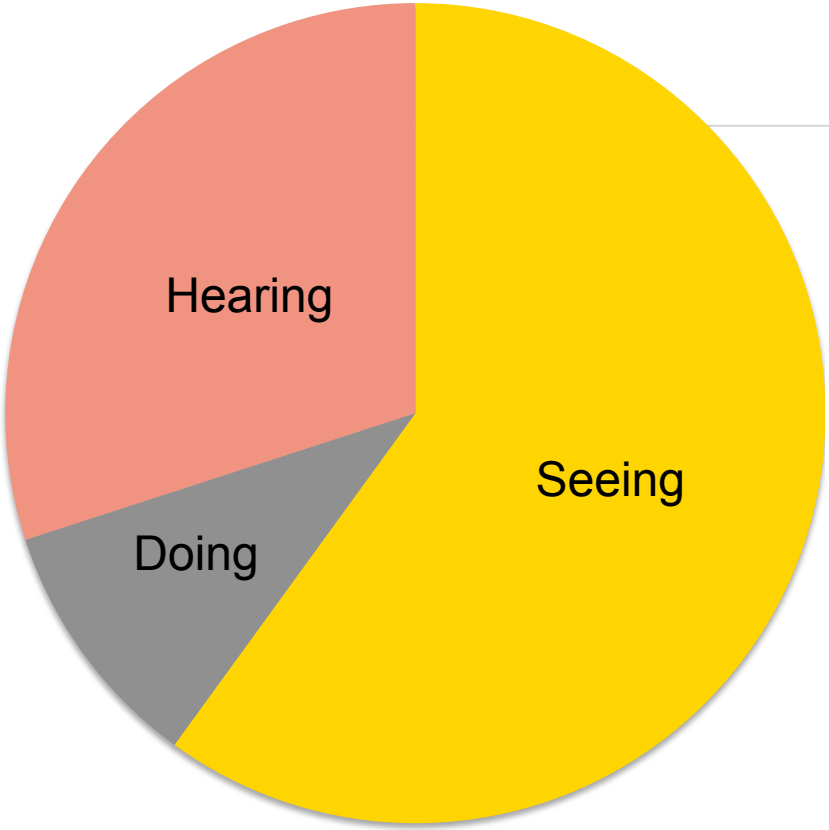
Acknowledgements:
This work was supported by a Palm Beach Atlantic University Quality Initiative Grant awarded to the first author.

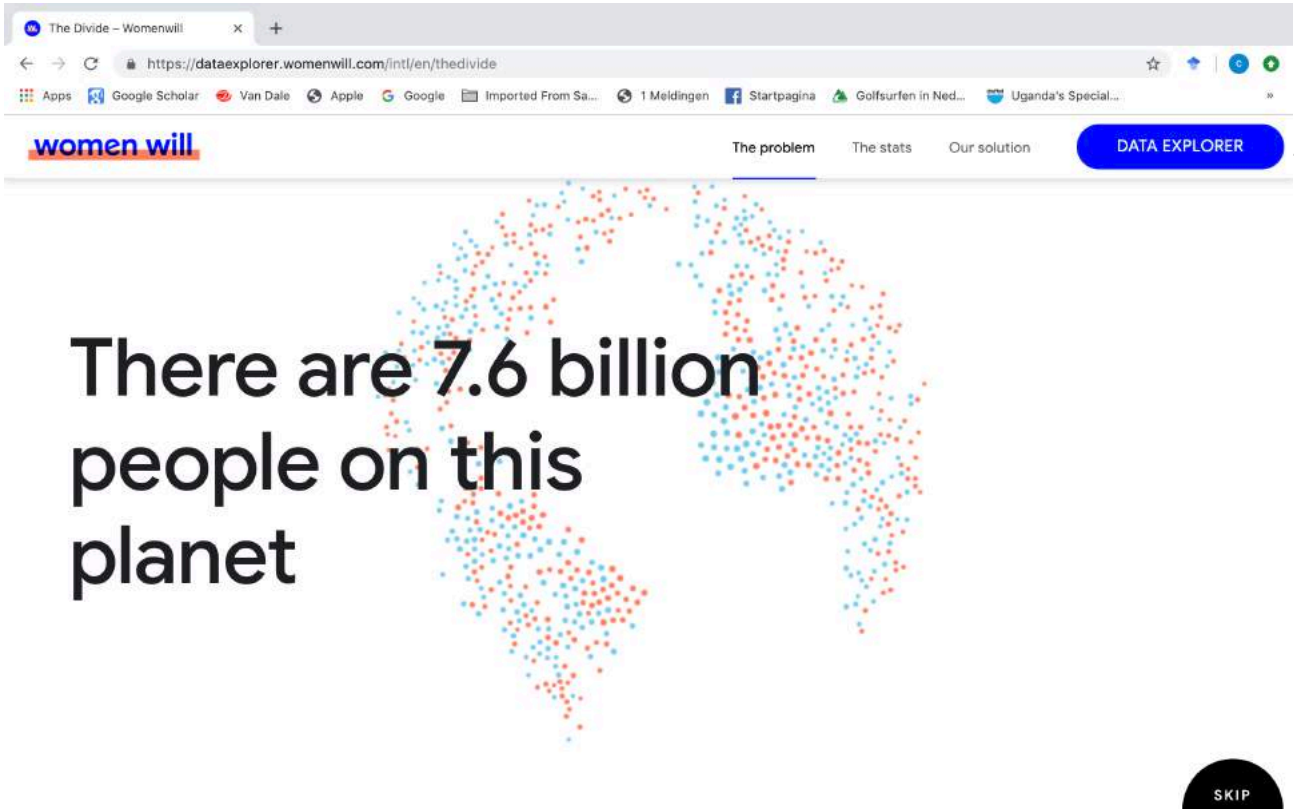
What's wrong?

In which way do people learn?



Examples

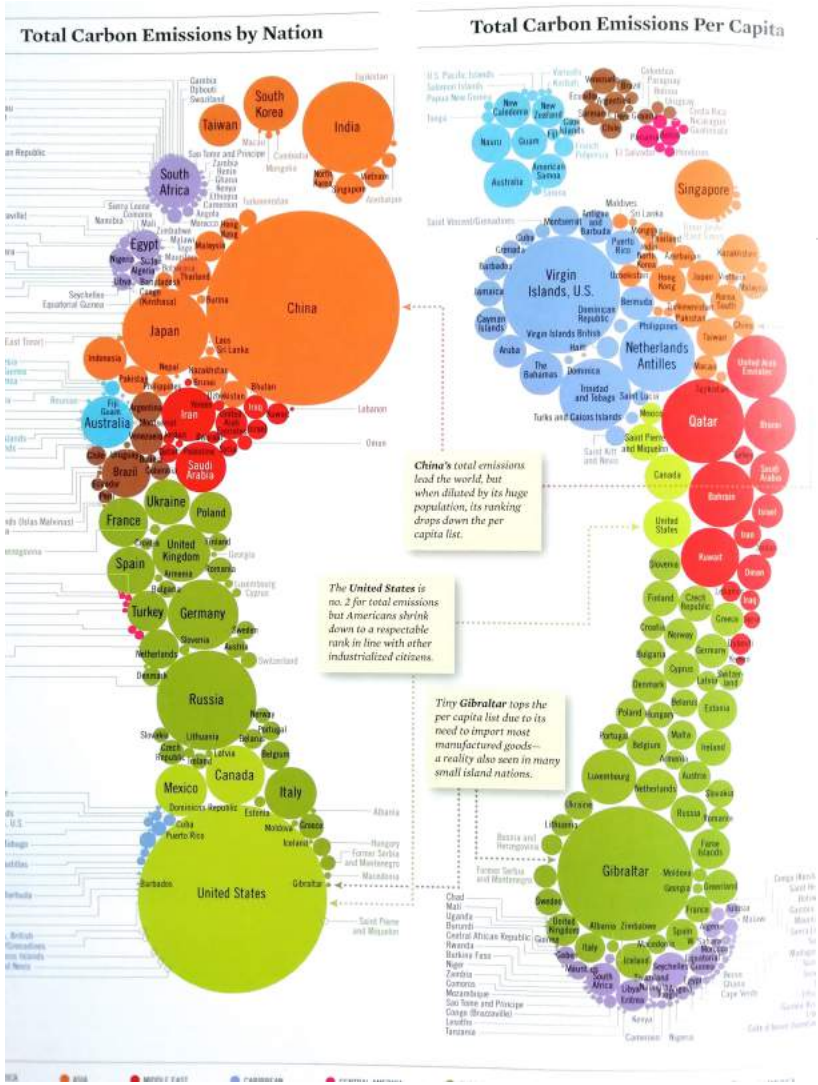
Website



Source: https://dataexplorer.womenwill.com

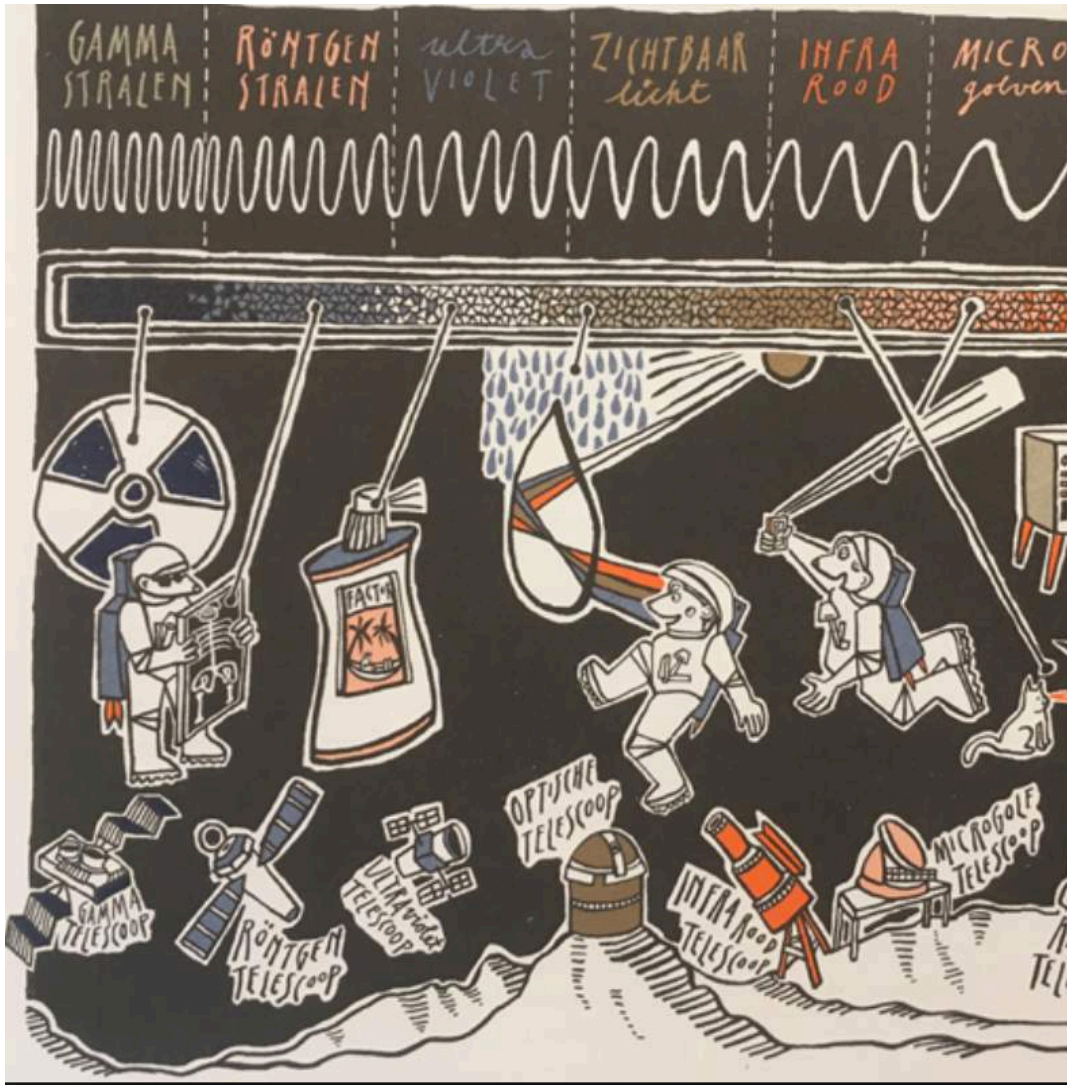
Infographic

Source: US Energy Information Administration



Children’s books

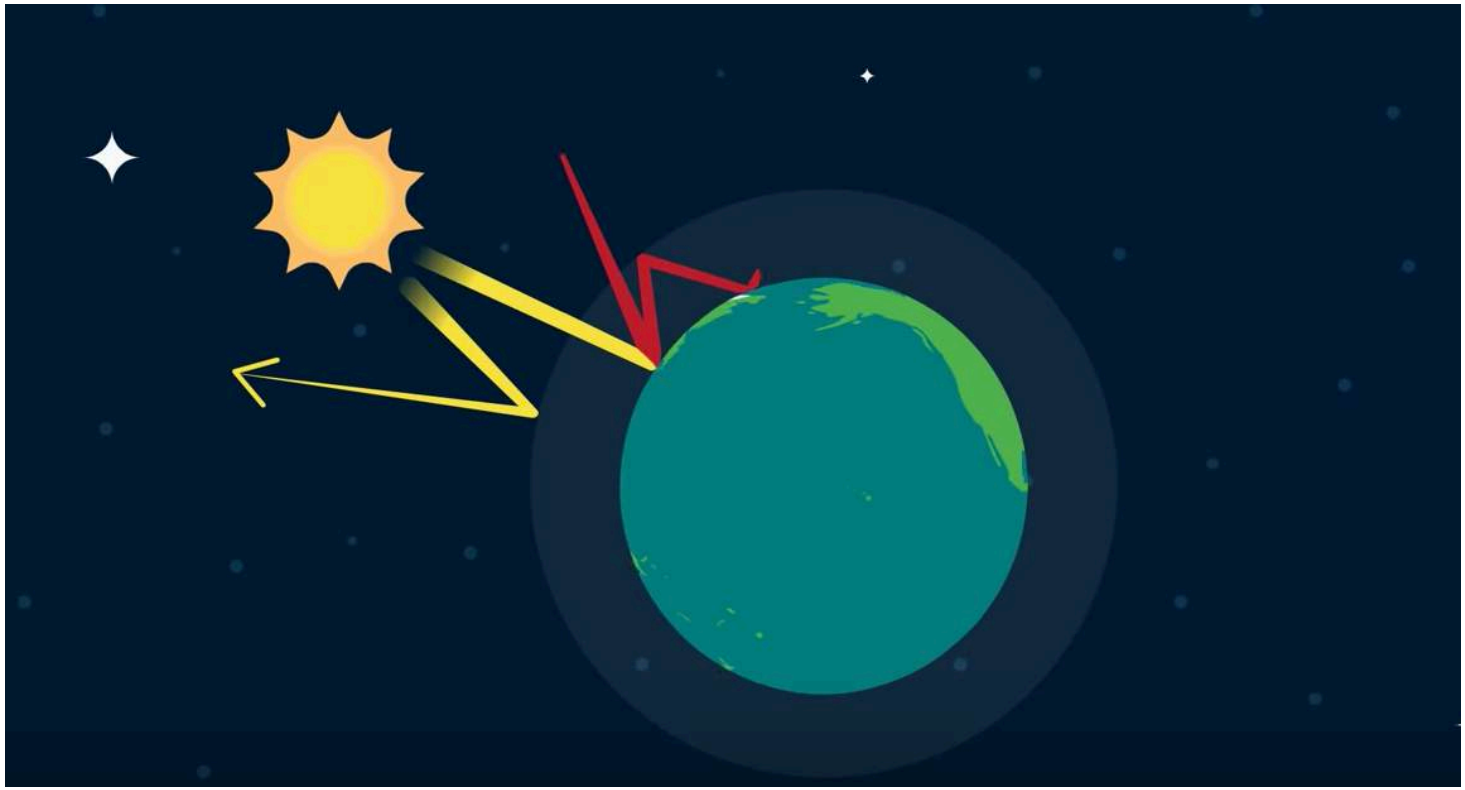
Source: Het mysterie van
Niks en oneindig veel snot



Games

Source: Risk and Race (Vito)

Animation



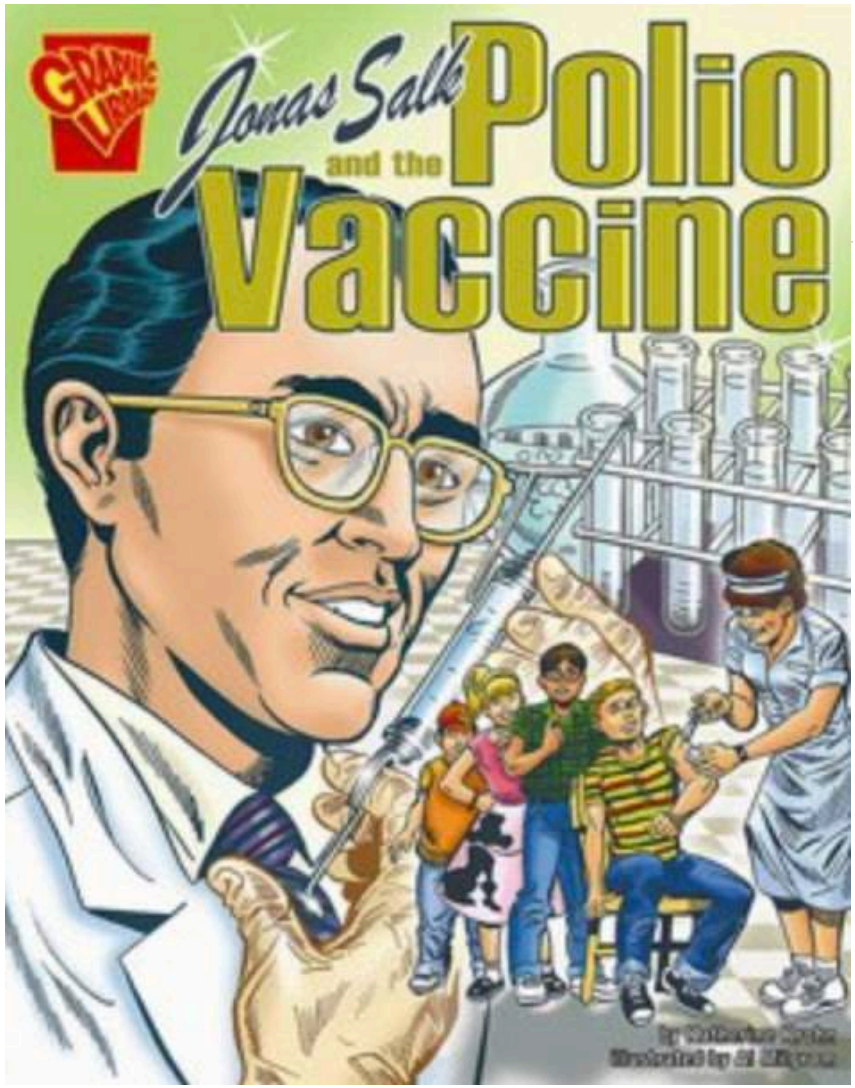
https://www.youtube.com/watch?v=J_QYjvtGR1s

Theater

Source:
thomasryckewaert.be

Cartoon/graphic novel

Source: Jonas Salk and the Polio Vaccine. Reviewed Titles. Graphic Library



Documentary

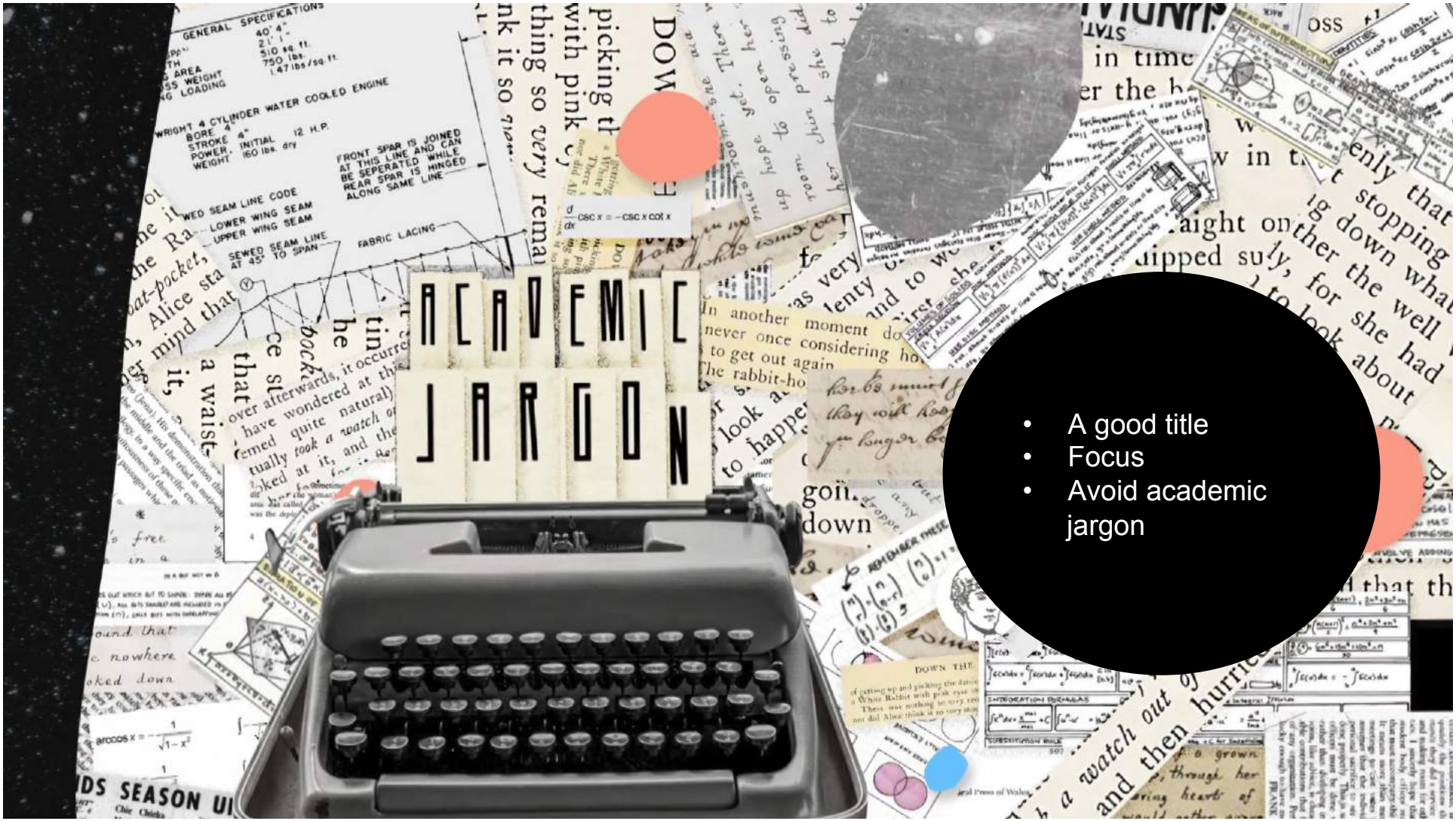
Source: field.community
@Honestwork_Maike

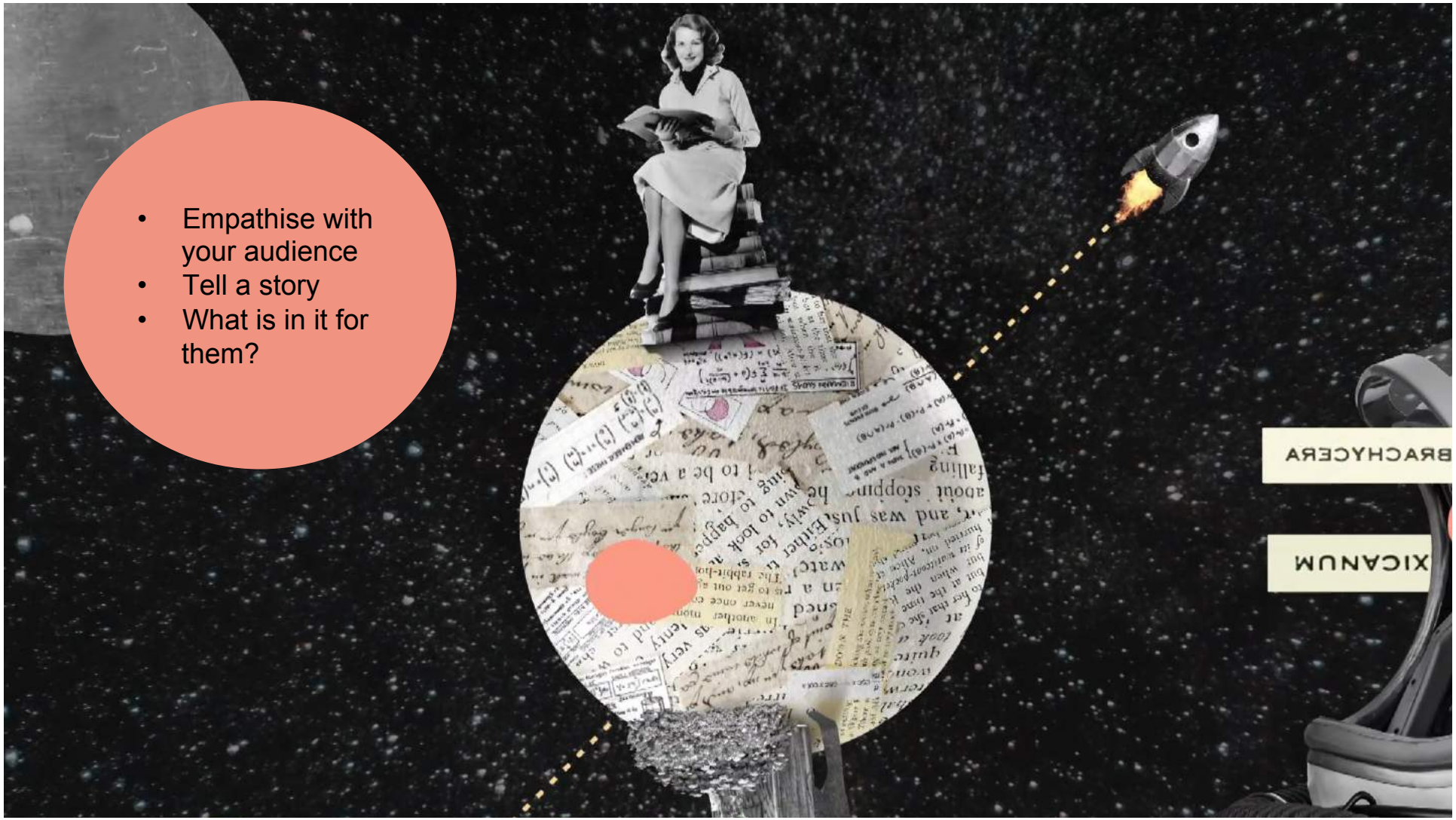
Exhibition

Source:
field.community

And many more……

1. Why?
2. Who?
3. How?
4. What?


ACADEMIC
JARGON
• A good title
• Focus
• Avoid academic jargon


Empathise with your audience
Tell a story
What is in it for them?

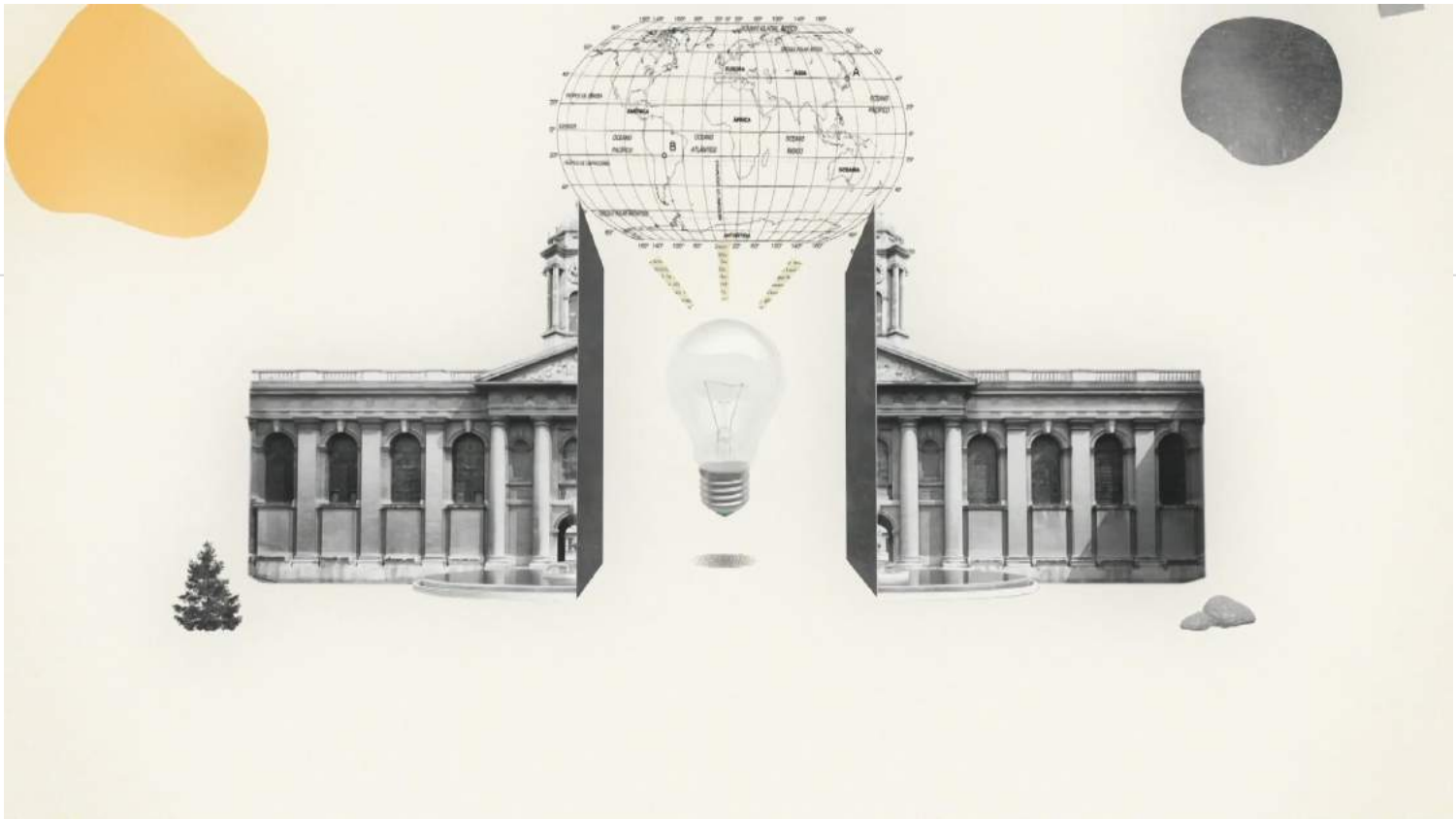
- Call to action
- Communication is a process
- Same message adapted to the medium

A song sounds sweeter from the author's mouth

Niger proverb: Save the children report

The questions

1. Why?
2. Who?
3. How?
4. What?



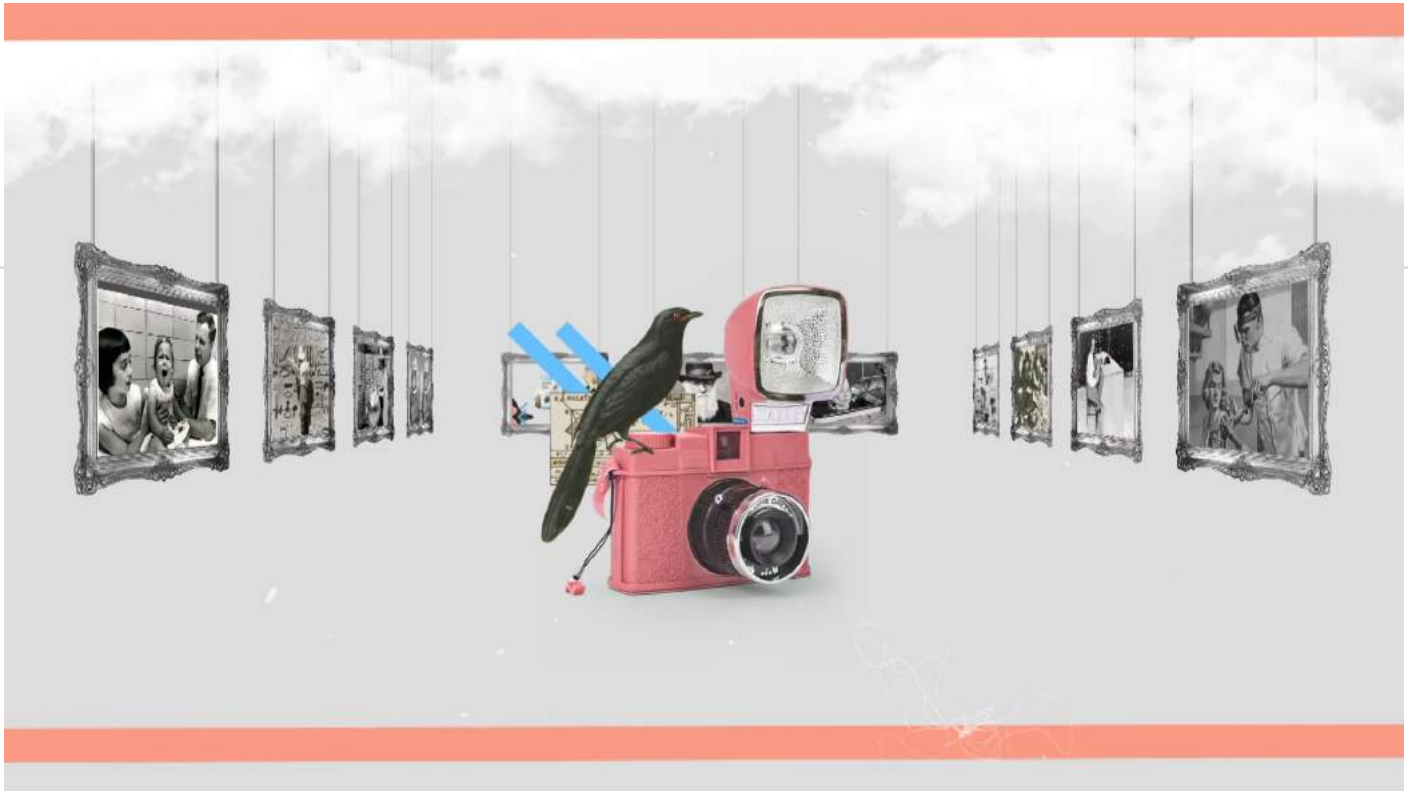
Source: runzebra.run

Tips

Tips

Source: runzebra.run

- One returning “concept-image”
- Plan your communication from the start
- Allow sufficient time and resources
- Work with partners (media, NGO’s,…)
- Ask for professional support
  Or discover creative skills in your team
- Ask feedback from your target audience
- Have fun!



Source: runzebra.run

Some examples

Project name

Call to action

Knappe K(n)oppen

In het citizen science project Knappe K(n)oppen onderzoeken we of onze bomen bestand zijn tegen een warmere wereld.

Bomen zijn vaker en vaker in de war door klimaatverandering. Daarom worden in dit citizen science project leerlingen van verschillende scholen opgeleid tot **knappe koppen** die de onderliggende factoren van de **knoppen** van bomen zullen onderzoeken. Lees meer

Knappe Knoppen project

Follow on Twitter

Find on Facebook

Focussed message


CurieuzeNeuzen Vlaanderen
Julie
Startpagina
Aanmaken
CURIEUZE NEUZEN
VLAANDEREN
CurieuzeNeuzen Vlaanderen
Startpagina
Berichten
Recensies
Video's
Foto's
Info
Gemeenschap
Universiteit Antwerpen
VLAAMSE MILIEUMAATSCHAPPIJ
De Standaard
Vind ik leuk
Volgend
Delen
Berichten
CurieuzeNeuzen Vlaanderen
9 mei om 09:31
Nog een bekroning voor CurieuzeNeuzen! Proficiat aan de journalisten van De Standaard.
4,3 op 5 · Op basis van de opinie van 100 personen
Community
Alles weergeven
Nodig je vrienden uit om deze pagina leuk te vinden
CURIEUZE NEUZEN
VLAANDEREN
Wat u moet weten
Wat kan u doen?
Vragen?
Kostenplaatje
HIER METEN
CURIEUZE NEUZEN
DE LUCHTKWALITEIT
standaard.be/curieuzeneuzen
HIER METEN
CURIEUZE NEUZEN
DE LUCHTKWALITEIT
standaard.be/curieuzeneuz
HIER MEET 1 VAN
20.000 CURIEUZENEUZ
DE LUCHTKWALITEIT
IN DE MAAND MEI
CURIEUZE NEUZEN
VLAANDEREN
Meer info op curieuzeneuzen.be
toch minder gezond dan u dacht?

Questions?

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Caroline Masquillier – caroline.masquillier@uantwerpen.be or www.field.community