

Raising Awareness of Environmental Crisis Caused by Textile Waste by Using 2-Dimensional Animation

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Abstract— The environmental crisis resulting from textile waste has become a pressing issue in contemporary society. This study aims to explore the potential of 2-dimensional (2D) animation as a powerful medium for raising awareness and promoting sustainable practices in textile consumption. The abstract discusses the rationale, methodology, and key findings of the research project. The research begins by examining the alarming rise in textile waste and its detrimental impact on the environment, encompassing issues such as pollution, resource depletion, and greenhouse gas emissions. It further investigates the lack of public awareness regarding these consequences and emphasizes the need for effective communication strategies to address this issue. Drawing upon the principles of visual communication and storytelling, the research employs 2D animation to engage and educate audiences about the environmental implications of textile waste. By leveraging the creative potential of animation, the study develops a series of animated short films that vividly illustrate the life cycle of textiles, from production to disposal, highlighting the adverse effects at each stage. Through a combination of qualitative and quantitative research methods, the effectiveness of animated films in raising awareness and influencing attitudes towards sustainable textile consumption is assessed. Pre- and post-viewing surveys, focus groups, and interviews are conducted to measure the impact of the animation on viewers' knowledge, perception, and behavioral intentions. The findings of the research reveal a significant positive correlation between exposure to animated films and increased awareness of the environmental crisis caused by textile waste. Participants reported heightened understanding of the issue, empathy towards the affected ecosystems, and a willingness to adopt more sustainable practices in their own textile consumption habits. This research contributes to the field by showcasing the power of 2D animation as an educational tool to address complex environmental challenges. The study highlights the importance of creative communication strategies in mobilizing public action and fostering a collective responsibility towards sustainable textile practices.

Keywords—textile waste, environmental crisis, 2-dimensional animation, awareness raising, sustainability, visual communication

I. INTRODUCTION

The global textile industry has witnessed unprecedented growth in recent decades, fueled by fast fashion trends and consumer demand for inexpensive clothing. However, this rapid

expansion has come at a staggering cost to the environment, as textile waste has become a major contributor to the ongoing environmental crisis. The detrimental effects of textile waste encompass a range of issues, including pollution, resource depletion, and greenhouse gas emissions.

Despite the severity of the problem, there is a lack of widespread awareness among the general public regarding the environmental consequences of textile waste. This knowledge gap presents a significant challenge in addressing and mitigating the impact of textile waste on the planet. It is crucial to develop effective communication strategies that can raise awareness, foster understanding, and encourage sustainable practices in textile consumption.

In recent years, animation has emerged as a powerful medium for communication, capable of capturing attention and delivering messages in a visually compelling and engaging manner. Animation has the unique ability to simplify complex concepts, convey emotions, and create memorable narratives. Leveraging the creative potential of animation, this study aims to explore its effectiveness in raising awareness of the environmental crisis caused by textile waste.

By utilizing 2-dimensional (2D) animation, the research seeks to capture the attention of viewers and take them on a visual journey that illustrates the life cycle of textiles, from their production to their eventual disposal. The animated films developed for this study will vividly depict the environmental consequences at each stage of the textile life cycle, providing viewers with a comprehensive understanding of the problem.

The objective of this research is not only to inform but also to elicit emotional responses and inspire behavioral change. By employing storytelling techniques, the animated films will aim to create empathy towards the affected ecosystems and motivate viewers to adopt more sustainable practices in their own textile consumption habits.

To evaluate the effectiveness of animated films in raising awareness and influencing attitudes, a mixed-methods approach will be employed. Pre- and post-viewing surveys, focus groups, and interviews will be conducted to measure the impact of the animation on participants' knowledge, perception, and behavioral intentions.

By exploring the potential of 2D animation as a tool for raising awareness and promoting sustainable textile practices, this research seeks to contribute to the field of environmental communication and inspire new strategies to address the pressing issue of textile waste. [1] Through effective visual storytelling, it is hoped that this study will contribute to a more informed and environmentally conscious society.

Overall, the aim of this research is to shed light on the environmental crisis caused by textile waste and to demonstrate the potential of 2D animation as a means to engage, educate, and inspire action towards a more sustainable future.

II. LITERATURE REVIEW

A. Public Service Awareness (PSA)

Public service awareness campaigns play a crucial role in disseminating information, promoting behavior change, and addressing various social issues. These campaigns aim to raise public awareness about critical topics such as health, safety, environmental concerns, and social justice. This literature review provides an overview of key studies and theories related to public service awareness campaigns, highlighting their impact, effectiveness, and factors that contribute to successful outcomes. [2]

Several theoretical frameworks guide the design and implementation of public service awareness campaigns. The Health Belief Model (HBM) suggests that individuals are more likely to adopt health-related behaviors if they perceive themselves as susceptible to a problem, perceive the problem as severe, believe that the recommended action is beneficial, and feel capable of taking the action. The Theory of Planned Behavior (TPB) emphasizes the role of attitudes, subjective norms, and perceived behavioral control in predicting behavior change. Social Cognitive Theory (SCT) focuses on the influence of observational learning, self-efficacy, and outcome expectations on behavior change. [3]

Numerous studies have demonstrated the positive impact of public service awareness campaigns on knowledge, attitudes, and behavior change. For example, campaigns promoting safe driving have been successful in increasing seatbelt usage, reducing drunk driving incidents, and improving compliance with traffic regulations. Anti-smoking campaigns have contributed to a decrease in smoking rates and increased awareness of the health risks associated with tobacco use. Similarly, campaigns addressing social issues such as gender equality, racial discrimination, and mental health stigma have led to increased awareness and positive shifts in societal attitudes.

Effective public service awareness campaigns share common characteristics. Clear communication objectives, tailored messaging, and targeted audience segmentation are crucial for maximizing campaign impact. The use of compelling narratives, emotional appeals, and relatable stories can effectively capture audience attention and evoke empathy. [4] Collaborations with trusted community leaders, influencers, and stakeholders can enhance campaign credibility and reach. Utilizing multiple channels and platforms, including traditional

media, social media, and interactive technologies, allows for wider dissemination and engagement. Furthermore, incorporating behavioral change techniques, such as goal setting, feedback, and incentives, can enhance campaign effectiveness.

Public service awareness campaigns face various challenges that may limit their effectiveness. Message fatigue, competing messages, and information overload can hinder audience engagement. [5] Limited resources and budget constraints may restrict campaign reach and frequency. Additionally, cultural and social factors, as well as audience diversity, necessitate campaign adaptation to ensure relevance and inclusivity. Evaluation and measurement of campaign impact can be complex, requiring robust methodologies and long-term follow-ups.

To overcome these challenges, strategic planning, formative research, and continuous evaluation are essential. Collaboration with key stakeholders, including target audiences, can facilitate campaign development and ensure relevance. Incorporating innovative approaches, such as gamification, user-generated content, and interactive experiences, can enhance audience participation and engagement.

B. 2-Dimensional Animation

2-dimensional (2D) animation is a dynamic and expressive form of visual storytelling that has been widely used in various industries, including film, advertising, education, and entertainment. This literature review provides an overview of key studies and research related to 2D animation, exploring its history, techniques, applications, and impact on audiences.

The evolution of 2D animation can be traced back to traditional hand-drawn animation techniques, where each frame is meticulously crafted by animators. [6] With advancements in technology, digital tools and software have revolutionized the animation process, enabling greater efficiency and flexibility. Techniques such as keyframing, tweening, and layering have enhanced the fluidity and realism of 2D animations.

2D animation finds applications in various fields. In the entertainment industry, animated films and television shows have captivated audiences of all ages, with the ability to transport viewers into imaginative worlds and convey complex narratives. In advertising and marketing, 2D animations are used to create compelling advertisements, explainer videos, and branded content that engage and inform consumers. In education, animations are employed to simplify complex concepts, making learning more accessible and engaging for students. Additionally, 2D animation is utilized in video games, interactive media, and virtual reality experiences to enhance user engagement and immersion.

Numerous studies have investigated the impact of 2D animation on audiences, particularly in terms of emotional engagement, cognitive processing, and information retention. Animation has been shown to evoke strong emotional responses, capture attention, and enhance information recall compared to static visuals or text alone. The dynamic and visually appealing nature of 2D animation can effectively convey complex ideas, making it a powerful tool for communication and storytelling.

The cognitive processes involved in perceiving and comprehending 2D animation have been explored in research. Animation's ability to create motion illusions through the persistence of vision and the Phi phenomenon plays a fundamental role in generating the illusion of movement. Studies have also examined how different animation techniques, timing, and character design influence viewers' emotional responses, attention allocation, and comprehension of narratives.

2D animation has significant cultural and artistic value. It has been used to preserve and showcase cultural heritage, folklore, and traditional storytelling techniques. Additionally, animation serves as a medium for creative expression, allowing artists to experiment with various styles, aesthetics, and narrative structures. Through its artistic versatility, 2D animation has contributed to the development of distinct visual languages and genres.

C. 7R in Fashion

The concept of the 7R's in fashion refers to a set of principles aimed at promoting sustainability and responsible consumption within the fashion industry. These principles guide individuals, businesses, and policymakers in making conscious choices that reduce the environmental impact of fashion production and consumption. The 7R's framework expands upon the traditional 3R's of Reduce, Reuse, and Recycle and incorporates additional principles to address the complexities of the fashion industry. [7]

Rethink: Encourages individuals and businesses to question the current fashion system and its unsustainable practices. This involves considering alternative approaches, such as embracing circular economy models and prioritizing sustainable materials and production processes.

Reduce: Focuses on minimizing the overall demand for fashion products by consuming less and avoiding excessive consumption. This can involve making mindful purchasing decisions, opting for timeless and durable clothing, and resisting fast fashion trends.

Repair: Promotes repairing and maintaining garments to extend their lifespan. This includes mending damaged items, altering clothing to fit better, and seeking professional repair services when needed. Repairing clothes reduces waste and maximizes the value and use of existing garments.

Reuse: Encourages the reuse of fashion items through various means. This can involve swapping or sharing clothes with others, participating in clothing rental or secondhand markets, or repurposing garments into new designs or accessories.

Recycle: Emphasizes the recycling of textile materials to divert them from landfills. This can be done through proper sorting and disposal of textile waste, supporting recycling initiatives, and choosing clothing made from recycled materials.

Responsible sourcing: Focuses on sourcing materials and products from sustainable and ethical suppliers. This includes selecting fabrics that have minimal environmental impact,

ensuring fair labor practices, and supporting brands that prioritize transparency and responsible sourcing throughout their supply chains.

Educate and raise awareness: Recognizes the importance of education and awareness in promoting sustainable fashion practices. This involves educating consumers about the environmental and social impacts of the fashion industry, providing information on sustainable alternatives, and promoting responsible choices.

By adopting the 7R's principles, the fashion industry can move towards a more sustainable and circular approach, reducing waste, conserving resources, and mitigating the negative impacts on the environment and society. These principles encourage a shift towards more conscious consumption patterns and foster a greater understanding of the interconnectedness between fashion, sustainability, and individual choices. [9]

D. Multimedia Elements

Multimedia elements refer to the integration of various media formats, such as text, images, audio, video, and interactive components, to create engaging and immersive content. This literature review provides an overview of key studies and research related to multimedia elements, exploring their impact on learning, communication, and user experience.

Research in multimedia learning focuses on how the integration of different media formats can enhance learning outcomes. The Cognitive Theory of Multimedia Learning suggests that combining visual and auditory information can improve comprehension, retention, and transfer of knowledge. Studies have shown that multimedia presentations, incorporating text, images, and animations, can facilitate deeper understanding, reduce cognitive load, and promote active engagement in the learning process.

Multimedia elements play a crucial role in capturing and maintaining attention. The Attentional Theory of Multimedia Learning suggests that engaging visuals and interactive components attract and sustain learners' attention. Research has shown that the inclusion of multimedia elements, such as videos and interactive simulations, can increase user engagement, motivation, and enjoyment of the learning experience.

Multimedia elements are widely used in communication and persuasion contexts. Studies have explored the impact of visuals, such as images and videos, on influencing attitudes, emotions, and behavior. Visual stimuli can evoke emotional responses, facilitate information processing, and enhance message recall. Additionally, interactive multimedia elements, such as gamification and virtual reality, have been found to be effective in engaging users and persuading them to adopt desired behaviors.

Multimedia elements need to be carefully considered in different cultural and contextual settings. Cultural factors, such as visual preferences, symbolism, and language, influence the interpretation and effectiveness of multimedia content. Contextual factors, including the medium of presentation, device capabilities, and user preferences, impact the design and

delivery of multimedia elements to ensure optimal user experience.

Multimedia elements have a significant impact on learning, communication, and user experience. The integration of various media formats enhances comprehension, attention, engagement, and knowledge retention. By understanding the cognitive processes, attentional mechanisms, and persuasive effects associated with multimedia elements, designers and educators can create more effective and engaging multimedia content. Cultural and contextual considerations further contribute to the customization and adaptation of multimedia elements to suit diverse audiences and contexts. The continued exploration and integration of multimedia elements contribute to advancements in learning technologies, communication strategies, and user-centered design practices.

III. METHODOLOGY

The ADDIE methodology is a widely used instructional design framework that stands for Analysis, Design, Development, Implementation, and Evaluation. [8] It provides a systematic and structured approach for designing and developing effective training and learning materials. Each phase of the ADDIE process focuses on specific activities and outcomes to ensure the creation of high-quality instructional content.

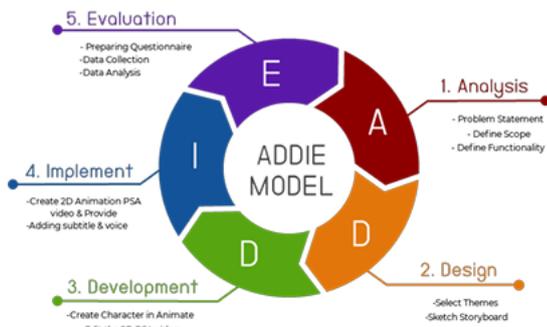


Figure 1. ADDIE Model

A. Analysis

In this phase, the instructional designers gather information to understand the needs, goals, and constraints of the learning project. This involves identifying the target audience, their characteristics, existing knowledge levels, learning preferences, and the specific learning objectives. It also includes analyzing the learning environment, resources, and any potential challenges that might affect the learning process. The main goal of this phase is to define the problem and set clear objectives. Avoid combining SI and CGS units, such as current in amperes and magnetic field in oersteds. This often leads to confusion because equations do not balance dimensionally. If you must use mixed units, clearly state the units for each quantity that you use in an equation.

B. Design

In the design phase, the information gathered during analysis is used to create a comprehensive instructional plan. This includes developing a detailed curriculum, designing the learning content, determining the instructional strategies, and creating the assessment methods. The design phase also involves structuring the content, sequencing the learning activities, and creating a storyboard or outline for the entire course or training program.

C. Development

During the development phase, the actual learning materials are created based on the design specifications. This phase includes writing content, creating visuals, developing interactive elements, and producing any multimedia components required for the course. It's important to ensure that the learning materials are engaging, accurate, and aligned with the learning objectives set in the earlier phases.

D. Implementation

The implementation phase involves rolling out the developed course or training program to the learners. This might involve conducting pilot tests with a small group of learners to identify any issues or areas for improvement. The instructional materials are delivered to the learners, and the learning activities are carried out according to the plan. Trainers or facilitators might be involved to guide learners through the content and activities.

E. Evaluation

The evaluation phase focuses on assessing the effectiveness of the instructional design and its impact on the learners. This can be done through various methods, such as assessing learner performance, gathering feedback from learners and instructors, and analyzing the learning outcomes against the initial objectives. Based on the evaluation results, adjustments and improvements are made to the instructional design for future iterations.

The ADDIE model emphasizes a systematic approach to instructional design, where each phase builds upon the previous one and informs the subsequent phase. This iterative process allows for continuous improvement of learning experiences over time. While the steps are presented in a linear order, it's important to note that the model is flexible and can be adapted based on the specific needs of the project and the learning environment.

IV. RESULT

A total of 28 questions were posed and answered by each respondent. The respondents who took that questionnaire online, and 41 responses gathered. The age range of the respondents were from 13 to 25 years old. The major goal of the testing is to see whether the information presented in the video is understandable and accepted by the audiences with the use of multimedia elements.

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Did the 2D PSA environmental crisis cause by textiles waste provide you enough information?
41 responses

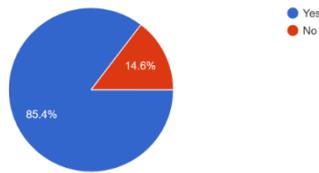


Figure 2. Question from the Questionnaire: Did the 2D PSA provide you with enough information on the topic?

Based on the response gathered, 85.4% or the respondents agree that the 2D PSA gave them enough information on the topic while the remaining 14.6% said otherwise.

Will you recommend this 2D animated PSA series to others?
41 responses

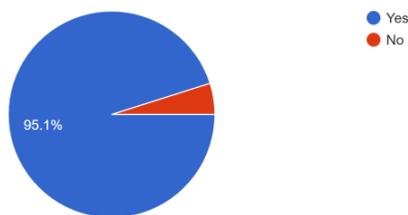


Figure 3.

Figure 3. Question from the Questionnaire: Will you recommend this 2D animated PSA series to others?

95.1% of the respondents respond that they will recommend this Public Service Awareness to the others, while the rest will not recommend this to the others.

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