2D PSA on Essential Oils Usage and Its Effects on Children's Hormonal Growth

2D PSA on essential oil effects on children's hormon and how to use them responsibly

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***Abstract*— Essential oils are concentrated extracts of plants, specifically their flowers, leaves, and fruits. These extracts are usually made through the process of distillation or cold pressing. In fact, "essential" means that the oil is a key to the character of the plant itself. They can be used for aromatherapy and cosmetic purposes, among other things. They also have a strong odour, which is why they are utilised in food flavourings and perfumery. For many people, specifically in Malaysia, the idea of using essential oils is a new concept. The essential oil industry appears to be thriving as a result of self-care and pampering practices, as sales of candles, aromatherapy, and detox products have increased significantly since the COVID-19 pandemic. The study of essential oils' health impacts is still ongoing, and it is still too early to know how they function and what their long-term implications might be. However, according to a new study published in 2018, the components in lavender and tea tree oils can disrupt the hormonal system in children. As a result, the aim of this research is to produce a 2D animated video public service announcement (PSA) based on the ADDIE model framework that explains the impact of Lavender and Tea tree Oils on children's hormonal growth. This study also aims to raise awareness among Malaysian parents about the impact on their children's endocrine systems.**

Keywords—2D video PSA; essential oils; lavender oil; tea tree oil; children's hormonal growth

I. INTRODUCTION

According to Preedy[1], essential oil steam distillation is used to extract fragrant, volatile liquids from plant material, which are then called after the plant from which they were extracted. Essential oils are made up of fragrant compounds or combinations of fragrant and odourless substances that have a pleasant scent. Typically, these aromatic compounds are chemically pure molecules that are extremely volatile when exposed to normal environmental circumstances. Essential oils differ substantially from one another, occasionally as a result of inherited factors but more often as a result of environmental factors such as climate, rainfall, and geographical origin. Essential oils have a wide range of applications. They are widely used in cosmetics and perfumes, but they also have medicinal and different agricultural applications due to their antibacterial and antioxidant qualities.

Lavender oil (LO) and tea tree oil (TTO), two of the most frequently used essential oils in aromatherapy, which will be the focus of this study, may provide a variety of health and skin advantages. LO may help you sleep better and feel less nervous, while TTO may assist with acne and other skin concerns. They are found in a number of products advertised as natural ingredients. While the use of LO and/or TTO-containing personal care products (such as shampoo, lotion, soap, and facial cleanser) is likely safe for the majority of adults, it may not be suitable for children who have not yet reached puberty. While more research needs to be done to further verify these implications, preventative steps need to be followed. As a result, these 2D animated Public Service Announcement (PSA) videos were created to share information and raise awareness among users in Malaysia, particularly parents or those with children.

2D (two-dimensional digital images using software) animated video PSA was chosen because it is effective when there is a need to grab instant attention. Its most prevalent use is in the production of cartoon episodes. As the creation of 2D animated videos is regarded an efficient technique for conveying a specific message to a target audience, its popularity is progressively dominating the PSA industry. Its simplicity and comprehensibility for the audience make it more popular than others.

To summarise, videos are gaining traction in business and have the capacity to influence managerial decisions. This is true for everybody, regardless of age, but is especially prominent among younger generations. According to a Nielsen survey conducted on behalf of Google, more Americans aged 18–49 watch YouTube weekly than all cable television networks combined [2]. Explainers are less frequently used than regular films, which makes them stand out. Simultaneously, if they are produced properly, they immerse the viewer in the storyline from the first second. And literally seconds are at stake. According to Chartbeat CEO [3], internet users choose whether to stay on a website or leave after an average of 15 seconds.

As the examples above demonstrate, a well-crafted animation may be a long-term investment that pays off in the shape of leads or multiplied earnings. To begin, the key to a

successful explanation video is a compelling story. Without appropriate content, a nice image will remain just that: a nice image. It will have the opposite effect of encouraging customers to collaborate. Second, the animation must be tailored to the intended audience. Each of the PSA videos offered here was created with a specific target in mind. Nothing about this is accidental: the graphic style, the duration of the animation, the voice of the narrator. Preparation is required to communicate complicated and complex problems in a clear and appealing manner. As a result, the first stages of animation creation are critical. With those in mind, 2D animated video has been chosen to easily reach a potential audience because it has a dynamic effect on the target audience and visually facilitates the presentation of knowledge.

There has been little published data on the effects of their use until recently. However, one study discovered that personal care products containing these oils might alter hormone function, particularly in children's hormonal development. In a 2007 study published in the New England Journal of Medicine, regular use of products containing LO and or TTO was linked to an elevated risk of prepubertal gynecomastia (a disorder that is characterised by enlarged breast tissue in boys prior to puberty) [4]. A team of paediatric endocrinologists at the University of Colorado in Denver and the Health Science Center's School of Medicine discovered gynecomastia in three otherwise healthy boys prior to the trial (ages four, seven, and ten) [5]. Each of the three boys had used lavender- scented soaps and lotions, as well as tea tree and lavender- infused shampoos and styling products.

Given these facts, it was considered that LO and TTO were endocrine disruptors (chemicals that interfere with the body's glandular system and the hormones it generates). Five of twenty-five individuals with gynecomastia or early thelarche (the beginning of breast development at the onset of puberty) were exposed to LO- containing products throughout the course of a seven-year trial, according to a group of clinical researchers in 2018. After the exposure was stopped, the condition was resolved. "Continual use of LO scent products were constant across these clinical instances, and when exposure was discontinued, breast tissue retreated in all cases," Korach and colleagues said in their study[5]. Prior to the aforementioned study, there were little to no studies for reference, making this study a big surprise and a significant advance for endocrinologists and consumers alike.

As such, this project is focused on the development a 2D animated video PSA about the usage of essential oil in Malaysia and its effect. The animated video PSA is hoped to spread awareness on essential oil's impact on children's hormonal growth. The final objective of this study is to evaluate the effectiveness of the video PSA in terms of information delivery.

III. Literature Review

While there are many 2D animated video PSAs accessible, there are only a few on essential oils, let alone one that explains the effects on children's development. Several resources for this research are available; however, just a few stand out when compared. This emphasizes the need to develop one that combines the most recent research findings in order to enlighten consumers is emphasized by this. Information, stories, and education are being shared worldwide through animation, which has evolved into one of the most popular means for doing so. Incorporating animation into daily life is becoming increasingly popular among people. Because it is a distinctive mode of communication, animation is becoming increasingly common in multimedia products.

Recently, animation has surpassed all other visual communication tools as the most widely used visual communication technique. Growing demand for animated videos has resulted in an increase in the popularity of animations, which has developed in tandem with the introduction of new technology and breakthroughs in computer-generated images. Furthermore, multimedia has a wide range of applications spanning from entertainment to research.

A. Multimedia Techniques

2D animation, as a multimedia technique, has its own structure and qualities, just as each other kind of media has in its own right. A number of different components, such as video, sound, text, and graphics, are included. Each of them is subject to a set of principles and laws that apply to them. As a result, when combining several technologies and processes into a single project, it is required to use specialized techniques and technologies.

As a result, we have 2D animation, which serves as a multimedia information medium, transferring information from the creator to the audience through visual features and audio (both linear and non-linear). With 2D animation video PSAs, the audience will get more than just a fleeting glance at moving pictures or music; instead, the audience will be able to perceive the world from quite a different perspective. This format also has a high level of engagement with viewers of all ages.

A study by Zaman stated that animation is a graphic representation of drawings that shows movement within those drawings[6]. According to another study by Anderson[7], animation is a series of linked and subtly altered paintings that are replayed in fast succession, giving the impression that the movements in the painting are seamless (24 frames per second). Animation can be classified as 2D, 3D, a blend of 2D and 3D, or metamorphosis in an interactive multimedia system [8].

Aside from that, they seem to be alive and moving, which might emphasize performance in order to engage and capture viewers' attention. The study also stated that animations, like objects, may have similar visualization methods[8]. The graphical presentation of information with the goal of giving the viewer information contents for qualitative interpretation is known as visualization [9].

It is vital to research what the viewers know, particularly in the context of educating, in order to build a compelling visualization. To provide viewers with the same or more outstanding quality of experience than traditional teaching techniques, multimedia learning environments must be used to be educationally effective [10]. As a result, the best system will be able to improve and enhance the quality of learning for viewers.

B. Video

Younger audiences have taken to using the phrase "explainer videos" to describe how their products or services performed. Informative video explainers are short, informative videos that integrate a compelling narrative with a range of animated visual and text elements, as well as a carefully chosen music tone, to create a piece of media that is both educational and interesting to watch.

In comparison to a video consisting just of static images and text, animated videos are more efficient at capturing and retaining viewers, making them excellent tools for educating and providing information in a fun, creative, and motivating manner. When it comes to explaining complex concepts, video explainers are a popular presentation format because they are easy to understand and accept by audiences.

Most e-Learning and MOOC (Massive Open Online Courses) platforms, as well as social media, incorporate video explainers of various types into their content to achieve specific marketing objectives.

C. Case Studies

Fig. 1: Essential oil and how to use them safely

Essential oils and how to use them safely are discussed in the video above [11] which is one of the few available on the subject. However, it does not specifically address the influence on children's endocrine systems.

The character that appears throughout the video is inconsistent, displaying a number of various art styles and colour schemes throughout the video. The use of background music and narration, on the other hand, was great, and there were no sound effects to keep viewers engaged.

Overall, the video had significant transitions and has a lot of potential; yet it appeared to require a little polishing to be even better.

Fig. 2: 2D Animation PSA: In Depth of Halal (Part 1)

As previously indicated in this paper, there are very few to no animated videos available on this subject. Due to a lack of knowledge on this subject, the researcher decided to produce a 2D video PSA to educate and inform consumers, particularly parents and their children, who will be directly impacted. In terms of production, the video, as mentioned above [12], falls flat, even though the premise and narrative surrounding the halal debate have the potential to be intriguing. The producers created a character to interact within the video, which aided the flat style animation and might be improved to make it more interesting. In this video, the audio quality is excellent because the producers included appropriate background music, a clear narrative, and the presence of sound effects to aid in the educational process.

Fig. 3: How Aromatherapy Works

The above video referenced [13] utilized an excellent blend of captivating colour schemes, a well- written script, clear narration and the auditory tone of this video is also very precise, sounding like it was intended for a targeted audience, which is their adult consumers. The animation style was also consistent throughout the whole video, which helped it to flow together cohesively. However, there is very little application of animation techniques used and very little to no text assistance in the video, so viewers must rely only on their hearing.

Fig. 4: 2D Animation PSA: Hygiene Self Care (Part 1)

The video titled "2D Animation PSA: Hygiene Self Care (part 1)" [14], is an example of what mediocre animated video PSA with 2D animations look like. The continuous utilization of characters and aesthetics that can be observed in this video and a clear narration are among the advantages that may be highlighted. Despite the fact that the creators were able to visualize the concept of taking care of our personal hygiene, the narration came off as rushed and a bit monotonous.

D. Comparison Table

Table 1: Comparison of existing 2d animated video PSAs

Feature	Essential Oils and How to Use Them Safely!	In-Depth of Halal	How Aromatherapy Works	2D Animation PSA: Hygiene Self Care
Theme	Average	Average	Excellent	Average
Colour scheme	Good	Average	Good	Average
Graphic style	Not consistent	Consistent	Consistent	Consistent
Animation / transition	Good	Average	Excellent	Poor
Sound effects	No	Yes	Yes	Yes
Narration	Good	Excellent	Excellent	Average
Background music	Good	Good	Excellent	Average

IV. METHODOLOGY

This chapter will describe and explain the research methods used to carry out this study. While there are several multimedia techniques and models available, the researcher for this study chose to use the analysis, design, development, implementation, and evaluation approach to create an effective visualization by designing and developing a 2D animated PSA video. These visualization design steps are summed up by the acronym ADDIE, and as a result, it is now considered as an instructional design approach. The history of instructional design dates back to the 1950s. ADDIE, on the other hand, was not created until 1975. ADDIE was developed by Florida State University's Center for Educational Technology and was primarily built for the United States Army [15]. It was later adopted by all branches of the United States Armed Forces. The objective was to finish each phase before going on to the next. Practitioners later updated the steps, and the model finally became more fluid and interactive (in a cyclical process) than the initial hierarchical version.

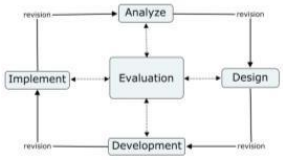

Fig. 5: Hierarchical version

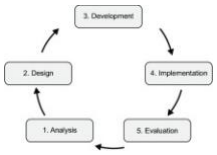

Fig. 6: Cyclical version

A. Analysis phase

Analysis might be considered as the main objective stage. The researcher's primary focus at this phase is on the intended audience. After consuming the produced content during this phase, the researcher needs to differentiate between what the audience already knows and what they should know. Additionally, it is here that the intended content considers the amount of competence and intelligence demonstrated by each user or viewer. This is to guarantee that users' prior knowledge is not replicated, and that the emphasis is instead placed on topics and information they have yet to explore and understand.

B. Design phase

A study by Arkün & Akkoyunlu [16] summarises that this is the procedure for determining the manner in which information will be acquired. This step establishes the development strategy based on the data acquired during the analysis phase and specifies how the objectives will be reached. In other words, this is the portion that explains the instructional technique, the learning activities, and the evaluation procedure. Throughout the analysis process, activities are divided into learning phases, enabling a more precise and straightforward implementation of the design. Throughout the design process, the researcher acquired details in the literature review that may be used to connect the study's findings. The 2D animation style, background music, audio, narrator, typeface, interface, colour, and graphic coordination of the video's theme and mood are all planned and created accordingly.

C. Development phase

The workflow of a multimedia project is always in a continuous loop. The process starts with an idea and then transforms the idea into the final product with multiple stages between each step, done by one or more people. This section will showcase the development process of the whole video production and how researcher workflow is.

Therefore, the author will be explaining how to prepare multimedia project design by understanding what software is used to create multimedia constructions. The section will go through video production steps, from choosing an idea to storyboarding to designing visuals and putting together every element.

Below are the different stages in the process:

- Conceptualizing (stage 1)

This stage is when the researcher starts to formulate an idea for the videos. It starts by making a list of everything that needs to be conveyed in the video. What is it about, who it is for, and what will it look like? With this primary preparation stage, the researcher will also be learning how to deliver the message clearly through the case studies.

- Storyboarding (stage 2)

This section will explain how to plan out a video so that it is easy to follow and visually engaging. There will be templates used for storyboarding the project's components. Each template will have its advantages and disadvantages.

- Designing visuals (stage 3)

The following section will explain how to design visuals through the proper use of software, such as Photoshop, After Effects and others. For this stage, each of the templates used in storyboarding is explained in detail so that the researcher knows exactly what they can do with the software creatively.

- Presenting findings (stage 4)

This stage is the last stage of the project design process, which involves ensuring everything is right before the actual production begins. The researcher will show the findings to someone else and get feedback and advice. For example, it would be good to set up a meeting with the supervisor.

- Putting everything together (stage 5)

The last section is about how to put all the parts together into a final product and see if the video created in this process is not just technically well-made but also has good storytelling elements.

D. Implementation phase

This stage is to create an animatic for the storyboard and storyline made in the previous phase. Animatics are a rough form of video that contains storyboards and scenes. They can be done as static or interactive animations which show different parts of the outcome.

According to Rhodes [17], an animatic is a preliminary sequence of shots, images, or sketches (as for a movie or an animated television program) that is filmed or arranged usually with a soundtrack and viewed to determine its effectiveness before being finalised.

It is a short video that served as the pilot and testing ground for the final production before it goes through the post-production stages.

These animatic videos are used as testable animation, and once the supervisor approves them, they will go through the post-production stages. The final phase was when the researcher completed alpha testing before being released to the target audience, and the final inspection was done on errors or glitches before the final process of sending out questionnaires to the target audience. During this phase, the videos that were produced were also released on the platform that was chosen, which was YouTube, for easy access. A website was also created in order to integrate all of the information and series into one location for the sake of convenience.

E. Evaluation phase

Evaluation is the procedure of systematically determining the value of a learning or training process by assessing criteria to a set of standards. The entire product is completed and ready for audience testing at this point. The researcher will assess how effectively the project meets its objectives. During this step, the researcher collected data from 30 Malaysian individuals, all of whom have or plan to use essential oil. The questionnaires designed specifically for this study were used to collect the samples. Following the evaluation, the researcher will be able to identify the project's strengths and weaknesses and whether the project successfully achieved the goals established beforehand by examining the responses to the questionnaires.

V. Prototype Development

This chapter provides an overview of the development stage of the proposed prototype. It will discuss in detail how the researcher comes up with ideas and concepts as well as determine the whole look and feel of the finalised product, which is the videos. This chapter will show the process of planning and visualising the idea in order to produce the final outcome. It will also underline the numerous updates and reworks that the researcher needs to go through during the prototype development process due to several barriers and constraints.

A. Project Design

A multimedia project's workflow is in a never-ending cycle. The process begins with a concept and progresses through numerous phases, each performed by one or more individuals, to produce the final output. This section will showcase the Design process of the whole video production and how researcher workflow is.

Therefore, the author will be explaining how to prepare multimedia project design by understanding what software is used to create multimedia constructions. The section will go through the phases of video creation, from coming up with a concept to storyboarding, creating graphics, and putting everything together

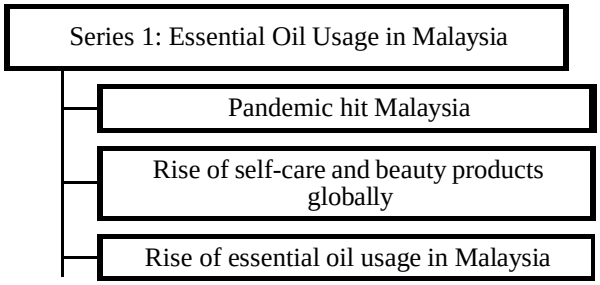

Fig. 9: Flowchart for Series 1

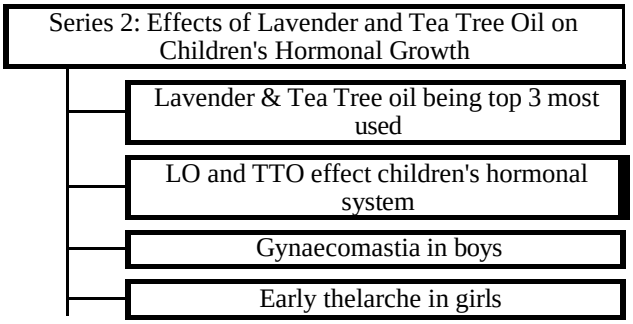

Fig. 10: Flowchart for Series 2

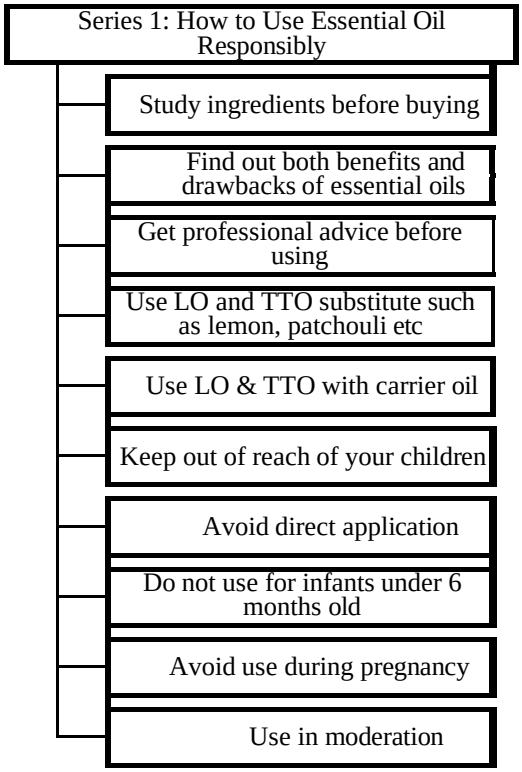

Fig. 11: Flowchart for Series 3

B. Early Sketches

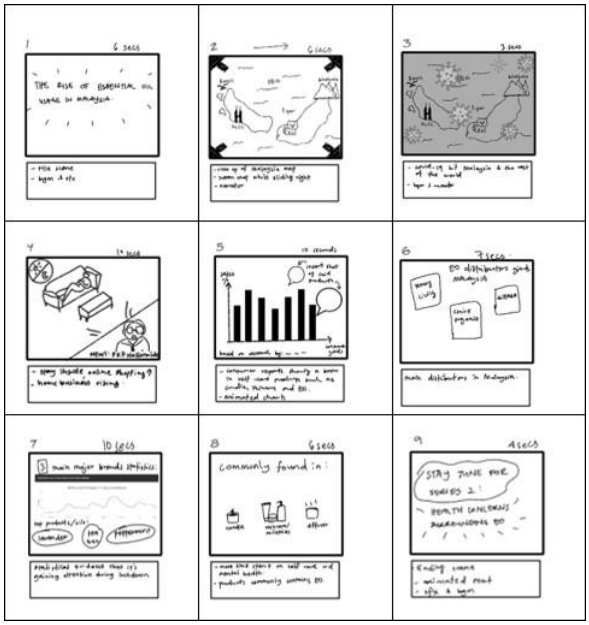

Fig. 12: Storyboard for Series 1

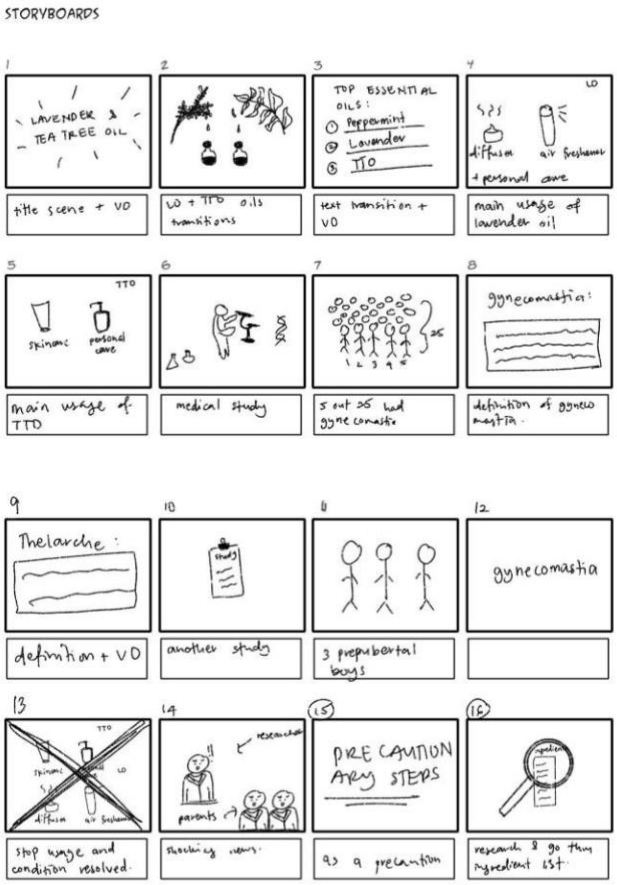

Fig. 13: Storyboard for Series 2

Fig. 14: Storyboard for Series 3

C. User Interface

Fig. 15: Color scheme used throughout the videos

Green and purple were chosen for their association with lavender and tea tree oil, while the remaining colours were chosen as complementary hues.

Fig. 16: Typeface used throughout the videos

VI. Testing and Result

To design and develop a high-quality multimedia project, the researcher must devote some time to testing and evaluating to determine the traits of an exemplary multimedia project development.

Evaluation determines whether the multimedia project meets the predetermined goals and whether recommended modifications are necessary to make the project effective for its intended audience.

A. Testing

- Alpha

The prototype was tested internally during phase one. This test was done when the prototype is ready. In phase two, adjustments and updates are implemented after discussion and completed alpha testing.

- Beta (Implementation and evaluation phase)

The implementation and evaluation phases are part of beta testing. In this stage, the final output, which is a three-series of PSA videos, is made available to the public for review. The researcher also collected data, and the audience will reflect and give relevant suggestions via the questionnaire.

B. Result

- Demographic

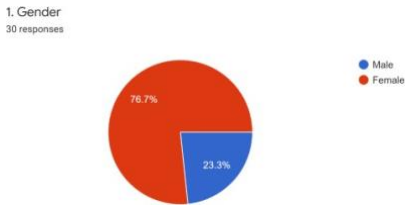

Fig. 17: Demographic

According to the results, there are 76.7% female respondents, while male respondents only make up 23.3% of the whole chart.

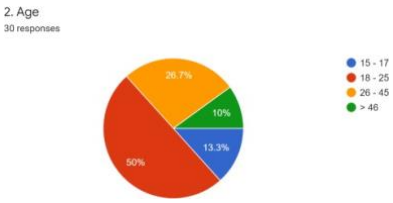

Fig. 18: Age

The pie chart depicts the age distribution of persons who participated in the survey. The majority of responders are between the ages of 18 and 25, making up fifty percent of the graph. 26.7% of the respondents are between the ages of 26 and 45, and 13.3% are high school students aged 15 to 17 years old. Those aged 46 and older who participated in the survey provided the fewest responses overall.

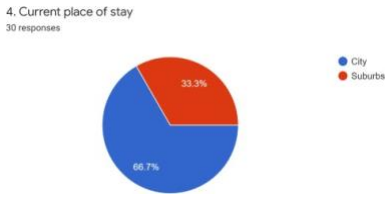

Fig. 19: Location

66.7% of those who responded to the survey live in the city, while 33.3% of them reside in the suburbs. This underlines the fact that the majority of essential oil consumers live in the city because the prices of essential oil goods were targeted toward individuals with incomes of this level

- Essential oil usage

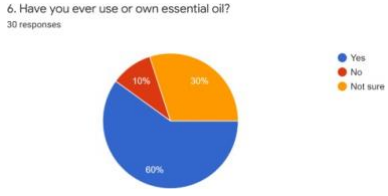

Fig. 20: Essential Oil Usage

60% of respondents admit having owned or used EO, while 30% of them are not sure whether they do or not. Only 10% of them had never used essential oil before.

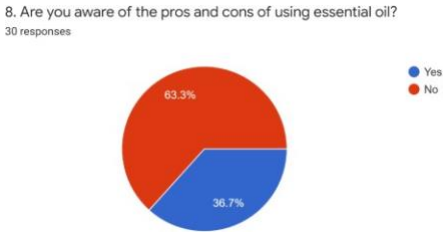

Fig. 21: Essential Oil awareness

From the survey, researcher found out that 63.3 percent of respondents who uses essential oils, did not know about the pros and cons of them. Only 36.7% of them answered yes. Making this project even more significant in order to spread awareness on the effects of LO and TTO on children's hormonal growth.

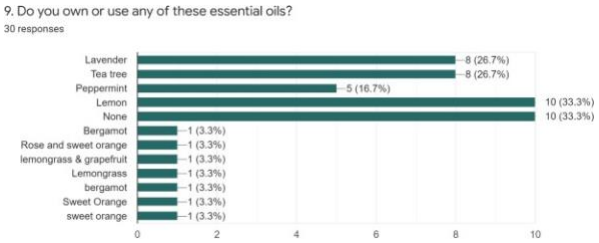

Fig. 22: Usage of specific essential oil

The results of this survey provide additional evidence that LO and TO are two of the top three essential oils, which highlights the significance of the production of this project.

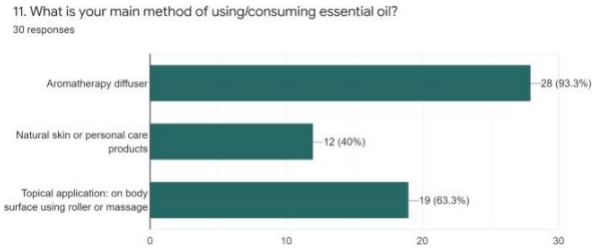

Fig. 23: Method of using essential oil

Based on the results of the survey, the researchers discovered that the most common way of using or consuming EO is through aromatherapy diffusers.

Diffusers expose users to prolonged EO exposure, which can lead to complications, especially if the oil in question is LO or TTO.

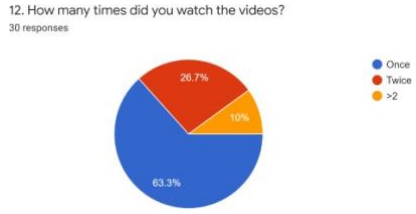

Fig. 24: Frequency of watching video

Most respondents spend times watching the series once. While 26.7% watched them twice and 10% watching more than twice. This indicates that the videos are both interesting (since some of them decided to replay), as well as informative enough (since they were only watched once).

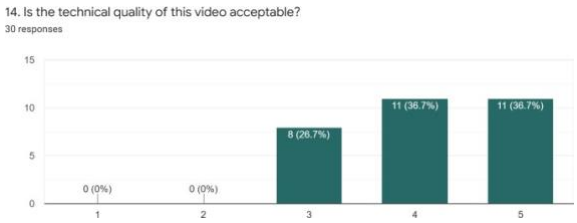

Fig. 25: Technical quality

The respondents give the videos a rating on a scale from bad to excellent. 36.7% of them gave the quality a rating of four out of five points, indicating that they were good enough but that there were rooms for improvements since 26.7% of them rated them as three out of five points

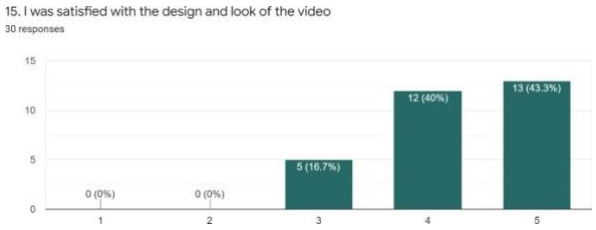

Fig. 26: Satisfaction on design

A little less than half of the respondents are in agreement that they are pleased with the overall quality of the video, while the remaining 16.7 percent have chosen to take a more neutral stance right in the middle.

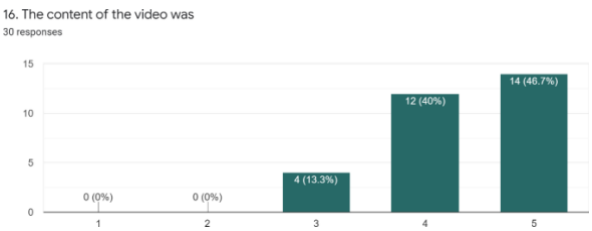

Fig. 27: Video content

In a scale ranging from very boring to very interesting, 46.7 percent of respondents said that they found the content of the videos to be very interesting. 40 percent of respondents selected Interesting, whereas only 14.3 percent of respondents thought the videos were satisfactory.

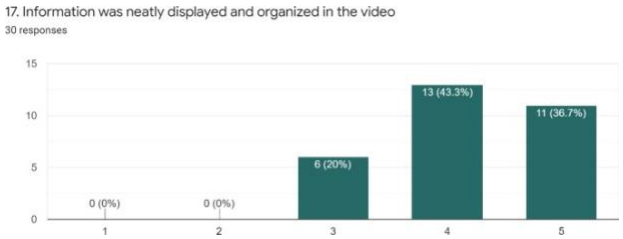

Fig. 28: Organization of information

36.7% of respondents strongly agree that the information was displayed and organised in an orderly manner in the video, while 43.3% agree with this statement. Around 20% of them think that it was just average overall.

- Effectiveness of the video

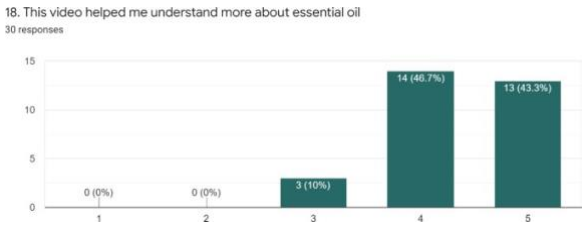

Fig. 29: Understanding of essential oil

Most of the respondents agree that the videos helped them understand more about EO. This is a promising development since it aligns with the goal of the researchers, which is to spread information on the LO and TTO effects so that more people are aware of them.

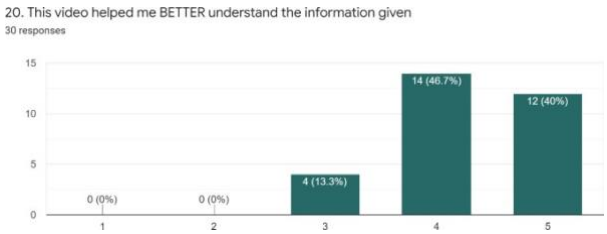

Fig. 30: Information delivery

In response to this question, the majority of respondents stated that they gained new information from the videos that were produced. This provides further evidence that there is a lack of knowledge on the effects of LO and TTO on children's hormonal growth, as the majority of respondents stated that the videos provide them with new knowledge.

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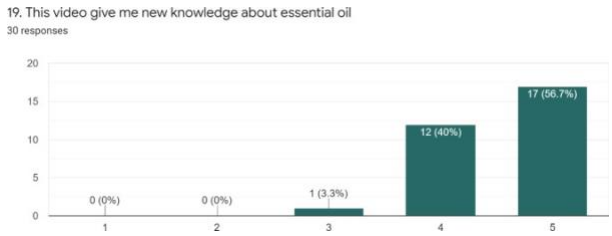

Fig. 31: Knowledge of essential oil

According to the results of the survey, the videos that were produced helped respondents better comprehend the subject matter since there are lots of multimedia elements incorporated in order to present information.

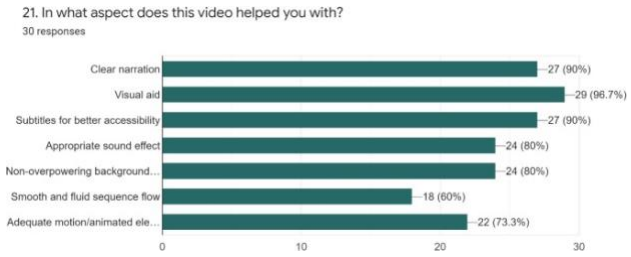

Fig. 32: Video features

When asked what part of the videos helped them most to comprehend new information, majority of them said that it was visual aid (96.7 percent), followed by subtitles for easier accessibility (90 percent), and clear narrative (90 percent). Other elements that contributed to the success of the video were sound effects that were effective in grabbing the audience's attention, background music that was not too dominant (so that the narrator's voice could be heard well), and adequate animations.

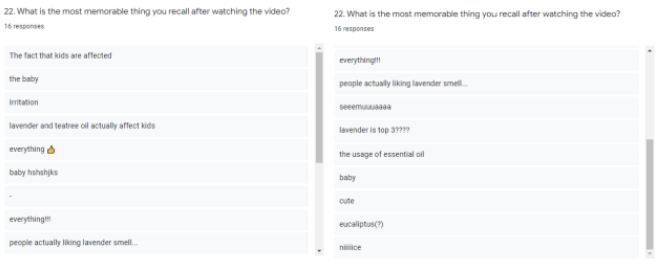

Fig. 33: Impression of video

Since this was an open-ended question, the researcher wanted to see what aspect of the videos had the most lasting impression on the respondents, and they received a variety of responses. This could provide as input on what aspects need to be improved and what aspects attract the most attention.

VI. CONCLUSION AND RECOMMENDATIONS

In this section, the researcher draws a conclusion on the projects after doing an analysis of the responses in the previous chapter. Due to some project limitations, this section will also feature a discussion of recommendations for future improvements and enhancements.

A. Recommendation

Since the nature of media is such that it is always advancing toward greater quality, it is possible that an updated version of this project may be made in 3D, given the fact that the current researcher has already completed the version in 2D. More studies on the effects of LO and TTO will be conducted by medical researchers over the course of time, and the new findings should be incorporated in the future series.

B. Conclusion

In summary, the three-part PSA video on essential oil use in Malaysia and its impacts on children's hormonal growth were a success due to a number of factors mentioned in the previous section. The project was successful in attaining the research aims regarding the dissemination of information and the efficiency of information delivery, as can be shown from the evaluations performed in section V. Future enhancements were also proposed to improve the project.

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Google commissioned Nielsen custom fusion study. Desktop, mobile and TV fusion. TV measurement of television distribution sources and total minutes watched. Reach among persons 18-49. Light TV viewers represent the bottom tercile of total TV watchers based on total minutes viewed.

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