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ANALYSIS AND DESIGN OF ANIMATED POSTERS

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Abstract: *Using a static or animated information on a medium, such as a poster, is a common decision to be made nowadays. Advertising solutions in the form of a screen that mimics a traditional poster format offer us a way to bring to life something that has been static for more than a century. Deciding if and when it is better to use an animated rather than a static (printed) poster is not always easy. The campaign budget has to be higher, and a decision must be based on the proven effectiveness and communicativeness of the medium in question. Research is focused on whether and how animation can improve perception. The main hypothesis is that animation of some graphic elements can improve the visibility and therefore the effectiveness of a poster. The first step of the research was to prepare a test material. In cooperation with Cankarjev dom, we animated five of their posters, the original of which was prepared only for printing. Different artistic styles and compositions were chosen. The second step was to animate some of the elements, focusing on the effectiveness and communicativeness of the final result. In order to determine the difference in the perception of static and animated posters, different methods could be used. Previous research has shown that the use of eye-tracking provides useful results. Like many other areas of graphic communication, e.g. photography, copywriting, graphic design ... eye-tracking has been influenced by the use of artificial intelligence as well. The use of neural networks fed with big amounts of real eye-tracking measurements gives us the ability to predict with great confidence the way the human eye looks at something. In our research, we used software called Expoze that analyses the content of an image or video and predicts heatmaps of how real observers would see the test material. The end result of the research gives us a detailed view of how we receive information from static and animated posters.*

Key words: *animated poster, artificial intelligence, eye-tracking, graphic design, motion perception.*

1. INTRODUCTION

While the general role of advertising has already been analysed in detail, the importance of advertising in urban areas has often been neglected. The rise of the advertising industry in recent decades has been accompanied by an increase in the amount and frequency of information we encounter on a daily basis. As the human brain can only absorb a certain amount of information, we as a society have begun to selectively choose the information that grabs our attention (Gulmez, Karaca & Kitapci, 2010). Animated posters have become an innovation in advertising and are most commonly used on social media and outdoor digital screens.

Animation is defined as a visual, dynamic message created through movement in a specific time frame (Baecker & Small, 1990). A sense of movement is created by successively changing images, with each successive image differing only minimally from the previous one. The use of animation in advertising began in the 1940s (Selby, 2022), with the term 'animated poster' originating with Swiss designer Felix Pfaellie. Animated posters present information in a specific sequence of frames, starting with the first (start key frame) and ending with the last (end key frame), and are designed to repeat their content imperceptibly over and over again (loop) (Harrison, 2018). The movements on the animated poster are smaller and simpler, not to be confused with longer animations or even movies (Dehrashid, 2021). The most commonly used ways to add movement to the poster are: Experimenting with typography and text, changing the colours and sizes of elements, adding smaller elements that highlight certain content of the poster, moving certain elements or playing with light on the poster itself. Animated posters are playing an increasingly important role in advertising as they can attract attention, inspire and entertain in a very short time. The advantages of animated over static graphics are: great creative freedom that allows designers to portray the brand more vividly and easily, achieve greater visibility and memorability, get the message across faster, hold the viewer's attention more easily and longer, enhance the user experience and stand out from the overwhelming amount of information (Sagiadinos, 2022).

Clear Channel is an American company that owns more than 330,000 outdoor advertising spaces and works with many large companies to create attention-grabbing campaigns in a highly creative way. It also

strongly promotes the use of motion in advertising (Social + DOOH, 2022). Together with Talon, it conducted a survey in 2018 on the perception of animated posters compared to static posters. They concluded that adding motion to the ads strongly influenced the success of the campaign with an increase of up to 23%. They also confirmed the increase of viewer's level of reflection and retention by 8% and purchase intent increased by 20%. In general, they found that an animated poster is twice as noticeable as a static one and maintains the viewer's attention 60% longer (Clear channel, 2022).

2. MATERIALS AND METHODS

2.1 Materials

For this research we collaborated with Cankarjev dom, Slovenia's largest cultural institution and congress centre. The main idea was to select five of their static posters (Figure 1), then create animation posters based on the same design, and finally compare their effectiveness. We used different tools to create the animated posters. The whole process of animation was done on an Apple Macbook Pro 15 (2018) laptop. Adobe Creative Cloud software, Adobe Illustrator 2022 and Adobe After Effects 2022 for animation were used to transform the posters. The web tool Expoze.io was used to generate the heatmaps and the research was completed with two versions of a survey on the website Survey sparrow.
Figure 1 shows the static poster for the *20th LIFFe*, designed by the in-house designer of Cankarjev dom, Mag. Maja Gspan Vavpetič. It is a typographic poster, as all the main elements are represented with typography. The poster is characterised by the words "love" and "life" (or liffe) as the key concepts of the festival, which are always connected. Life without love is empty, just as the poster would be empty if one of the two words were left out and vice versa.

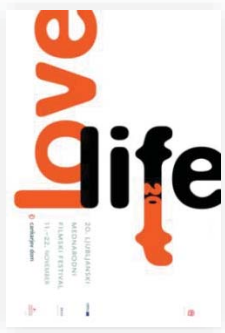

Figure 1: Poster for 20th LIFFe.

The poster was animated based on the idea of how life and love are connected, and especially on the important role of love in a person's life. Love for oneself, for one's partner, for one's family, for one's friends or love for hobbies, for things that bring a person joy and happiness, that inspire them and drive them forward in life. All this is contained in the word love. The words "love" and "life" are written in different directions on the poster because many people feel a lack of love (and therefore of one of the things mentioned above) at some point in their lives. In such situations, we look for ways to find these beautiful feelings again. Therefore, we have designed the animation (Figure 2) in such a way that we "find" the words themselves on the poster, which illustrates the idea described earlier.

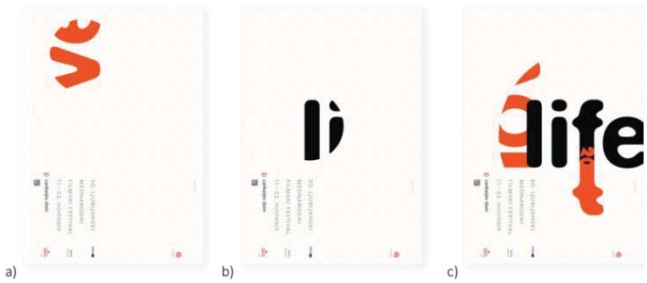

Figure 2: Animated poster for 20th LIFFe; a) starting keyframe, b) intermdeial keyframe, c) ending keyframe

The second poster we selected for animation was a poster design for the *26th LIFFe* (Figure 3). The idea behind the design was to write the name of the festival in different languages of the world (LIFFe, 2022). Each language has its own colour and line, and together the inscriptions form a colourful whole that forms the background of the poster. The design of the poster represents the meaning and the key message of the festival itself. Its main purpose is to introduce society to the works of different authors and cultures, while supporting smaller producers who are not yet established in the field. The different colours and sizes of the individual captions underline their variety and diversity. The foreground element of 'liffe' justifies its importance and presents itself as a solid pillar in this gathered mass of creators.

Figure 3: Poster fot 26th LIFFe

The animation concept was based on the idea of representing a large pool of producers and films that are very different from each other. We wanted to highlight this diversity by moving the captions outside the poster in the opposite direction each time (Figure 4). This creates a sense of a diverse community that ultimately has a holistic effect both on the poster and in the realm of the film itself, whose filmmakers are brought together by the festival.

Figure 4: Animated poster for 26th LIFFe; a) starting keyframe, b) intermdeial keyframe, c) ending keyframe

Figure 5 shows the poster for the 2022/2023 season and is a typical typographic poster. The word "ABONMAJI" is printed in linear black, bold and highly enlarged letters across the entire poster and divided into three lines by syllables. The viewer's secondary attention is drawn to the background lettering, which is smaller and in pink and illustrates the different contents of covered by the season tickets.

Figure 5: Abonmaji poster

When we brought movement to the poster, we wanted to ephasise the word "ABONMAJI" by successively enlarging the letters in each line, creating a visual effect that stood out from the rest of the poster. We depicted signs such as "MUSIC", "THEATRE" and "DANCE" as a steady movement to the left and right respectively (Figure 6).

Figure 6: Abonmaji animated poster; a) starting keyframe, b) intermdeial keyframe, c) ending keyframe

The *Veličastni* poster shown in Figure 7 consists of a photograph showing two dancers embraced in shades of blue, which form the background for the actual design. The name of the ballet company, the title of the performance and the composer of the music stretch from the left side of the poster across the middle. At the bottom, the word "magnificent" appears in the centre alignment, consisting of a yellow border in a slightly more playful tone.

Figure 7: Veličastni poster

When animating the poster (Figure 8), we wanted to give the viewer the feeling of a real ballet performance. We brought magic and elegance to the movement and played with lighting effects, which are an important part of any dance production. We designed the idea so that the animation appears very subtle at the beginning. The background is dark, you only see the flickering light particles that are also part of the static poster. Then, slowly and only minimally, the other elements of the poster are illuminated. In the next moment, a narrow beam of light appears from the left corner, gently sweeping across the entire poster as if following the dancers on stage. As the beam disappears, the rest of the poster is gradually illuminated so that we can briefly glimpse the overall image of the static poster.

Figure 8: Veličastni animated poster; a) starting keyframe, b) intermdeial keyframe, c) ending keyframe

The design of the poster (Figure 9) consists largely of a photograph of Nikola Tesla framed and interspersed with lightning bolts shooting from the top edge across the image of Tesla.

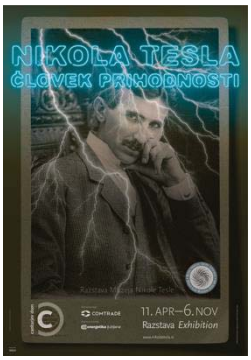

Figure 9: Poster for an exhebitiion of Nikola Tesla

We have kept the static image of Nikola Tesla as a stable element of the content. When adding movement, we focused mainly on the flashing of the lightning and the subsequent flashing of the neon sign. The animated poster (Figure 10) is darkened at first, appearing mysterious and arousing the viewer's interest. Then the first lightning flashes on the screen, followed by the flashing neon sign, followed by the rest of the poster. While the flashes continue to twitch, the penetrating gaze of Nikola Tesla rests on the viewers.

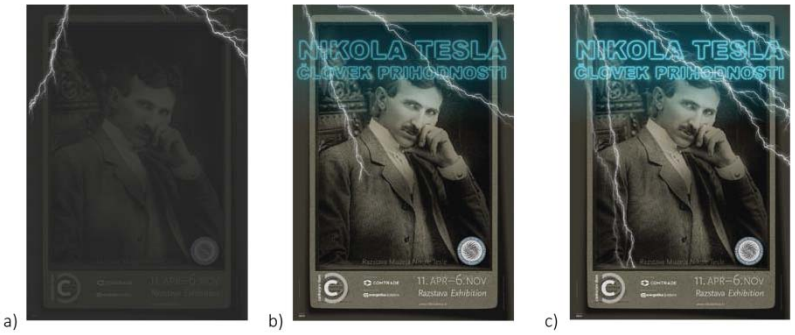

Figure 10: Animated poster for an exhebitiion of Nikola Tesla; a) starting keyframe, b) intermdeial keyframe, c) ending keyframe

2.2 Methods

Two different approaches were used to study the effects of static and animated posters. The first approach was more objective and used the AI predictive eye-tracking software Expoze.io (Expoze, 2022). With this tool we created heatmaps for both static and animated posters. The results are generated based on artificial intelligence, which is a great advantage in terms of the temporal component, as we do not need actual test subjects to collect the results. The programme was created with the help of thousands of contributors and now has a 95% reliability rate. To create our own material, we uploaded the images to the database on the website and within minutes the heatmaps were created.
The second approach was an online survey based mainly on the subjective responses of the participants, as we also wanted to check the memorability of different information on posters. In order to get the most meaningful results, we designed two different versions of the survey that differed only in the examples of posters that were presented to the respondents. In each version of the survey, all five posters were shown - but either as static or animated versions. The posters that were static in the first version appeared animated in the second version.
Sixty participants of different genders and ages took part in the online survey, 41 of whom were women and 19 men. Most of them were between 15 and 25 years old. Table 1 below shows their data.

Table 1: Charateristics of online survey participants

Gender		Age			
M	F	15–25	26–35	36–50	50+
19	41	27	10	13	10

Measuring the effectiveness of animated posters is difficult, not only because they are usually presented in city centres, but also because of the nature of the results, especially memorability, that we wanted to obtain. For this reason, we used two different approaches. While the results of the generated heatmaps provide information about the concentration of the gaze, the online survey provides important information about the memorability and effectiveness of the poster with communicating its content to the observants.

3. RESULTS

The aim of the work was to investigate the significance of movement on posters and to explore whether and to what extent animation contributes to the success of advertising. In particular, how it affects the observer, whether it holds his attention and whether it conveys a certain piece of information faster and more accurately.

3.1 Predictive eye-tracking testing with Expoze.io

First, we used the online tool Expoze.io to create heatmaps for static and animated posters.
On the heatmap of the *20th LIFFe* (Figure 11, a), the letter "o" was coloured with dark red spots, indicating that this area attracts the most attention. The result is quite predictable, as this is also a meeting point for the two main inscriptions on the poster and also a starting point for their reading. The less colourful areas are those that contain information about the name and date of the event at the bottom left. The logos at the bottom of the posters are the least colourful.
In animating the static poster, we focused on the most important technical information about the event, which did not get enough attention in the primary static version. With the additional movement, we wanted to give the viewer the opportunity to notice the date information first. The animation engages the viewers and at the same time forces them to follow the motion until after a few seconds the entire poster appears. By analysing a heatmap (Figure 11, b), we came to the conclusion that the poster with this particular motion provides some basic information that would otherwise be lost in the design itself. At the same time, we achieved a better perception of the individual sections with the animation and, above all, increased the engagement of the observer himself.

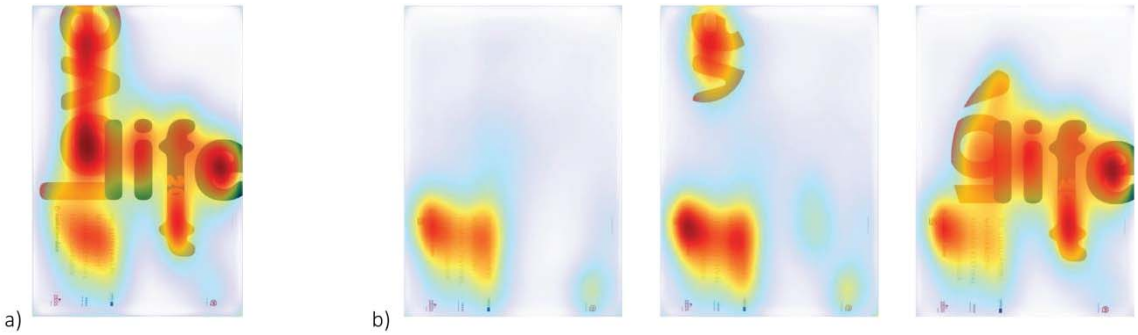

Figure 11: Heatmaps of the: a) static poster and b) animated poster for the 20th LIFFe

In the heatmap based on a static poster for the *26th LIFFe* (Figure 12, a), it can be seen that the upper left part of the posters is coloured the most intense dark red, which means that the concentration of gazes was highest there. We wanted to make sure that the viewer perceived both the background and the main text of the poster. The results show that the word "life" in black colour does not overshadow the background, which is also a very important component of this static poster. When designing the animated version, we focused on making the background even more visible to the viewer. This is the main reason why we decided to animate only coloured text in the background and move each line of text in its own direction (left or right). After creating the heatmap of the animated poster (Figure 12, b), the results show that we kept the background of the poster and even drew more attention to it.

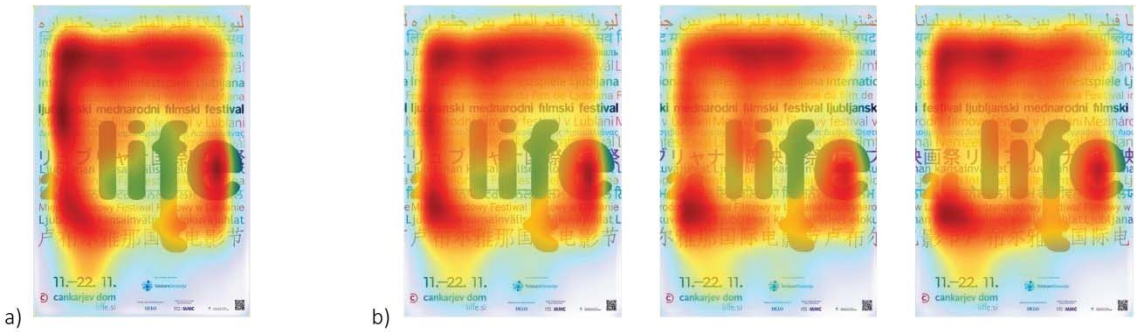

Figure 12: Heatmaps of the: a) static poster and b) animated poster for the 26th LIFFe

In a poster *Abonmaji* we are confronted with a large amount of information that needs to be communicated to the observer. All the elements of the poster are typographic and expressed with a linear font, which makes it even more difficult to bring movement into the poster so that certain information does not overshadow the others. The only exception is the logo of Cankarjev dom, which is quite large and displayed in a vivid orange colour. The heatmap of the static poster (Figure 13, a) shows that the logotype and the letter "O" in the word "ABONMAJI" are the areas with the greatest concentration of views and therefore attract more attention from the start. When creating an animated poster, we mainly wanted to shift the focus from the logo to the letter "A" in the word "ABONMAJI", which is not so clearly visible in the heatmap of the static poster. For this purpose we animated only the main word "ABONMAJI" in bold black letters to make it larger and stand out from the rest of the design. As can be seen in the heatmap of the animated poster (Figure 13, b), the logotype is still the most viewed area due to its colour and size. The concentration of views has shifted slightly due to other parts of the design. The other elements are coloured in roughly the same shades of orange as in the heatmap of the static poster, which means that the hierarchy of the poster has remained unchanged and the movement of the text in the background has not overtaken the main message of the poster.

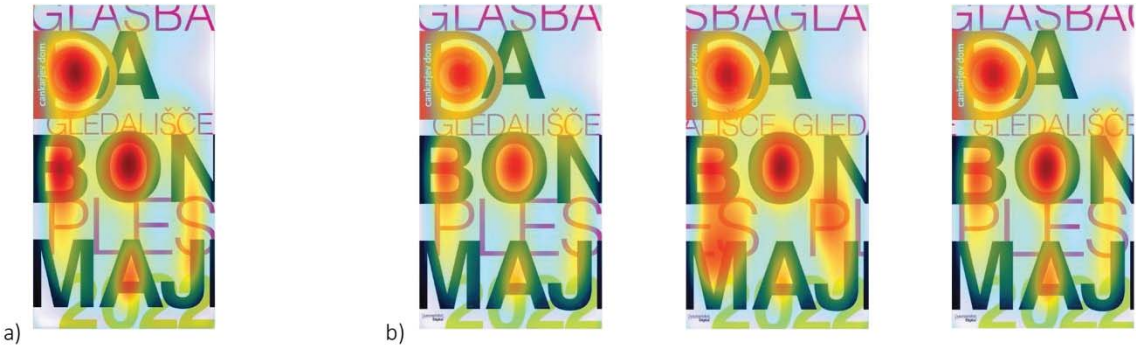

Figure 13: Heatmaps of the: a) static poster and b) animated poster for the Abonmaji

The static poster for the theatre performance *Veličastni* is designed in such a way that the dancers in the photo are in the foreground and immediately convey the main content of the image to the observer. The analysis of the heatmap (Figure 14, a) only confirms this idea, because the place where the two figures are located is also the place with the highest concentration of views. The area where the name of the ballet company and the title of the show are located is also very attention-grabbing for the observer. In contrast, the area where the date of the event is displayed is the least visible spot. When creating the animation, we took into account the fact that there are a large number of different elements on the poster itself. The movement was created with the aim of representing the magic and impression that a ballet performance leaves on the audience. We recreated a beam of light moving slowly across the poster as if it were following the dancers on stage. With this kind of movement, where only a small part of the poster was visible at a time, we forced the viewer to follow the light and gradually absorb the information shown. The heatmap of the animated poster (Figure 14, b) shows that the concertation of gazes moves with the animation through the entire content of the poster. In this way we have limited the visible area of the poster and allowed the observer to perceive only individual pieces of information at a time.

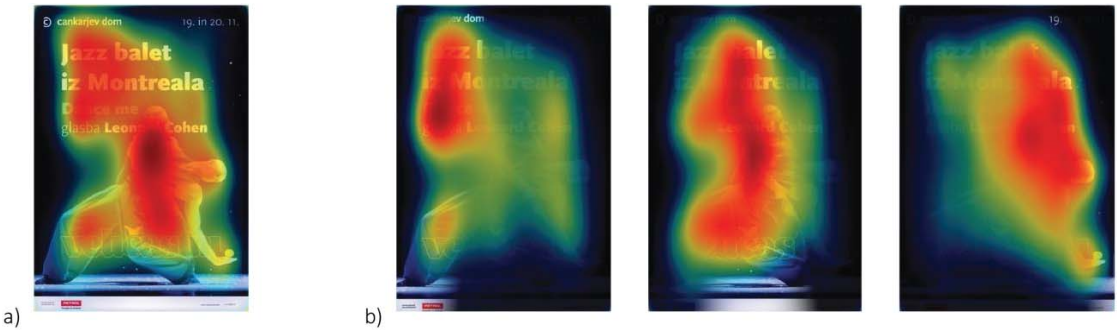

Figure 14: Heatmaps of the: a) static poster and b) animated poster for the Veličastni

The designer of the static poster for the *Nikola Tesla* exhibition wanted above all to emphasise the static look of the inventor himself, while at the same time drawing attention with the intense neon lettering and the bright lightning bolts in the upper part of the poster. After generating a heatmap (Figure 15, a) for a static poster, the results show that the area with the highest concentration of views is Nikola's eyes and the area around the logo in the bottom right. When creating the animated version of the poster, we took into account the desired hierarchy, which we emphasised even more by adding movement. In the first frame of the animation, the background is darkened, but just enough so that Tesla's gaze can still be seen. This is the first and most important element that stands out on the poster, just enough to catch the observer's attention. Later, two smaller lightning bolts appear on the screen, hinting at what is about to come. At the same time, the movement of the lightning does not occupy the viewer's attention, which is confirmed by the heatmap of the animation poster (Figure 15, b). As the animation progresses, more and more flashes appear and the neon sign begins to flash, drawing attention to the upper part of the poster. The animation therefore added a certain aesthetic effect, it did not disturb the primary poster hierarchy, but presented the poster in a more interesting and engaging way.

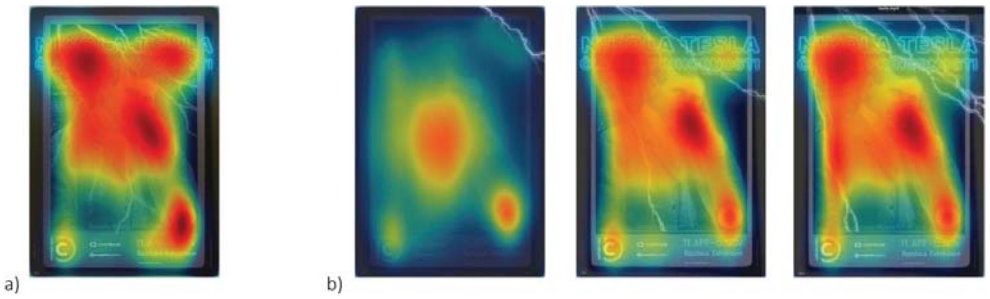

Figure 15: Heatmaps of the: a) static poster and b) animated poster for the Exhebition of Nikola Tesla

3.2 Online survey

For each version of the survey, we received 30 responses, which means that a total of 60 participants took part in the survey. The two surveys were designed in such a way that the respondent was first shown each poster, with the additional option of rating the likeability of the poster. After that, there was always a follow-up question that referred to some contextual information of the poster, such as: "Who is the composer of the music?" or "What day does the event start?". In this way, we wanted to check whether animated posters attract more attention and convey information more effectively. We checked how much information respondents remembered after viewing the poster and whether the results were more accurate for animated posters compared to static ones.

First, we showed both groups of participants a poster of *Nikola Tesla*. In survey 1, we presented participants with a static version of the *Nikola Tesla* poster. Most respondents chose a rating of 4 (40.00%) on a likability scale of 1 to 5. Compared to the animated poster in survey 2, most respondents chose a rating of 5 (50.00%). Overall, the results showed that participants liked the animated poster much better than the static poster. Next, participants were asked what the subtitle of the poster was, choosing between three different answers. For the static poster, 26 people (86.67%) chose the correct answer, while for the animated poster, 28 people (93.33%) chose the correct answer.

In the following part of the survey we presented the *Veličastni* poster to the respondents. In this case, the static version of the poster was rated best by 5 people (13.33%), while the animated version of the poster was rated a 5 by 9 respondents (30.00%), which means that the respondents liked the animated poster better. Next, respondents were asked who the author of the music was, with a choice of four different authors. The correct answer was chosen by 17 people (56.67%) for the static version of the poster, while 25 people (83.33%) gave the correct answer for the animated version. The poster is designed in such a way that the beam of light gradually reveals the content of the poster so that the viewer can perceive the information step by step and thus memorise it better. This is the reason why the viewers paid more attention to the information when looking at the animated version of the poster.

In the third set, the poster for *Abonmaji* was shown. Participants rated the static poster with an average score of 3. For the animated version, most respondents chose a rating of 4 (40.00%) and a rating of 3 (33.33%). The results show that the results are quite similar and the animation does not have a decisive influence on the likeability of the poster. Next, we asked the participants about the artistic areas listed on the poster. They could choose between three different answers, with 70% of the respondents who looked at the static poster answering correctly, i.e. 21 people. For the animated poster, 24 people (80.00%) chose the correct answer. The movement on the poster helped the observer to better memorise a particular piece of information.

The static design of the *20th LIFFe* poster was rated 3 by 50% of the respondents, 8 respondents (26.67%) chose 5 and 7 respondents (23.33%) chose 4. The animated image of the poster was most often rated 3 (36.67%), with 8 respondents (26.67%) also choosing the highest rating here. It can be seen that the results are very similar and that the movement did not affect the likeability of the posters. Respondents were then asked which of the words on the poster was upright and written in orange. For the static poster, 16 respondents (53.33%) chose the correct answer. The animation was designed to show the content of the poster step by step. We conclude that this type of motion placement has a good effect on the observer's perception, as the animated poster performed significantly better. In fact, respondents who were shown the animated format answered correctly more often: a total of 21 (70.00%) respondents chose the correct word.

In the final section, participants were presented with the poster of the *26th LIFFe*. The liking of the static design of the poster was mostly rated as 4 (36.67%), followed by 3, which was chosen by eight

respondents (26.67%). For the animated poster, most respondents chose a rating of 4 (33.33%), followed by 3 (30.00%). Five people gave both posters the highest rating of 5. Participants rated the two versions of the poster quite similarly, with a slight preference for the static poster. Participants were asked when the festival would take place. They could choose between three different answers, with 14 (46.67%) respondents answering the static poster correctly. The 56.67% of participants who were shown the animated poster answered correctly. This suggests that the animated poster conveys the information better.

We then asked respondents whether they thought that in a real environment the animated posters would be noticed more quickly than the static ones. Only 54 respondents answered the question, but 46 (85.00%) of them answered "yes". In the last question, we asked the respondents for their opinion about the movement on the poster. The majority, 27 (45.00%), think that an animated poster is noticed faster than a static one because of the movement. Six (10.00%) of the respondents think that the movement on the poster is distracting. 17% of the respondents think that the information on the poster is perceived faster because of the movement, while 5% of the respondents say that the movement has no influence on the information presented to the viewer. 14 respondents (23.00%) agreed with the statement that movement adds aesthetic value to the poster.

4. DISCUSSION

Predictive eye-tracking results include heatmaps of static and animated posters. The main purpose of this type of testing was to see if we could draw attention to important areas of content that are otherwise neglected by adding motion to the poster in an appropriate way. To this end, we have already provided improvements in the design of the animated posters and focused on improving the functionality of the poster rather than just adding a visual effect. At the same time, we had to be careful not to destroy the purpose of the poster by adding more elements to it. With the first poster for the *20th LIFFe*, we realised that the added animations only improved the hierarchy of the stop-gaze. Indeed, the nature of the animation gradually reveals the different parts of the content, which also allows the observer to focus their gaze on important information about the event - the date and the name - that was not sufficiently highlighted on the static poster. For the *26th LIFFe* poster, we added an animation to the back of the poster, as we assumed that the strong black lettering in the foreground would attract too much attention. It turned out that in both cases the attention was already drawn to the background and that the movement spreads the view evenly over the whole poster. For the *Abonmaji* poster, we wanted to highlight the main message - the word "ABONMAJI" - through animation. On the static poster, most of the attention was focused on the central "O", but by animating the central word, we were able to soften the focus of attention a little and draw a little more attention to the other letters in the word. Unfortunately, the difference was not that obvious, probably due to the high saturation of the poster with colours and the use of linear typography for all texts on the poster. With the animated version of the *Veličastni* poster, we wanted to divert attention a little from the central motif of the dancers. By using a beam of light that travelled across the poster, illuminating only one part of the poster at a time, we were able to force the viewer's gaze to also focus on the date of the performance and the name of the music composer. This made the viewer more informed and successfully integrated the animation into the poster. On the *Nikola Tesla* poster, we used the animation to first darken the content, just enough to show Tesla's gaze through the blackness, which remains the first and most important element. Next, the lightning bolts appear in the poster, also capturing the viewer's gaze, and the exhibition information at the very bottom of the poster is a little less noticeable.

Analysis of the heatmaps suggests that the added movement sometimes adds value by increasing interest in the poster itself or holding the viewer's attention. The most successful results were achieved with the *20th LIFFe* poster and the *Veličastni* poster, where we also drew the focus to the parts of the poster that contain important information but did not receive the desired attention in the static version.

The survey showed that in most cases the participants rated the animated poster better than the static one in terms of attractiveness. The exception is the poster for the *20th LIFFe*, where respondents rated the static version as slightly more appealing. The biggest difference can be seen in the posters for *Veličastni* and *Nikola Tesla*, where respondents liked the animated versions much better. Another indicator of the animation's success was checking participants' retention by answering questions about the posters' content. Overall, the animation achieved the desired results, as in all cases respondents were more likely to give the correct answers when viewing the animated poster than when viewing the static poster. This data demonstrates the successful integration of animation into the design and the

importance of this type of work in communicating the poster content. The biggest difference was observed in the case of the *Veličastni* poster, where 56.67% of the observers answered the static poster correctly, while 83.33% gave correct answers to the animated version of the poster.

5. CONCLUSIONS

One of the main reasons why animated posters are still fairly unexplored is that they are still a relatively new advertising method and therefore not widely used. However, the main reason lies in the difficulty of verifying their effectiveness, i.e. measuring their impact on the viewer. Nevertheless, the success of the research is confirmed by predictive eye-tracking results and survey data. The main objective of the work was to investigate whether poster animation can serve as a tool to improve communication and increase the viewer's level of information. Nowadays we are surrounded by a large amount of information and it is necessary to find new and user-friendly ways to simplify, facilitate and speed up the communication process without getting lost in the information overload.
Using predictive eye-tracking analysis, we have shown that animation affects the observer's perception of the data. At the same time, we found how important additional movements are, which can completely change the hierarchy of the presented content. In most cases, the added animation also successfully drew attention to important parts of the poster that might otherwise have been overlooked. From the survey, we concluded that observers find the movement attractive and it engages their interest. The results of the survey also confirmed the important finding that the transformation of static posters into animations was well thought out, which helped the viewer to perceive and retain the information better. In all cases, it was found that the content, i.e. the information about the events, was better remembered by viewers of animated posters. The inclusion of carefully selected movements therefore increases the possibility of better presentation and communication of the poster content.

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