

Eco-Easter Eggs: Production Design and Climate Change

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August 2022

DECLARATION PAGE

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ACKNOWLEDGMENTS

I want to express my sincere gratitude and appreciation to my supervisor Prof Pat Brereton. I want to thank the academics who participated in an online interview for my research project, namely Dr Liani Maasdorp, Prof Brian McCabe, Meagan Goodspeed and Georgina Shorter.

Thank you to the film practitioners willing to participate in the data collection interviews: Berman, Bunker, Cheyenne, Conroy, Donovan, Faber, Fox, Glogauer, Gramatky, Hodges, Hofeling, Kozlova, Mary, Melini, Mpsi, Ordonez, Ramsdalen and Verweij.

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ABSTRACT

Eco-Easter Eggs by Margot Maritz

This thesis uses concepts of climate change, sustainability, environmental ethics, zoomorphism and cognitive theory to ascertain whether it is possible to produce new forms of environmental awareness, evoke eco-conscious debate, inspire biocentric mindsets and provoke climate change innovation through fantasy films' production design alterations, additions and enhancement.

The study will explore potential new modes of eco-cinema by firstly discussing the fundamentals of climate change, along with the negative impact of the Anthropocene, and whether a biocentric transformation might positively speak to the climate crisis. These concepts will then be applied to various aspects of sustainability within film production workflow patterns. Secondly, a discussion on eco-cinema and the potential for subtextual and even explicit environmental awareness being embedded within a film, as inspirations for audiences' eco-conscious change. These discussions will specifically be applied to the production design of film.

Interpreting whether specific design elements of film, such as the design contrast highlighted in *Lord of the Rings*, recycling within *Harry Potter* and upcycling seashells in *Pirates of the Caribbean*, could constitute a new form of eco-cinema analysis, in communicating environmental awareness, eco-conscious perspectives and biocentric lifestyles. The thesis attempts to analyse the broad-ranging opinions of 57 global film industry members to help support a range of conclusions regarding sustainable production design and facing up to climate change.

In summary, the thesis will initially investigate how the film industry and filmmaking help contribute to and mitigate climate change and in particular, explore how production design can assist in provoking effective media content which foregrounds climate change debate and innovation. The research seeks to actively address film workflows and filmmakers' mindsets as they take on the challenge of using the power of film to help change audience behaviour and play its part in helping to save our planet.

CHAPTER 1: INTRODUCTION

1.1 Title

Eco-Easter Eggs: Production Design and Climate Change

1.2 Significance of research

The film industry is slowly becoming increasingly aware of the role they play in addressing and hopefully assisting in helping to prevent the worst excesses of climate change. This awareness is, however, not being realised fast enough. As filmmakers, we are responsible for producing films in an environmentally conscious manner, from pre-production to distribution. Together with creating eco-conscious filmmaking processes, film has the responsibility to address themes and concepts that reflect the situations and crises of today and filmmakers should thus aim to create awareness of current events such as the global climate crisis.

Should an audience member be asked which environmental film they have heard of, the answer may not get far beyond *An Inconvenient Truth* (the 2006 film directed by Davis Guggenheim). The films with the most potent environmental message are usually mainstream, big-budget films or animations. Animated films such as those directed by Andrew Stanton: *Wall-E* (2008) and *Finding Nemo* (2003). Audiences are exposed to eco-cinema while engaging with these films; however, is it enough? Melini (2021) states that he believes it is far more beneficial to speak on environmental issues via a cinematic experience than from a member of Greenpeace. Awareness of the environmental and climate crisis, together with how sustainable behaviour should take on a more critical role in decreasing climate impact and any effects caused by climate change.

As not much previous research has been produced regarding whether non-documentary films, particularly fantasy films, could provoke environmental awareness and evoke eco-conscious audience

perspectives, as climate change is probably the most extensive global challenge we face today. This research is vital to inform filmmakers about their ability to produce impactful eco-cinematic films without being considered too self-righteous. Ivakhiv (2013, p. 122) said studies of film tourism, for example, have shown how landscape depictions in films have increased the tourist traffic industry. For example, after the *Lord of the Rings* trilogy (directed by Peter Jackson from 2001 to 2003), the number of visitors to New Zealand increased by 30%. If a film has this much influence over the audience's travel agendas, an environmental agenda can be awakened in audiences by producing new forms of eco-cinema.

Therefore, this study will assess how such new forms of eco-cinema practice could be generated while remaining true to the director's vision and consisting of a subtle layer of subtextual environmentalism. Wille (2017) refers to Carroll (2003:139) that the purpose of production design is "primarily the creation of story world, stimulating imagery, style, visual metaphor and the extension of character traits in physical or virtual scenographic space supporting dramatic action and story idea". Production design has thus the ability to communicate more than just what the characters' narrative discloses. This study will specifically explore how production design could produce new forms of eco-cinema. According to Wille (2017), Tashiro (1998) explains that when examining production design, audiences can search for visual metaphors acting as visual subtext in the background of the action.

Finally, the research hopes to significantly ascertain new ways of creating environmental awareness that could assist in the development of audience environmental debate – developing a more sustainable perspective - and help promote climate action.

1.3 Research context

The current environmental crisis influences morality, attitudes and nature and is predominantly affected either by ignorance or a lack of proper

environmental education. Alternatively, it is due to the climate crisis's intentional disregard, as it does not suit a contemporary anthropocentric-driven- modern society. Creating proactive environmental awareness is vital to dealing with natural resource management and sustainable development (Omran, 2014, p. 141). Eco-cinema could be used as a method of environmental education to create awareness, communicate knowledge, help change attitudes regarding the environment, and recognise the impact human activities have on the natural surroundings. It can further be used to identify and help analyse environmental issues and hopefully provide new methods to solve these global challenges.

From pre-production to distribution, from consumption to recirculation, films - like other industries - are entangled in an environmental web. Whether it is the way a film is produced or the message, the audience receives. Films cannot be separated from the environment and, therefore from climate change. Films of all hues, from mainstream Hollywood to National cinemas, as well as a broad swathe of art-house and avant-garde films, help affect our imagination, habits, and ultimately our behaviour towards the environment. Additionally, the technology used during these manufacturing processes - such as lights, cameras and online streaming - all involve using natural resources that are depleting at an alarming rate.

Nevertheless, only recently, cinema's environmental implications have started to be examined (Rust, 2013). This research project is inspired by the researcher's undergraduate thesis, *Burnt Toast: The film industry and climate change*, which investigated how the film industry and filmmaking contribute to and mitigate climate change. Sustainable film industry workflows need to focus on ways to decrease its carbon footprint as well as how production design as a new form of eco-cinema activity, explored in this *Eco-easter eggs* project, might help mitigate the environmental crisis and assist in provoking climate change innovation.

McCabe (2019) said that “the earth is a closed dynamic system which means if you have burnt toast in your kitchen, you smell it around the house”. Climate change involves extreme variations in weather conditions comprising increased and decreased temperature (Global Change, 2019). It is the heating of the Earth’s atmosphere due to numerous human activities and resulting in damaging the Earth’s ecosystems.

The argument could be made that filmmakers and the film industry are responsible for creating films that will seek to mitigate climate change by developing audience awareness and hopefully inspiring action. However, to achieve this goal, the film industry needs to change its work processes to fit a biocentric mindset and workflow in order to become more sustainable, with a decreased carbon footprint and ultimately have a minor impact on climate change. For this study, a greater understanding of climate change, film, environmental ethics, and sustainability is vital before the importance of eco-cinema can be comprehended in both the narrative, visual and aesthetic sense.

Using narratives, production design, sounds and colour, cinema represents a powerful, multi-sensory encounter with the world we live in. Cinema affords its audiences the possibility of experiencing our world in a new way and gives insight into circumstances other than our own; through fantasy, fiction and documentary films (Maasdorp, 2021). In particular, the screenplay, production design, acting, cinematography, editing, and sound design form a unity of aesthetic engagement, contributing to setting the tone and actively conveying the story. Furthermore, production design helps create the story’s visual properties and specific representation through location, sets, props, and costumes. “By concentrating on the production design instead of putting all your focus into the equipment and camera, you are more likely to draw audiences in” (Lift-Off Global Network, 2017).

The study of *Eco-Easter eggs* will therefore focus on eco-cinema as an academic tool to assess how production design as a core film element can

assist in helping to adjust or transform anthropocentric behaviour into more sustainable biocentric behaviour. According to Brereton (2019, p. 9), anthropocentrism positions humans at the centre of the universe, whereas biocentrism alternatively assumes that all living creatures are equal and connected. Humans' egocentrism resulted in the dominance of the earth's environments to the detriment of all ecosystems. The Anthropocene refers to the era or period centred around human value and their dominance over non-humans (Kopnina, 2018, p. 109). Environmental ethical or biocentric mindsets and behaviour are the opposite of anthropocentric views and include concepts of sustainability, conservation and eco-conscious views. During an interview conducted for *Burnt Toast*, Brereton (2019) said that: "eco-cinema is a broad range of cinema that comments on environmental and eco issues in its subtext". Eco-cinema has the ability to provide subtle but candid messages and also serves to investigate situations where filmmakers, production companies, narratives and audiences communicate (Chu, 2016, p. 11).

According to Wille (2017), the production design is more than the physical design of film and has the ability to convey meaning through visual metaphors. Production design enhances a film and significantly promotes the film's theme. While creating a film, the screenwriter compiles a specific blueprint for the storyline, and the director then adds a distinct treatment of how the story should play out on screen. The elements of a film need to fit the style, mood, tone and message envisioned by the director.

Subtle adjustments and additions in production design that goes beyond what is strictly necessary for the 'digestion' of the film may have the ability to add an extra layer of biocentric meaning without jeopardising the integrity of the film. While simultaneously promoting eco-audience-engagement. It is essential for production design practices to be sustainable and implement an environmentally ethical work process before "eco-easter eggs" can be usefully inserted within a film.

This thesis will explore sustainable production design practices and examine whether production design as a new form of eco-cinema practice, especially within fantasy films, could provoke climate change innovation. In order to ascertain a thorough investigation, existing production design and changes in production design within animated and live-action fantasy films, in particular, will be discussed. Furthermore, production design will be analysed using concepts drawn from environmental ethical theory, alongside sustainability, cognition and zoomorphism.

Film illustrates a meaningful, constructed world where actions on-screen enable audiences' experiences to be replicated in reality (Ivakhiv, 2013, p. 11). "Easter eggs", through the use of zoomorphism highlighted in objects, props, buildings and sets, can be used as a cognitive nudge towards effective production design. Zoomorphism is the assignment of animalistic characteristics to humans and objects (Nanay, 2018). An example of zoomorphism is Jafar's staff designed within *Aladdin* (Guy Ritchie 2019); the staff resembles a snake. These are not hidden, subliminal messages that work on the subconscious but supraliminal stimuli that are perceived consciously and should therefore be approached both ethically and appropriately. They should be used in a way that makes the audience feel connected. For example, *I Am Legend* (directed by Francis Lawrence and production design by Naomi Shohan and David Lazan in 2007), during the Times Square hunting scene, Will Smith's character passes a billboard that advertised a Batman and Superman movie poster to be released in 2010 (Choudhury, 2015). This is an example of how Hollywood inserts an "easter egg" into a film to tease audiences about future schedules. Using the same method, focusing on environmental cues, it is possible to attract the audience's attention to biocentric messages that could, in turn, provoke environmental awareness, sustainable debate and perspectives, and even eco-conscious behaviour.

1.4 Research question

1.4.1 Main research question

How can filmic production design assist in provoking climate change debate and innovation?

1.4.1.1 Sub-questions

- Film and environmental messaging:
 - Is film an influential medium?
 - Can film communicate an environmental agenda?
 - Can film inspire audience behaviour?
 - Can filmic production design communicate additional information?
 - Can filmic production design imagery inspire audience lifestyle changes?

- *Production design as a potentially eco-cinematic practice*
 - How does the representation of landscapes/milieu in fantasy films help create new forms of eco-cinema?
 - How do props in fantasy films create eco-cinema?
 - How does set dressing in fantasy films create eco-cinema?

1.4.2 Secondary research question

How can the film industry and filmmaking help to mitigate against climate change?

1.4.2.1 Sub-questions

- *Sustainable production design workflow*
 - How can film decrease its carbon footprint?
 - How can production design be produced sustainably?
 - How can film promote sustainable behaviour?

1.5 Aims and objectives

1.5.1 Aims

The overall intention of the research is to determine whether production design can help provoke climate change innovation.

The aim will determine whether production design can be a potential new mode of eco-cinematic practice. To specify what enhancements and or changes in product design might be needed in order to ascertain if new forms of eco-cinema practice can be used as a strategy for engaging audiences in helping to see, understand and mitigate climate change transformation coupled with a more environmental-centred-production design workflow. The thesis seeks to inform and inspire filmmakers on sustainable practices, inspire the film industry to support a biocentric workflow, and influence filmmakers to create focused environmental agendas within their films by using eco-conscious production design principles.

1.5.2 Objectives

- A quantitative and qualitative online questionnaire will be completed by production designers and related practitioners for data analysis and interpretation. The selection of the respondents will be based

on a convenience sampling approach, and the aim is to have a sample size of 100 or more across continents.

- In addition to the questionnaire, an online interview with respondents will be performed for a more in-depth discussion in order to ascertain further opinions.
- A *Dune* case study will be conducted to evaluate how the film's existing themes and production design, as well as the opinions discovered within both the questionnaire and the interviews, convey robust environmental messaging.

1.6 Research methodology

1.6.1 Data collection

A mixed-method and case-study approach will be used to obtain the data for the research.

1.6.1.1 Online questionnaire

A quantitative and qualitative questionnaire - with members of the film industry - will gather information from respondents and determine whether production design can create environmental awareness. The intended sample size is 100, based on availability across continents. The sample will focus on production designers and related practitioners, as these are the individuals that are responsible for the visual design. Production designers, directors and producers are responsible for the overall sustainability of a film and certainly have the ability to influence how the film is made.

1.6.1.2 Online interview

The online interview will be conducted with willing questionnaire respondents. These interviewees will provide additional, more in-depth opinions and ideas surrounding production design concepts as a new strategy in the armory of supporting and developing new forms of eco-cinema. The interviews will ascertain whether fantasy film production design could communicate environmental awareness and, in turn, provoke the audience's biocentric perspectives and behaviour.

1.6.1.3 *Dune* case study

A case study of Denis Villeneuve's 2021 film *Dune* - will be conducted to assess whether the film could be characterised as a valuable model of eco-cinema and how production design could be used to produce a new form of eco-cinema. The case study will discuss existing themes, concepts and production design, as well as sustainable film practices and whether additional changes can be made in the production design. Opinions collected within both the questionnaire and the interviews will assist in the evaluation of *Dune*.

1.6.2 Data analysis

Open-ended questions and questions using the Likert Scale (1 strongly disagree, 2 disagree, 3 somewhat agree, 4 agree, and 5 strongly agree) will be used for the questionnaire. Qualitative questions will be included as they allow the respondent to answer and clarify in how much detail they wish. These qualitative questions will thus allow for comprehensive explanations in understanding sustainable production design elements and help to signal eco-cinematic strategies that might be designed for audience engagement.

An online interview with respondents will ascertain whether the production design in film has the ability to create environmental themes and a

potentially effective eco-cinematic practice. Lastly, the examination of *Dune* will be carried out using the tools of environmental ethics, sustainability and zoomorphism, while drawing on existing production design and concepts (production design that can be altered or enhanced) and non-existing production design (production design elements that can be added). The proposed suggestions regarding *Dune*'s production design will be partially influenced by the data gathered from the questionnaires and interviews.

1.6.2.1 Academic online interviews

The researcher has performed online interviews with academics for her primary research to expand on the information necessary and help support the literature review in Chapters 2 and 3. Online zoom interviews will be held with academics (refer to Appendix D), namely respondents with extensive knowledge regarding climate change, environmental ethics, sustainability, production design, biomimicry and zoomorphism. These interviews will focus on a general discussion around the set topic (refer to Appendix D).

1.7 Potential challenges

Changing anthropocentric perspectives, creating a more robust biocentric production design workflow and supporting the development of eco-aware films will be challenging. However, the filmmakers/the film industry should be fully aware of their carbon footprint, as well as other impacts on climate change and the environment. While many audiences 'learn better' from traditional anthropocentric engagement and the biocentric may be too 'radical' a notion for some to engage with. Furthermore, regarding the data collection process, finding willing participants could be a challenge since film industry practitioners have busy schedules, and additional unforeseen circumstances could arise.

1.8 Conclusion

This research project aims to provide an innovative outlook on the relationship between film audiences, production design and eco-cinematic production around climate change. By looking at film and how, in particular, product design changes can be made in order to create greater eco-awareness, eco-cinema protocols hope to nudge and prompt audience behavioural changes to become more environmentally ethical and help mitigate climate change transformation in the process.

1.8.1 Thesis outline

After the introduction chapter, this thesis will follow with the first section of the literature review within chapter 2 and will, in particular, discuss climate change, environmental ethics and film sustainable practices. Chapter 3 will continue with the second section of the literature review and discuss film communication, eco-cinema, environmental awareness and production design. Chapter 4 will consist of the methodology, data collection process and examination of the data gathered. The final chapter, chapter 5, will address the questions highlighted in *1.4 Research question* and conclude with some recommendations.

CHAPTER 2: LITERATURE REVIEW - SUSTAINABILITY

The film industry remains excellent at depicting effects but finds it hard to show causes, which might, in turn, address underlying ecological and environmental problems (Brereton, 2016, p. 118). Since the 19th century and the beginning of the Industrial Revolution, the relationships between transportation, factories, and pollution has been normalised (Boylan, 2014). Along with the exploitation of fossil fuels, humans' egocentrism' dominated the earth's environment. Evans (2019, p. 1) reinforced this claim by stating that the "effects of centring decisions on yourself are that often the earth is viewed from a utilitarian perspective, which allows it to be abused for its resources out of convenience for the economy". Modifying egocentrism into a more fruitful ecocentric way of thinking (ideology) while considering oneself as simply at one or equal to the environment can help fight the battle against climate change.

Throughout this literature review, a discussion of whether film, in particular production design, could assist in creating a sustainable film production, eco-conscious debate alongside an ecocentric mindset are explored. However, before this examination can be carried out, a fundamental understanding of climate change and its global effects on all aspects of our planet remains a vital first step in understanding the crisis.

2.1 Climate change

Climate change is a condition that disrupts the normal climatic pattern across the planet. Weather constitutes short term changes to conditions in the atmosphere, for instance, rain or snow falling across a specific area and time period. Alternatively, climate focuses on the long-term conditions associated with seasonal change and the average weather measurements over at least 30 years (Healy, 2014, p. 1). In Healy's book, *The Climate Change Crisis*, he explains that climate indicates the year-to-year variants of the average conditions worldwide, whereas climate change indicates

long-term shifts in unpredicted climate over decades. A respondent, Nockels (2021), provides an example of how climate change affected the weather patterns, which could affect society and film productions. When Nockels was shooting a film in Namibia in 2019, and the art department constructed the set in a dry riverbed; “according to the last 20 years, this river has never flowed at that time of the year, guess what it did that year (referring to 2019) - it flowed.”

2.1.1 Understanding climate change

Climate change can be compared to a coin, according to McCabe (2019), where one side of the coin symbolises surplus carbon and various greenhouse gasses (Figure 2.1) that are released into the earth’s atmosphere. The other side of the coin corresponds with excessive land use (and ocean) and general change. In the academic interview with McCabe (2019), a California State University, Fullerton, professor in the Department of Geography & the Environment, he explains that “greenhouse gases are kind of like little batteries that hold energy”. This analogy means that both concerns of releasing surplus carbon and altering the way humans utilise the earth (through mass cattle farms, deforestation, infrastructure) contribute to the development of the same “coin”, which leads to rapidly increased climate change. When comparing human activity from 100 years ago to the activities of today, the difference, especially the excessive use of land and other natural resources, coupled with additional human activity targeting our natural flora and fauna, represents the exponential amount of carbon produced that leads to increased environmental and climate crises.

Therefore, climate change is due predominantly to the human use and abuse of fossil fuels, releasing carbon dioxide and additional greenhouse gases into the atmosphere. Additional human activities, such as deforestation and modern modes of agriculture, also contribute to the proliferation of these gases that sparks climate change. These gases are confined within the atmosphere and build heat traps near the planet's

surface. This can have an array of effects on ecosystems, including severe weather events, rising sea levels, and adverse effects on landscapes and biomes (Takepart, 2019). Jackson (2017) states that climate change caused by human activity has had observable effects on the environment; “glaciers have shrunk, ice on rivers and lakes is breaking up earlier, plant and animal ranges have shifted, and trees are flowering sooner”.

2.1.1.1 Atmospheric carbon and greenhouse gases



Figure 2.1: ClimateSmart, *So what does a tonne of CO₂ look like, anyway?* An art installation at the 2009 UN climate talks in Copenhagen was created by Millennium ART in partnership with the United Nations Department of Public Information, 2015. Artwork. (Van Derwill, 2015).

According to Kaufman (2020), “civilisation emitted an estimated *34 billion tonnes* of heat-trapping carbon dioxide into the atmosphere” in 2020. A visual representation of 1 tonne of carbon is depicted in figure 2.1. Lindsey (2021, p. 379) connects to Kaufman and states that in 2020 the average atmospheric density of carbon dioxide was 412.5 parts per million. For 12 000 years, the earth had around 280 parts per million of carbon in the atmosphere. Nevertheless, in the last 75 years, we have added an astronomical amount of 412 parts per million (McCabe, 2019). Lindsey (2021, p. 379) states that “the annual rate of increase in atmospheric carbon dioxide over the past 60 years is about 100 times faster than

previous natural increases, such as those that occurred at the end of the last ice age 11 000-17 000 years ago”. Carbon dioxide and other greenhouse gases encompass more heat in the atmosphere culminating in rising temperatures, rising sea levels, and ultimately creating environmental issues. However, it is estimated that 50 trees per year could offset 1 metric tonne of surplus Carbon (Climate Neutral Group, 2022). Therefore, the excess carbon produced and the escalation of human activities such as deforestation contribute to increased heating of the environment (Livescience, 2018).

2.2 The film industry and climate change

“The entertainment, film and TV industry is notoriously wasteful behind the scenes” (Goodspeed, 2022). “Films have the average carbon footprint of 3 370 metric tons (Figure 2.1) – or about 33 metric tons per shooting day” (Spangler, 2021). Reich (2015) refers to a study, *The Impact Of Filmmaking On The Environment*, conducted by the University of California in Hollywood, Los Angeles. The study discussed emissions created by studio electricity use and air travel and estimated that the film industry generated a more significant impact on climate change than any other industry, excluding fuel refining and cement manufacturing. The film industry remains one of the most wasteful industries, from pre-production to post-production and distribution. Starting with pre-production: meetings, travel, paperwork and scouting (location, props, actors). During production: the travel intensifies, electricity and energy are used for lights, cameras and generators, printing, catering, and production design. Additional travelling and energy use for editing within the post-production stage. Distribution, film festivals, cinema release and merchandising have their own set of contributing factors (Reich, 2015).

2.2.1 The environmental impact of filmmaking

Since 1895 audiences have been captivated by images on the screen. From the Lumière brothers, that were among the first filmmakers in the pre-human era, to today's Hollywood blockbusters in the Anthropocene era, the way the film industry produces films has developed and shifted radically.

Film producer Melanie Dicks, the co-founder of *Greenshoot*, a UK-based sustainability organisation, expressed that the average person's daily life generates about 7 (metric) tonnes of carbon a year (Figure 2.1). A single film technician typically generates up to 2.5 tonnes of carbon on an eight-week production, or 32 tonnes per year. Typically, up to 250 cast members and crew will be working on a large production, plus the whole supply chain supporting it (Bynoe, 2018).

McCabe (2019) expresses that the nature of film "is like a carnival dynamic, where they move into a certain location, disrupt the natural environment and they leave, and while doing this they have a responsibility to leave the location whether it is in a Wildlife Park in South Africa or the Arizona desert, they have to return it to its natural state". Unfortunately, in many cases, such as the Hobbit village from *The Lord of the Rings: The Fellowship of the Ring* (directed by Peter Jackson, production design by Grant Major in 2001), built into a field in New Zealand, much damage has been done to the natural habitat (Figure 2.2). Castley (2015) states that film productions have changed location to fit their needs to the point where the environment cannot be restored to its natural state (Figure 2.4). Nonetheless, when the productions have the ability to return the environment to its natural state, the timeframe of these productions would, regardless, have generated an impact. For example, when shooting *Dune*, Failes (2021) explains that "Gerd came up with the brilliant idea of a vibrating plate. Denis wanted to see sand vibrating to give us a clue that a worm was coming, and Gerd built this massive 12 by

12 wide plate and buried it in the sand”. Even though the production cleared all machinery and apparel after the production, and left the environment just as they found it, the disruption of the ground shaking within those months of filming could have disrupted local desert biodiversity and could have damaged the occurring natural surroundings.

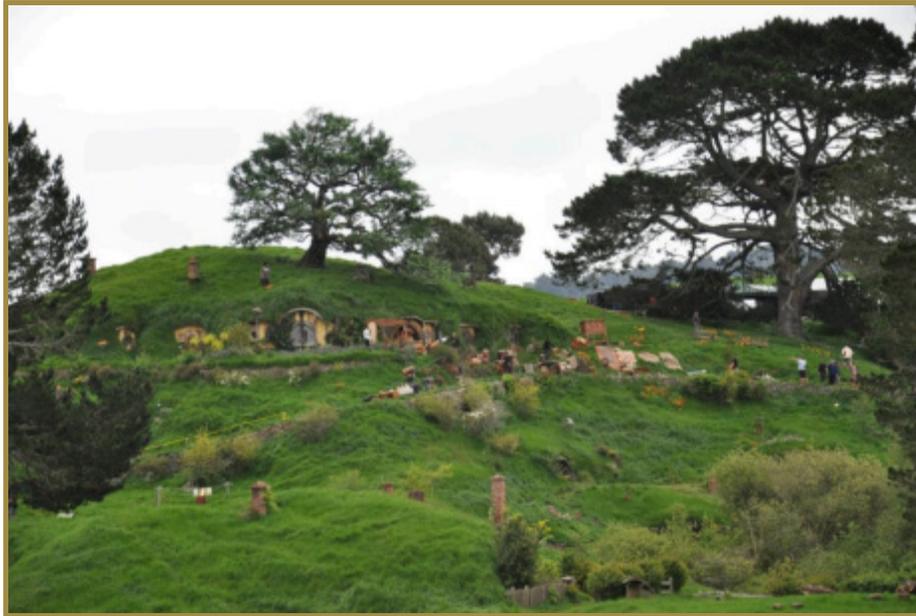


Figure 2.2: Alastair Bull/AAP, *Hobbit Village from Lord of the Rings*, 2015. Photograph. (Castley, 2015).

2.2.1.1 *The influence of filmmaking on location*

Film industries need particular locations to fit their storylines, and when they cannot find them, they create their own area that fits. According to Fitzpatrick (2019), films have various degrees of liability, from *Mad Max: Fury Road* (directed by George Miller and production design by Colin Gibson in 2015) that left the sand dunes in Namibia badly damaged, to *The Hobbit trilogy* (directed by Peter Jackson in 2012-2014), that left structures on location, as seen in Figure 2.2. He states that the crew allegedly dumped chemicals when shooting *Pirates of the Caribbean: Dead Men Tell No Tales* (directed by Joachim Rønning, Espen Sandberg and production design by Nigel Phelps in 2017) waste while filming in Queensland, Australia.

Film industries add directly to greenhouse gas emissions by travelling to and from locations. In particular, air pollution and fuel consumption are linked to how far and how big the film locations are. These pre-production emissions impact the environment before taking a step onto the shooting location. Research from UCLA indicates that greenhouse gases depend on the production scale and shows that the industry has a high regional impact (Castley, 2015). A film production generates by-products such as sound, fossil fuel and light pollution, damage to vegetation and biodiversity, and numerous amounts of waste that negatively impact the film location and the environment, as well as extend to the local community.

2.2.2 Carbon footprint of a film production

Bynoe (2018) said that “the film industry is extremely wasteful, and that does not only include the catering department”. Annually the film industry in the USA produces approximately 700 films and 500 series, where millions of dollars are spent on flights, food, fuel and electricity, all influencing their carbon footprint and environmental impact (Harper, 2018). Hoad (2020) says that an average of 2 840 tonnes of CO₂ per production is generated by blockbuster films, specific films with a budget of over \$70m (€63m, ZAR1bn - South African Rand). Hoad further emphasises that this is “a figure equivalent to the amount absorbed by 3 700 acres of forest in one year”. While Harper (2018) reinforces Hoad's measurements and explains that a film with a budget of \$50m (€45m, ZAR752m) produces about 234 000 metric tons of CO₂. The budget for *The Day After Tomorrow* alone was estimated at \$125 million (€114m, ZAR1.8bn), with an estimated greenhouse gas emission of 10 000 metric tons of CO₂ (Corbett and Turco, 2006).

Films, of course, vary in production size in terms of cast and crew. In the case of *Iron Man 3* (directed by Shane Black and production design by Bill Brzeski in 2013), the production had more than 3 000 cast and crew members (IMDb, 2013). A film of this size could have extreme implications

for its total carbon footprint. While researching the carbon footprint of film production, a list containing four key areas should be addressed (1 - fossil fuels, 2 - pre-production, facilities and administration, 3 - production and waste generation and 4 - distribution and promotion), all of which were identified by the researcher. This list is composed through information found on a toolkit from the Green Production Guide (2016), a *Deadline* article by Grater (2020), a blog from Green Filmmaking (2022) and a green checklist by Green The bid (2022a). A further discussion within 2.5.1.1.2 will assess how these elements could adopt sustainable practices and be considered to promote a form of eco-consciousness.

1. Fossil fuels

“Fuel — used in production vehicles and generators — typically was the largest source of greenhouse gas emissions on film and TV productions, representing 48%-56% of emissions for films and 58% for scripted TV dramas” (Spangler, 2021). As a practical illustration, *The Dark Knight's* production team burned through the amount of \$500 000 in gasoline and \$1 000 000 building materials. The team consisted of 900 people. They travelled from America to England to China to film in different locations (New York Film Academy 2014). An estimated 17,83 metric tons of carbon per one way flight was used (Carbon Footprint, 2019).

- Travel: Cars, trucks and air travel for various use, for instance, transport to and from meetings, housing/accommodation, shooting locations, events, film festivals, distribution-related locations and transportation of apparel and shipment.
- Electricity use and or generator use: Locally supplied electricity for all equipment and lights, and the use of gas or petrol/diesel

generators to supply electricity on locations as well as electricity use for editing.

- Shipping: Shipment of all apparel and gear, as well as shipment of the film and merchandising in the distribution phase.

2. Pre-production, facilities and administration

“40% of the industrial wood harvest goes into paper products, and by 2050 pulp and paper production are expected to account for over 50% of the world’s industrial wood demand. Land-use change is resulting in approximately 50 000 square miles of deforestation annually. Decreasing paper use becomes an important method for reducing the environmental impact of our TV and film productions” (Green Production Guide, 2016).

- Housing: Accommodation for all cast and crew while production takes place.
- Paperwork: Printing of contracts, scripts, production planning, posters, and other documents.
- Location: Location scouting, warehouse renting, storage, and shooting locations.
- Equipment hire and usage: Cameras, lights, trucks, dolly tracks and other technology.
- Crew and cast, vendors and recruitment: To list a few - director, DOP, production designer, accountant, gips and main cast, supporting actors and extras.

3. Production and waste generation

O’Leary (2014) writes in an article in the Los Angeles Times, *On Location: Greener film shoots can also save costs*, “film sets are notoriously wasteful places. Big movies can generate 225 tons of scrap metal, nearly 50 tons of construction and set debris, and 72 tons of food waste”. Hollings (2017) states that during 2016 21 films were produced by Universal Studios. She explains that if all of those productions had a 60-day shooting period, approximately 804 400 plastic water bottles would have been used by Universal Studios in the year 2016.

- Catering: Food preparation for all cast and crew and waste from packaging.
- Plastic bottled water use and on-location water use: Supply cast and crew with bottled water throughout shooting days.
- Production design: Costumes, make-up, props, set-dressing, set building and other building materials.
- Waste and disposal: Any waste acquired on and off set and incorrect disposal.

4. Distribution and promotion

“For as long as promotions have existed, merchandise and memorabilia have lived in the physical world (Downing, 2021). Downing further expresses that *The New York Times* states that a cotton tote bag should be used 20 000 times to offset its impact. “That’s every day for 54 years”. Szalai

(2017) states that global retail sales of licensed film merchandise increased by 4.4% in 2016 - "\$262.9 billion up from \$251.7 billion the previous year".

- Events, film festivals and advertising: Travelling to these events, planning, sales and additional promotional elements such as a press junket and film premiers.
- Distribution: Digital and hardcopy, cinema screening and audience engagements.
- Merchandising: Producing posters, toys, clothing and other apparel inspired by the film.

The four key factors somewhat overlap, and although these elements are essential to the production of a film, to some extent, they release various amounts of carbon into the atmosphere. The increasing amount of surplus carbon released by society, industries and specifically the film industry, along with the enormous carbon footprint created within film productions, could result from the Anthropocene. Nonetheless, a more sustainable and eco-conscious solution could be made within these factors in order to decrease a film's carbon footprint and help in subsiding the environmental and climate crisis.

2.3 Anthropocentrism and anthropocentric mindsets

Hale (2013, p. 224) proposes The Mad Hatter's Riddle: "The Mad Hatter develops a poison that has the potential to kill Alice, but for which he has the antidote. Once the antidote is administered, Alice will suffer no ill effects". In this analogy, taking the climate crisis into account, The Mad Hatter's poison could indicate human's egocentric views since the selfishness of the Mad Hatter allows him to keep the antidote for himself and will only act when he has something to gain while Alice represents the

Earth. Hale explains that humans have the attitude - referring to egocentric views, overconsumption, fossil fuel use and disregard for nature - to increase environmental issues and prompt climate change. These attitudes need to be adapted to an eco-centric, a conservational and frugal viewpoint that could be the antidote to the climate disruptions.

“The Anthropocene Epoch is an unofficial unit of geologic time, used to describe the most recent period in Earth’s history when human activity started to have a significant impact on the planet’s climate and ecosystems” (National Geographic Society, 2019). This era is centred around human value and their dominance over non-humans, which leads to increased eco-centric actions while environmentally ethical behaviour is diminished (Kopnina, 2018, p. 109). According to Will Steffen (Head of the Australia National University’s Climate Change Institute), the Anthropocene era started with the industrial revolution in the early 1800s (Steffen, Crutzen and McNeill, 2008, p. 615). Land-use change and the production of surplus carbon have since exponentially progressed, with the Industrial Revolution, when the exploitation of fossil fuels first began in earnest and even though many believe the Anthropocene started as far back as 8 000 years ago, this was the turning point for what we now characterise as climate change (Smithsonian, 2018).

Although Anthropocentrism as an all-encompassing phenomenon is not the only contributing factor to climate change, it is undoubtedly highly significant since humans are forcing change upon earth systems into an unnatural state. For instance, the modification of the biosphere due to agriculture and infrastructure, air travel polluting the atmosphere, change created within the hydrosphere due to ocean oilrigs and cruises and mining altering the lithosphere. “Increases in global temperatures cannot be explained by any Earth system process other than increasing anthropogenic greenhouse gas emissions” (Ellis, 2018, p. 68).

The Anthropocene was produced through the impacts of agriculture, infrastructure and additional land-use change resulting in soil, water and

air pollution, with the decreasing of biodiversity: through deforestation and similar practices, generally in order to create space for human food production and shelter. Population growth is one of the primary causes of environmental difficulties since population growth results in an increased demand for land-use change, with more significant habitat destruction, loss of species and placing more pressure on natural resources, such as freshwater, marine life, clean air, and by default general weather and climate patterns. Therefore, greenhouse gasses (created through the workings of Anthropocentric mindsets) place a strain on the earth's atmosphere and directly contribute to the rising of the earth's temperature (Ellis, 2018, p. 66). To reinform what was discussed above, the film industry participates in anthropocentric human activities (Grater, 2020). Land-use change for sets and production warehouses (Figure 2.4), upscaled productions increase air travel, energy and other fossil fuel use and grand narratives, special effects, and production design elements contribute to excess carbon (Castley, 2015).

Goralnik and Nelson (2012, p. 145) reinforce Anthropocentrism and explain that this positions humans at the core of the universe, where environmental ethics is often disregarded with only humans considered necessary. Referring to Hale's *The Mad Hatter's Riddle*, with regards to climate change and the amounts of fossil fuels, carbon dioxide and other greenhouse gasses we as a society generates, Anthropocentrism could be interpreted as society's and extend to the film industry's desire for over-consumption and having their best interest in mind without regard to the effect they may cause.

Hjort (2016, p. 105) expresses that "historically, the film industry has a very poor environmental track record. George Eastman's production of film stock involved a mix of toxic substances, the consumption of enormous amounts of water, and the discharging of polluting waste into the Great Lakes system. Well over a century after the invention of film, the situation cannot be said to be greatly improved; in California, home to Hollywood, "municipal

and state-wide levels of film-related energy consumption and greenhouse gas emissions (carbon dioxide, methane, and nitrous oxide) are about the same as the aerospace and semiconductor industries” (Maxwell and Miller 2012: 271–272). Given the increasingly convergent views of scientists regarding the anthropogenic nature of climate change and its threats and likely consequences, the time for ecologically minded filmmaking has undoubtedly come.

The principles of environmental ethics cannot be satisfied with just an appreciation of the Anthropocentric mindset dominating the world at present. Alternatively, humans, industries and filmmakers need to apply more altruistic and generous life-affirming modes of thinking and adopt environmental ethical and more constructive types of sustainable behaviour when dealing with our fragile planet and not simply demand more resources and various types of extraction from nature being constantly called upon.

2.4 Environmental ethics theory and biocentrism

“Nature is our main ally in reducing the carbon emissions that drive the climate crisis and limiting its dangerous consequences. The more severely we harm nature, the more we exacerbate the climate crisis and weaken our ability to deal with it” (Hann, 2020).

Ethics is a theory or system dealing with morals relating to human conduct, concerning what is right and wrong in certain situations and good and bad motivations for actions (Fieser, 2017). Environmental ethics speaks to a moral relationship between the natural environment and humans. “In terms of environmental ethics, biocentrism is the principle that ensures the balance of ecology on the planet” (Rinkesh, 2014). Therefore, biocentrism can be interpreted as a sub-section to these environmental ethical agendas (Humphreys, 2016, p. 263).

A solution to The Mad Hatter's Riddle cited above involves developing an environmentally friendly and ethical mindset. Biocentrism and ecocentrism is respecting all forms of biodiversity and treating the environment as equivalent to human values, which has become a counter ethical value. In an academic interview with Prof Brereton (2019) from Dublin City University, he expresses the notation that we should, in the film industry and all aspects of human behaviour, "promote frugality as sexy, and promote de-consumption & de-growth as acceptable". Striving to discard anthropocentric lifestyles and establishing the notion that we as a species need the environment remains an essential first step.

Consequently, for our survival, we should constantly reassess the impact of our lifestyles while striving to be more frugal. For instance, since we rely on natural elements such as oceans to regulate temperatures and forests to provide oxygen and offset carbon, we should be more concerned about protecting nature rather than participating in extracting more fossil fuels, land-use change and other anthropocentric activities. "As wealthy, developed, and technologically advanced as we are, ultimately, nature is the bedrock of our human existence and the key to human resilience, health, stability, and wellbeing. By harming nature, we harm ourselves even more" (Hann, 2020).

In order to erase the dominant Anthropocentric mindset, humans need to and should adopt a Biocentric lifestyle. Attfield (2013, p. 2) states that "biocentrism holds that all living things are morally considerable, whereas many people hold that only human beings are so". Brereton (2019, p. 12) references Paul W. Taylor, who states that Biocentrism is an explicit representation of environmental, and ethical behaviour. The human-centred viewpoint of Anthropocentrism is juxtaposed with Biocentrism and the ethical belief that everything is equal and connected.

According to Biocentrist values, humans should consider it unacceptable to take the life of an animal to satisfy their own needs, such as trophy hunting and fashion, much less for food, just as it would be considered

wrong to take a human life for the same reason (Bruner, 2019). In other words, trophy hunting, poaching, whaling, over-fishing, animal testing and killing animals by destroying their habitats are not considered environmentally ethical or acceptable and certainly pull against the general first principles of Biocentrism. Therefore Biocentric principles such as conservation, eco-conscious and sustainable behaviour can be applied to all industries, including the film industry, to help control carbon emissions and greenhouse gases, resulting in diminishing the effects of climate change (Attfield, 2011, p. 32).

According to Bruner (2019), life and morality, in terms of material, spiritual, and ethical values, need to become integrated in order to help resolve our climate issues. Society, industries and filmmakers should examine the contrast between what they want and what they need more closely as part of a move towards reducing consumption levels and supporting a more sustainable future.

2.4.1 Environmental ethics and climate change

Climate change, exacerbated by pollution, deforestation, land-use change and overpopulation, is a significant threat to human existence. However, adopting an environmental ethical perspective, this dilemma can be actively addressed if not radically changed. The depletion rate of our natural resources (due to increased human development and natural resource usage) is occurring faster than nature can restore itself (UN, 2019). Biocentric mindsets and modes of established behaviour should thus be implemented in order to decrease further environmental decay and help mitigate the current climate crisis. By actively addressing our daily life through eco-conscious change, the environment and ecosystems will hopefully be restored to a healthier state. A biocentric future model is needed to understand and help mitigate the challenge necessary in addressing the climate crisis. All this leads to the rationale for highlighting such well-worn issues and concerns since the media and film industry remains one of the many industries that produce an enormous amount of

carbon waste (Figure 2.3), which unfortunately increases levels of carbon in the atmosphere (Parascha, 2019). Hence there is an urgent need for the media industry to both recognise these scientific facts and face up to the urgent need to transform and thereby actively green the industry – through both new modes of low carbon production methods, alongside recognising the enduring power of the medium to communicate more environmentally-driven messages. This is the primary focus and agenda that this thesis concentrates on.

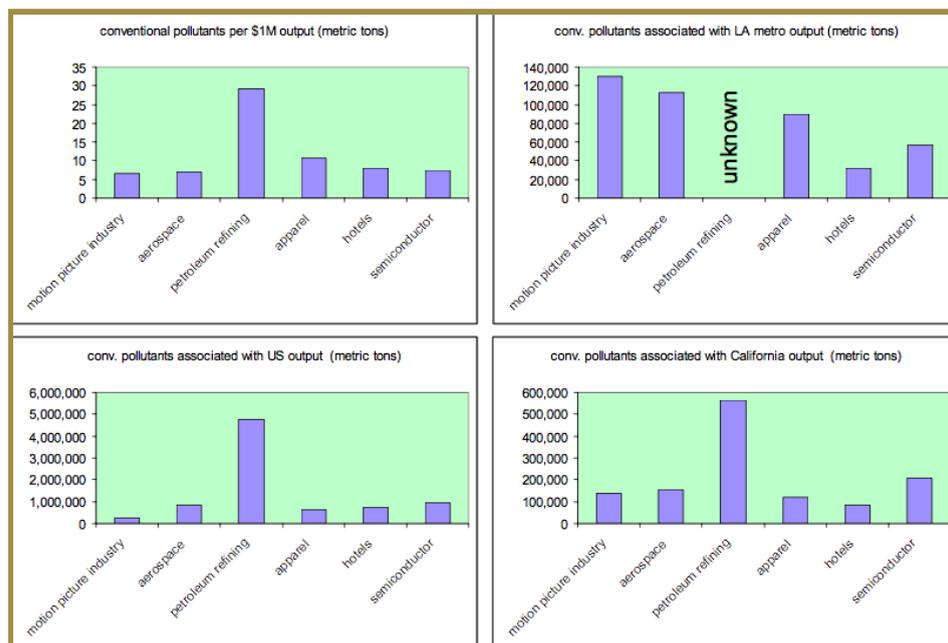


Figure 2.3: Parascha, *Greenhouse gas emissions per selected sector in the Los Angeles metro area. 2006.* (Parascha, 2019).

We should progress the way of thinking across all aspects of human activity rather than having a ‘business as usual’ approach while our ecosystems are degrading (Brereton, 2019). Figure 2.3 indicates a few of the most significant film sectors in Los Angeles – the centre of the Hollywood movie industry - and highlights how they measure carbon usage between one another. Parascha (2019) goes so far as to suggest that the film industry is one of the most significant contributors to carbon emissions. To reiterate, “films have the average carbon footprint of 3 370 metric tons – or about 33 metric tons per shooting day” (Spangler, 2021) and as stated above, Hoad (2020) explains that big blockbuster films produce an average of 2 840 tonnes of CO₂ per production. Of course, all

industries have a responsibility to the earth and our environment by decreasing their carbon footprint while adopting environmentally friendly solutions together with environmental ethical behaviour to mitigate against the worst excesses from climate change. Environmental solutions that could be road-tested by the film industry in order to decrease their carbon impact will be discussed in *2.5 Sustainability*.

2.4.2 Film ethics

Film ethics includes the relationship between film practitioners (cast and crew) as well as the audience's implied or actual moral engagement with environmental issues, together with the ethical consequences of producing an audio-visual product with a high carbon footprint (Choi and Frey, 2014). As a rule of thumb, the filmmaker should aim to protect the subjects they are filming (both human and non-human), alongside protecting the environment they are filming in. Therefore, it is imperative that filmmakers understand the repercussions of all the decisions they make (Unite for Sight, 2019). Arthur (2007) said: “generally speaking, however, if environmental ethical abuses occur on the set, the evidence remains off-screen”. For example, Illustrated in figure 2.4 is how the production of *Pirates of the Caribbean* changed an open area in Australia in order to build a pirate village (first image set) and a green-screen warehouse (second image set). Although they did not participate explicitly in deforestation, the production nonetheless remained disruptive to the location's integrity to some degree, and this signals an ecosystem dilemma that may occur within these exotic locations. Castley (2015) suggests, for instance, that environmental impacts of filming may disturb wildlife and habitats and could lead to air pollution, biodiversity and vegetation loss, and this could further impact local towns and so forth. Unite for Sight (2019), a global health and impact non-profit organisation, explains that filmmakers must determine “what clips to include, which people to film, and how to represent the film participants. Filmmakers should strive not to harm the people they are filming, the environment they

are filming in, and should strive to represent them in the best way possible, or otherwise inform them of how they will be presented”.



Figure 2.4: Google Earth, *Before and after imagery of Pirates of the Caribbean* 2014, 2015. Aerial photograph. (Castley, 2015).

2.4.3 Environmental ethics, climate change and film

McCabe (2019) asserts that individually, we may not think we are making a difference, but there are 7.5 billion people on the planet using a lot of technology, energy and land. Collectively we have fundamentally shifted the natural climate into an Anthropocentric controlled climate. “Humans are too influential now, and because we as humans are also influenced by the film industry, whether that is movie stars, films or the companies themselves, we cannot ignore we are changing the environment with these activities” (McCabe, 2016). The film industry has the ability to adopt these biocentric principles and engage in environmental and eco-conscious solutions and film members’ workflow. Hjort (2016, p. 106) emphasises that filmmaking should evolve into a form of ecological and environmental ethical filmmaking - it “is nature-oriented, the task being to

determine how pro-environmental intentions relating to production practices, depicted contents, and the expression and curing of appreciative attitudes through moving images are constitutive of it.”

In summary, using Bennard's (2021) statement, “the biggest issue that the film industry has is that it does not have a culture of sustainability. From the earliest days, Hollywood would simply create sets on location and then abandon them without a thought to their impact on the local ecology. Without any oversight to guide their actions. Now, as climate change starts to affect humanity in noticeable ways, the industry needs to step up to the challenge. The mindset of sustainable filmmaking must make it to the forefront. It is no longer just an option that the community has. It is a stake in the future of humanity”. *2.5 Sustainability* will focus on how the film industry, focusing on production design, can decrease their overall carbon footprint and adapt eco-conscious and biocentric workflows through sustainable practices.

2.5 Sustainability

“Filmmaking is an excellent way to raise awareness and draw attention to a certain topic or issue. However, before creating a film, many ethical issues must be considered” (Unite for Sight, 2019).

2.5.1 Sustainable and ethical thinking

Hundreds of films and series are made each year, resulting in awards for many role-players; however, this should not be the primary goal. The main target should be to minimise each film’s carbon footprint and environmental impact (Harper, 2018).

Many filmmakers have an attitude toward the benefits of having too many resources to cover their creative desires instead of just the right amount (Reich, 2015). Reich connects with Brereton’s statement of “promoting

frugality as sexy” and explains how rather than being frugal and minimising waste, film productions overindulge in unnecessary amounts of equipment, location usage and grand production design elements, which lead to production upscale, financial rise and a high carbon footprint. Filmmaking consists of sets, props, travel, construction, catering and a lot of plastic water bottles (StudioBinder, 2015). A film's nature and its process are not de facto conducive to sustainability. “Despite this, for now, it is individual filmmakers who will have to take the lead in stopping the damage that films make off-screen, being more destructive than the action depicted on it” (The Independent, 2019).

“The film industry has to step out of its little bubble and start inter-connecting with how they contribute to the problems of our self-imposed climate crisis, rather than being economical” (Brereton, 2019). According to Bakri, et al (2009, p. 222), “filmmaking is part of our world, and as such, it has to help sustain the environment in which we live, develop our societies, and maintain economic prosperity”. The film industry can become sustainable by adopting new ways of environmental ethical thinking.

For instance, in *The Amazing Spider-Man 2* (directed by Marc Webb and production design by Mark Friedberg in 2014), 52% of waste was reduced by reusing 50 tons of materials for future production and donating 6 000 meals to shelters. The film saved \$400 000 (€372 129 and ZAR6.2m) by going “green” (Harper, 2018).

“Replacing bottled water with coolers and reusable bottles can slash water budgets by 51%. Composting, recycling and offering up props and set materials for reuse can cut waste disposal budgets by 40%. Exchanging disposable nine-volt batteries for rechargeable batteries can shrink battery costs by nearly 60%” (O’Leary, 2014). Although sustainability in filmmaking saves money, it still remains a novel idea (Harris, 2014). Harper (2018) provides an example of *Bad Words* (director by Jason Bateman and

production design Shepherd Frankel in 2013) and how green energy was incorporated into the production by only using solar energy. Harper further states that it was a first in the film industry; it is possible to produce a film using only renewable energy. Eco-conscious thinking can easily become a habit, and ethical awareness across the film industries could assist in biocentric behaviour, reducing carbon footprint and environmental impacts.

To think sustainably is not complicated; however, changing a production's workflow to achieve a more environmental ethical approach needs practical solutions, especially in waste control and containing fossil fuel use. Props, clothing, flats, building material, set dressing, catering, single plastic use, packaging, printing, fuel and gasoline, these elements are used in large quantities and can create a considerable amount of waste, mainly through incorrect disposal, lack of upcycling and reusing (Harper, 2018). These elements usually end up in landfills, which can implicate the environment when they can be recycled, reused or donated for future productions or to help the disadvantaged (Goodspeed, 2022).

2.5.1.1 Sustainable solutions and eco-conscious alternatives in film production

“Environmental measures in production are a responsibility for us all” (Green The Bid, 2022b).

2.5.1.1.1 Green-production toolkit

Goodspeed (2022) emphasises that the most significant impact would be to 100% utilise renewable energy, as fuel and energy use is the most egregious form of waste in any production.

A Green-production toolkit (Appendix A) is composed through conjoining and paraphrasing information from various sources, including the green filmmaking guides, and toolkits found on Green Filmmaking (2022), Green Production Guide (2016), Green The bid's (2022a), and Sustainable Production Toolkit (Banta *et al.*, 2022, pp. 1–101) together with the information gathered in an *Earth Angel's* interview with Meagan Goodspeed (2022). The green-production toolkit will follow the four key areas identified in 2.2.2, namely 1 - fossil fuels, 2 - pre-production, facilities and administration, 3 - production and waste generation and 4 - distribution and promotion.

2.5.1.1.2 *Earth Angel*

There are multiple sustainable companies, such as *We are Albert* (located in The United Kingdom) and *Earth Angel* (located in The United States of America), that assist in helping film productions become eco-conscious and support decreasing the production's carbon footprint. In the academic interview with the Education Manager at Earth Angel, Meagan Goodspeed (2022) explains that “*Earth Angel* is a sustainability service provider for the film and TV industry, which mission is to mitigate waste by incorporating zero waste practices”.

“Our end goal is to divert as much waste from the landfill as possible by implementing downstream practices such as composting and recycling, as well as PPE recycling and food donations, but also working on upstream practices as well to eliminate the use of, like, plastic, for instance. One of the biggest practices that we do in every production is we try to eliminate the use of single-use plastic water bottles and then incorporate reusable bottles so there's no waste being generated. And ultimately, our mission is to not only implement this practice on productions but really to educate cast and crew on, like, what going green really looks like and what that means, because ultimately,

sustainability is something that can be practised at work and then also at home” (Goodspeed, 2022).

2.5.1.2 EMA green seal and green productions

“Green Production goes far beyond just purchasing carbon offsets because reducing energy demand and decreasing the amount of waste sent to a landfill will have a much broader impact on our environment and our communities” (EMA, 2020a). A Green Seal is given to films using sustainable practices and products within all production operations to reduce the environmental impact (Green is Universal, 2019). The Environmental Media Association (EMA, 2020a) explains that a Green Seal is a program honouring progress in sustainable production for various visual media. “I think that is a really great representation of when something has become standardised” Goodspeed (2022) expresses that when audiences are exposed to a Green Seal or green stamp of a film, it could spark curiosity and could create sustainable awareness.

“The Program rating is determined on a scale of 200 points. A minimum threshold of 75 points must be obtained in order to receive EMA Green Seal recognition. We have also introduced the EMA Gold Seal for projects that score 125 points and more. The rating is based on a self-assessment by the production company on how well it complies with the Program criteria developed by EMA and the sustainability departments of major studio Board members” (EMA, 2020a).

For example, in 2018, The EMA awarded a green seal to *First Man* (directed by Damien Chazelle and production design by Nathan Crowley in 2018). When filming in Atlanta, the production team carried out sustainable actions. A recycling schedule was implemented in the office and on set. Steps they took were composting coffee grounds, using

reusable dishes, using eco-friendly containers, tying them into the electric grid and thus reducing fuel and generator use. They also reused materials from the set of *Pitch Perfect 3* and donated building materials to non-profit companies. After the shoot was completed, office supplies, cooking supplies, food and other items were donated (Green is Universal, 2019).

Green is Universal (2019) states that *BlaKkKlansman* (directed by Spike Lee and production design by Curt Beech in 2018) also received a Green Seal from the EMA. While filming in New York, the production team set up a recycling plan in the office and set. They also educated the crew via memos regarding green practices on set. The construction department and production design department used wood from sustainable forests to build sets, recycled material for carpets, recycled props, and LED lighting was used and tied into the grid. Solar-powered trailers were used for cast and crew, and food and other items were donated.

2.5.1.2.1 EMA (EMA, 2020b) gold and green seal awarded fantasy films

- Gold Seal (125+ points out of 200)
 - *Spider-Man: No Way Home* (directed by Jon Watts and production design by Darren Gilford in 2021)
 - *Uncharted* (directed by Ruben Fleischer and production design by Shepherd Frankel in 2021)

- Green Seal (75-124 points out of 200)
 - *The Last Duel* (directed by Ridley Scott and production design by Arthur Max in 2021)
 - *Cinderella* (directed by Kay Cannon and production design by Dante Ferretti in 2021)

CHAPTER 3: LITERATURE REVIEW - ENVIRONMENTAL MESSAGING AND FILM COMMUNICATION

“There are two ways you can embed sustainability into your content. You can raise the issues in a way that inspires your audiences to take action. Or you can normalise sustainable behaviour on-screen” (We are Albert, 2022). In the academic interview with Goodspeed (2022), she states that “Hollywood is one of the most beloved and championed industries in the world. And it is great because we employ hundreds and thousands of people. But there is also the content that we produce. It is watched by billions of people. There is a huge opportunity to start to standardise sustainability and have that connection with the people who watch the content. So, yeah, that is why sustainability is important to me. It is about the people and protection of our planet”.

3.1 Anthropocentrism, film narrative and communication

“Suggestive examples of actions expressing attitudes at odds with a pro-environmental approach to filmmaking include the production of distorted depictions of nature for purely instrumental entertainment purposes; a willingness to inflict harm on living beings, even to the point of death, for the sake of enhancing a film’s chances of success with audiences; and the modification of natural environments for filmmaking purposes without regard for the consequences” (Hjort, 2016, p. 106).

Together with decreasing the carbon footprint of a film’s production, the film itself within the context and storytelling protocols could also potentially inspire audiences to embrace similar sustainable practices within their daily lives (Fleming, 2021).

Ford and Hammerton (2020, p. 147) expressed that “film has played a key role in creating and perpetuating negative effect towards nonhuman species. From early Hollywood films to contemporary online series, these

majestic species have been subjected to vilification and denigration onscreen, resulting in speciesism, subjugation and colonisation of animals, whilst simultaneously extending human 'authority' over nature perpetuating fear – particularly of apex species". The film industry mainly focuses on what might also be characterised as an Anthropocentric storyline. For instance, in *Interview with the Vampire* (directed by Neil Jordan and production design by Dante Ferretti and Francesca Lo Schiavo in 1994), Lestat's egocentric lifestyle allows him to do as he pleases without remorse nor compassion for human life. Basically, a vampire needs to consume blood to live. However, Lestat is witnessed sucking blood and killing just for fun rather than for the core purpose of survival. This strategy at one level could be interpreted through a human need for meat and to sustain a balanced diet, but due to this egocentric mindset, humans (if not such Vampires) are willing to kill animals for sport and support even more ethically suspect activities such as trophy hunting and poaching. "This necessitates raising issues around human attitudes, motivations and the paradoxes inherent within human behaviour towards the natural world and nonhuman species. We have previously noted that humans as a species expect that the human right to access all environments supersedes the rights of nonhumans to their habitats, regardless of the direct and indirect impacts" (Ford and Hammerton, 2020, p. 151).

Adapting a different form/mode of film storytelling methodology namely focused around eco-cinema attributes, such as *Wall-E* (directed by Andrew Stanton and production design by Ralph Eggleston in 2008), *The Day After Tomorrow* (directed by Roland Emmerich and production design by Barry Chusid in 2004) or *Avatar* (directed by James Cameron and production design by Robert Stromberg and Rick Carter in 2009); a film can help promote a more holistic environmentally ethical agenda around climate change (Pat Brereton, 2019). Although Ford and Hammerton express concerns mainly around animal depiction within film, these concerns could be applied to other natural elements and the environment. They state that films need to specifically avoid the human gaze of the

commodification of animals, nature and the environment. “Filmmakers need to be made aware of stereotypical representations and the tropes that vilify and damage the relationship between humans, nonhumans” and the natural environment (Ford and Hammerton, 2020, p. 169).

By creating a biocentric attitude and developing productive environmental ethical behaviour, the dilemma of carbon emissions and the general climate crisis can be hopefully mitigated within the film industry. The core question that will be investigated within this chapter remains. Can film/media, in general, positively impact the environment by creating awareness? Furthermore, can biocentric attitudes be promoted through more explicit eco-cinematic practices?

3.2 Eco-cinema

Maasdorp (2021) express that “facts and statistics do not change people's minds or behaviour. It is an emotion that does, so you have to make them feel something”, and a film could create that emotion.

Environmental Media Association (EMA, 2020a) expresses that “Hollywood is routinely considered a first mover in terms of recognising and highlighting topics of importance and working towards social change. Because it has the opportunity to reach such vast numbers of people at any given time, Hollywood has an otherwise unmatched ability to shape attitudes and beliefs, and through its actions to ultimately bring about both individual and social change”. Film has the ability to engage with audiences, expose them to different ideas, issues and concepts and create awareness of the crisis we and the world experience. Eco-cinema is a broad range of cinema that comments on environmental issues explicitly or implicitly in its subtext (Pat Brereton, 2019). Mohamed (2014, p. 2) states that “eco-cinema is a film art form that manifests in both fiction and non-fiction with the purpose of educating and disseminating environmentally conscious messages”. There has been an increasing

amount of films depicting environmental issues over the years, suggesting that environmental or eco-cinema could be regarded as an essential tool for transmitting knowledge, raising awareness and promoting eco-conscious action.

Silk et al. (2018, p. 597) reinforced the notion that films have the capacity to reach global audiences and impact attitudes regarding the environment. While more prescriptive nature documentaries differ from eco-cinema, basically as fictional narratives tend to be more indirect in addressing environmental issues and have the capability to extend to a broader audience outside of the environmental audience bubble. Nature documentaries would primarily target audiences with an interest or specific knowledge of nature. Alternatively, most environmental themes in eco-cinema function as a backdrop and are designed to assist plot development. Eco-cinema allows viewers to be entertained whilst subconsciously at least perceiving that climate change action is needed (Mohamed, 2014, p. 2). Eco-cinema can thus be used as a tool to the foreground and communicate biocentric agendas through ecological modes of representation. For instance, Fleming (2021) expresses that fictional films can emphasise essential issues, which are not limited by their primary role of entertainment. Fleming provides the example of *Soylent Green* (directed by Richard Fleischer and production design by Edward C. Carfagno in 1973), a film that “predicted a dystopian future set in 2022, where environmental losses and food shortages were causing havoc”.

3.2.1 Biocentrism and ecological representation in film

Nature is often idealised as a biophysical area that is occupied by wild animals and untouched by human influence. This idealisation of nature tends to create an exacerbated tension between humanity and nature. At the same time, film could be considered a potent tool for promoting new forms of environmental pedagogy. For instance, *March of the Penguins*

(directed by Luc Jacquet in 2005) visualises an animal-filled landscape untouched by human beings. The narration, however, portrays the dual world between nature and humans, especially when considering the anthropomorphism of the penguins (Monani and Hageman, 2010, pp. 205–210). They explain that “throughout the film, penguins are made to resemble humans - in the way they make love, in their familial obligations, and in their stoic resilience against the hardships of their material environment (which, in turn, is personified, for example, as “the mother of all blizzards” and the “wind’s rage”)”.

Art forms, especially film, represent the world and demonstrate the interconnection of film, humanity and nonhuman animals, plant life and inanimate materials (Pick and Narraway, 2013). Film has helped to establish this holistic ecology, the interrelationships and interconnections in environments between biotic (living) and abiotic (non-living) elements. However, in many film genres, this ecological link is particularly prominent, especially within animated and fantasy films.

The ‘images of ecology’ include the pervasive clichés that populate the modern environmental imaginary: Ross (2020) states that “belching smokestacks, seabirds mired in petrochemical sludge, fish floating belly-up, traffic jams in Los Angeles and Mexico City, and clear-cut forests. On the other hand, the redeeming repertoire of pastoral imagery, pristine, green landscapes, and unspoiled by human habitation, crowned by the ultimate global spectacle, the fragile, vulnerable ball of spaceship earth, produce very enticing imagery”. As Ross’s list indicates, environmentalist visuality typically counterposes a positive or ecotopian imaginary to a negative, dystopian and apocalyptic one. The former inspires, while the latter enjoins us to action or despair (Ivakhiv, 2013).

To reinforce Fleming's (2021) statement that film and documentaries can help create environmental awareness and “tackle” global problems, including climate change. Climate communication specialist John Cook assessed Al Gore’s 2006 documentary *An Inconvenient Truth*. He

concludes that it “raised awareness, changed behaviour and inspired others to communicate the issue of climate change”. Leiserowitz (2004) provide a non-documentary example of the fictional film *The Day After Tomorrow* (2004) and states that the film had a consequential impact on climate change awareness, perceptions and debate as well as prompted eco-conscious behavioural intentions of audiences (Figure 3.1).

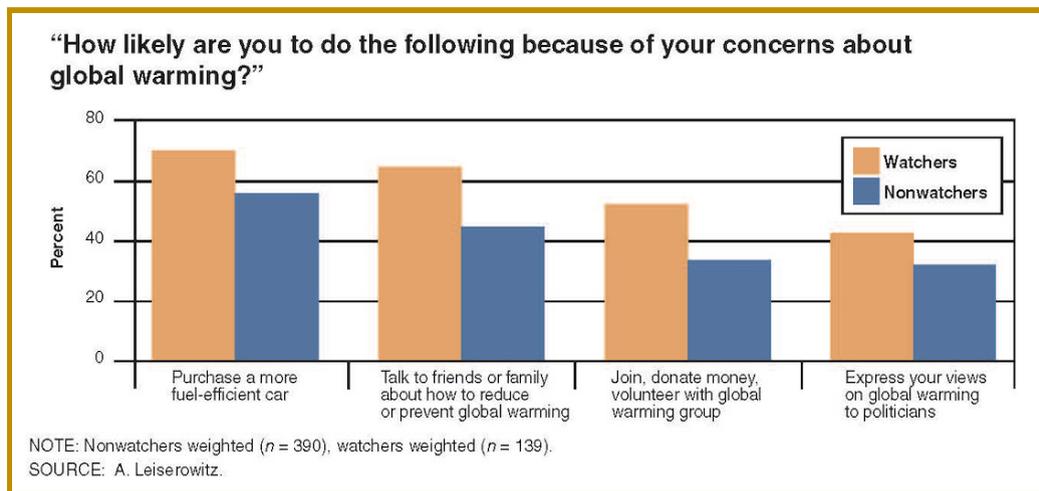


Figure 3.1: Leiserowitz, *Behavioral intentions of watchers and non-watchers*, 2004. Graph. (Castley, 2015).

Figure 3.1 depicts that “the film led moviegoers to have higher levels of concern and worry about global warming, to estimate various impacts on the United States as more likely, and to shift their conceptual understanding of the climate system toward a threshold model” (Leiserowitz, 2004, p. 34). Therefore, different film and film genres could be an educational tool to change narratives around environmental and climate issues, nature conservation and biodiversity loss (Seale, 2020).

3.2.2 Animated films

Animation is the manipulation of inanimate objects by providing them with living characteristics. Different mediums can be incorporated into animation, such as 3D and stop-frame animation (Lannom, 2019).

Goofy Gophers, in *Lumber Jerks*, a 1955 Warner Brothers cartoon, looks up to a “tree” that once was their home and is now sawed into furniture,

leaving only a stump, while asking, “Is not our house much better than it was before?” (Murray and Heumann, 2011). Jaime Weinman (Murray and Heumann, 2011) argues that *Lumber Jerks* is an illustration of ‘enviro-toon’, animated films that reflect environmental concerns. It shows how trees are being cut down for our personal gain and, in turn, shows how humanity is responsible for harming the environment. Such provocative forms of animation can thus establish social meaning that solicits viewers to re-perceive everyday challenges, themes and provocative ideas.

“If you have been wondering how to start a conversation about climate change or other environmental topics, a family movie night is a great idea” (Soni, 2019). Since 1930 this ‘enviro-toon’ ecological narrative and aesthetics have been present in animation. These ‘enviro-toons’ can have the ability to change viewers’ attitudes towards the environment. They morphed into additional animated films and film genres. Soni (2019) provides an example of an animated film that communicates the environmental distress caused by human activity; most recently, *WALL-E* (directed by Andrew Stanton and production design by Ralph Eggleston 2008), an animation concerning a wasteland created by humans, conveys a message about overconsumption. *Ice Age* (directed by Chris Wedge and production design by Brian McEntee in 2002) depicts animals trying to escape floods because of melting glaciers due to the slowly rising temperatures and poaching. Or game hunting and animal captivity, illustrated within *MADAGASCAR* (directed by Eric Darnell Tom McGrath and production design by Kendal Cronkhite in 2005). Ecological and environmental themes within various forms of animation could create environmental awareness and help promote biocentric mindsets.

3.2.2.1 *Finding Nemo and Finding Dory*

The animated film *Finding Nemo* (directed by Andrew Stanton and production design by Ralph Eggleston in 2003). The movies are about ‘finding family’ – first, Marlin, the clownfish, goes searching for his son

Nemo whom a reef diver captures, and Dory goes looking for her family, whom she has gotten separated from in *Finding Dory* (directed by Andrew Stanton and production design by Steve Pilcher in 2016). These animations comment on coral reef destruction, habitat and exotic fish loss as well as having these exotic animals as pets and whale captivity (Soni, 2019). The hopes are that animations like *Finding Nemo* would promote conservation and sustainable responses. Through the production of commercially profitable films, the impression on children's understanding of and association with the nonhuman environment cannot be misjudged.

Fantasy and animated films are undeniably effective as teaching tools (Bruckner, 2010). The central characters in this film are represented by anthropomorphised animals. It further accentuates the devastating impact of human behaviour through the dentist, Darla and the polluted ocean floor.

Bruckner (2010) further explains that, although the depiction of the animals and ecosystems in the film tries to attain a level of accuracy, the anthropomorphising of the animals remains eco-critically unsettling. Anthropomorphism is by all accounts anthropocentric in nature, as it validates humans and humanity as a totalising measurement, where the human is central, and the whole ecosystem is ignored, thereby conflicting with a crucial biocentric framework. Filmmakers need to acquire knowledge and understanding of animal behaviour and place them in a living ecosystem. Only then can such storylines and films have the potential to help diminish regressive anthropocentric attitudes.

3.2.3 Fantasy and science fiction films

Fantasy films are set in a fictional universe with often clear utopian ethics underpinning their storylines. These films are often a combination of animation and live-action; fantasy involves combining inanimate objects, animated characters and living beings, presenting unlimited possibilities. Non-scientific conceptions like magic and supernatural elements are

accompanied by human psychology and societal behaviour (Lannom, 2019). McCutcheon (2020) expresses “the importance of our connection to nature, as well as to each other. It also warns about the consequences of corporate greed on not only the natural world but indigenous societies” depicted in *Avatar* (2009). And “overpopulation, the dangers of nuclear weapons, and human ignorance” illustrated in *Planet Of The Apes* (directed by Franklin J. Schaffner and production design by William “Bill” Creber in 1968) could create awareness surrounding these environmental and social issues. Fantasy films communicate deforestation, pollution and species extinction, and films with a narrative focused on the planet could inspire audiences to protect it (McCutcheon, 2020). Goodspeed (2022) provides the example of “*Lord the Rings* and just seeing Frodo, hang out in the field, reading a book under the trees, just seeing the characters enjoying the elements and being outside and being in the water, I think just enjoying nature is an effective way to subconsciously promote this sustainable mindset of; when I see Frodo in a field of trees and read a book, I want to be there, too”.

3.2.3.1 *Dune* (2021)

Mould (2021) states that *Dune* (directed by Denis Villeneuve and production design by Patrice Vermette in 2021) highlights how society should transform our dependence on extracting resources in order for the planet to start its healing process. Mould further states how the film expresses the dangers of environmental issues such as water shortage and pollution. A case study of *Dune* will be further discussed in chapter 4. Fantasy films illustrate the proficiency of interdependent connections between the biotic organismic community. Fantasy films can influence what images the audience views on screen and the messages communicated to them. Film, in general, could model sustainable behaviour and promote eco-conscious debate and perspective changes (Green The Bid, 2022b), and fantasy films can depict an environment that we want to see in the future and alternatively a world we want to avoid. As stated by the sources above, film narrative has the ability to communicate

environmental awareness, and eco-cinema can be viewed as an educational tool for environmental issues and the climate crisis. However, films consist of a wide range of storytelling possibilities, and one cannot assume that all films will evoke an environmental agenda within their general narrative format. Consequently, could other forms of eco-cinema protocols be adopted?

3.3 Production design

In Chapter 2, the discussion on sustainable production design and the construction of eco-conscious production design elements in assisting in decreasing a film's carbon footprint was explored. This section will investigate production design as a new form of eco-cinema and an educational tool for environmental awareness.

“The goal of a production designer is to immerse you in the world they have created. That is the magic of production design, creating the world you see and making you believe the unbelievable” (StudioBinder, 2015).

In the academic interview with Shorter, a film lecturer at Central Saint Martin's College of Art and Design, in the United Kingdom, she emphasised that production design is a vital role within film and expressed that “production design is extremely important because it is whatever you see on the screen that the production designer has had complete control over” (Shorter, 2021). According to Soriano (2021), the simple definition of production design is the visual elements of a film; including the location, sets, set dressing, props, special effects, hair and makeup, and costumes.

Film is a visual medium, and production design embodies the core visual information of a film. Rizzo (2014) states that the essence of a film's environment is developed and fabricated by production design; it is the creation and organisation of the physical world surrounding a film story. This visual concept of a film among other elements consists of location (geographical area), sets (story location for example the living room), set

dressing (decoration to fill the sets), colour schemes (the colour pallet used within a film), lighting, costumes (the wardrobe of the characters), hair and makeup, props (any objects that the characters use), VFX, SFX and other additional graphics. These specific elements of production design help to influence the mood, tone and appearance while translating other languages into metaphors and symbols. “The design of production ultimately brings the story to life and encourages the audience to engage and interact with it. The details that make up the background of the story also contribute heavily to its overall emotional tone” (Nashville Film Institute, 2020).

3.3.1 Production design purpose and communication

“Production design can play a role in that exposition, but to have it be subtle” (Maasdorp, 2021). In an interview with Maasdorp, a Senior Lecturer of Screen Production and Film and Television Studies at the Centre for Film and Media Studies University of Cape Town in South Africa. She expresses that production design could communicate additional information and provides the example of her fireplace; “I have a bunch of photographs on the fireplace and they are wedding photographs and photographs of my kid - I don't have to say in dialogue or it doesn't have to come across in any other very explicit way that I have a partner and I have a child because as soon as you have a shot of my mantel, you can see that. She further explains that set dressing can communicate characters' backstory, relationships, hobbies, personality, preferences, motivations and characteristics; “I can have toys lying on my couch and immediately it is clear a child lives here, and if the toys are very clearly linked to a certain age of development, then it can tell you something about the age of the child as well”.

Soriano (2021) emphasises that a film's production design allows audiences to “easily find themselves lost in the world of the film, feeling like they too are a character in the story they are watching before them on screen. Production design generates the world of the film by establishing a

sense of time and space as well as helping to create a mood within the world. Without these visual elements, viewers would be left relying too heavily on what the characters say while unable to connect their words with actions within a particular setting”. The production design is used both as a visual and educational tool within a film. Production design creates believable film worlds and produces visual connections for the story, narrative and audience. Therefore, production design enhances the story being told and could assist in communicating additional information, emotions and themes (Shorter, 2021).

Every decision in terms of the visual style of the production can affect the integrity of the finished product, including its core ideas, emotions and informational cues provided for the audience. Rizzo (2014) explains that to compile an adequate visual concept, regarding production design, the arcs, thematic elements, emotional tones, character and other story informational elements need to be fully established and then production design will be able to come into its own and communicate these themes and elements to the audience. “The generally held position is that it involves creating, or creating a blueprint for, something new in a way that has a refined aesthetic that meets a predetermined purpose. Good production design is the creation of an environment with a refined aesthetic that enables the story of the film to be told to greatest effect” (Salom, 2014).

3.3.1.1 Visual design and the production designer

The visual design of a film is compiled via two sources: the art department and location scouting. However, the production designer also takes a leading role in the appearance of a film. “The production designer has to create sets and whole worlds that meet the demands of production, but they also have to contribute to the overall aesthetic and artistic look of the project” (StudioBinder, 2015).

Production designers are responsible for a unique film worldview by translating the script into a visual blueprint for the entire production. Maasdorp (2021) states that “the production designer is responsible for what you see on the screen - the set dressing and the props in that location”. This visual blueprint is obligated to capture the essence of the narrative structure and disclose it to the audience (Hannigan, 2013, p. 1). “Film design is so incredibly influential, yet at its very best, we do not even see it. Production designers create worlds for us to believe in, and when it all works, we accept the finished product as real” (Hannigan, 2013, p. 1). Production designers produce production designs that fit the tone and voice of the film and are used to elevate the project (StudioBinder, 2015).

“I believe that the production design does influence the way that we perceive the story because we understand the characters, not just through how they have styled the hair, the makeup, the clothing that they wear, we assume that they have chosen for themselves. We also understand the character through the environment that she or he inhabits” (Maasdorp, 2021). For example, in *Father of the Bride* (directed by Charles Shyer and production design by Sandy Veneziano in 1991), the house in which the Banks family lived was developed to function not simply as a backdrop to the story but as a character in its own right (Olson, 1998). The house was not only a major part of the plot but was used as a metaphor for the family and their life. Not only did all the events, like the wedding of his daughter, take place inside the house, but the house also influences reactions and sparks offset chains of events in motion. Olson (1998) refers to Bruce Block that said, in *Father of the Bride*, the wall colours of the house were painted with Steve Martin’s complexion in mind in order to help assist in making the house a member of the family.

3.3.1.2 Production design in animation

The objective of production design, in animated and fantasy films is to generate a physical environment in which the character comes alive. The ultimate goal is to create a unified world in which the characters and

backdrop interconnect. This world can be created through 3D landscapes, miniature sets or changing real locations to fit the fantasy world. In *Coco* (directed by Adrian Molina, Lee Unkrich, and production design by Harley Jessup in 2017), the character Miguel is unintentionally transported to the land of the dead on Mexico's Dia de Los Muertos (Figure 3.2). In the land of the dead, he encounters buildings in vivid colours and vertical towers reminiscent of Mexican history. The backdrop has influences of Aztec, Mayan and Spanish elements as well as Victorian and modern elements (Giardina, 2017a). The film has a great combination of more realistic and non-realistic elements within the production design. The vivid colours of the 'land of the dead' and the more realistic earthy tones of 'the real world' act as a great contrast between the film worlds.



Figure 3.2: Molina, *Coco*, 2019. Image. (Entertainment Access, 2019).

Figure 3.2 shows how production design can go from one type of world to another, and even though they might provoke and give off different tones and moods, the production design nevertheless remains within a coherent and similar style. This keeps the film more cohesive and thus keeps the audience's attention. This is a great example to show how production design can create different and contrasting environments. *Coco's* aesthetic was influenced by Mexican culture, and since the production design is drawn from reality, the film world is more believable even when there are unrealistic elements.

The production design of animation and fantasy films requires it to be believable while still representing the film language (Bacher, 2012). Props, costumes, and set dressing in production design can help the audience understand how to react to a situation happening on the screen, as well as believe it to be realistic even when the story world is fiction (Nashville Film Institute, 2020). For example, *The Lego Batman film* (directed by Chris McKay and production design by Grant Freckelton 2017). To draw attention to the absurdity of the Batman character (Figure 3.3), the production designer used metallic coloured lego blocks and blue tones to create a dehumanised environment and further reinforced this notion by exaggerating the Batcave by increasing the size. Simultaneously the idea used was to frame the character of Batman on a gigantic backdrop representing his self-produced technological world (Giardina, 2017b). These two contrasting colour schemes and sizes helped communicate the mood of emptiness and coldness to the audience. Certainly, the distance between Batman and the rest of the world is depicted through these elements and thus it also comments on the isolation and loneliness of the character.



Figure 3.3: McKay, *The Lego Batman Movie* 2017, 2018. Image. (Best of Movies & TV, 2018).

3.3.1.3 Production design in fantasy film and CGI, VFX, SFX

Ross (2020) states that the future of cinema is computer-generated imagery (CGI) and visual effects (VFX). More and more films use these concepts, and with the growth of technology VFX; the creation, manipulation or enhancement of imagery, for example, an image placed onto a phone in post-production assisted by a green screen, and CGI; a 3D digitally created image of, for example, a collapsing building, has the ability to create fictional and realistic computer illustrations that have become a prominent aspect of film. These visual effects form part of production design, through enhancing the visual aesthetic of a film. For example, in *Alice in Wonderland* (directed by Tim Burton and production design by Robert Stormberg and Karen O'Hara in 2010), the film world was created by computer-generated imagery (Figure 3.4). The actors performed in front of a green screen to accomplish the final look. Some characters also have computer-generated features and clothing (Figure 3.4). This was important to keep the film's aesthetic while creating realistic imagery that fits perfectly within this world.



Figure 3.4: Maritz, *Alice in Wonderland 2010*, 2015. Image. (Digital Synopsis, 2015).

In the mid-20th century, filmmakers continually experimented with contemporary technologies to produce visual effects. In 1958, John Whitney “used a WWII anti-aircraft targeting computer on a rotating platform with a pendulum hanging above it to create the spiral elements in the opening sequence” of the film *Vertigo* (directed by Alfred Hitchcock

and production design by Henry Bumstead) - This was the first major use of computer animation in film” (Beedle, 2022).

Although CGI and VFX have become more popular, the art of SFX (special effects); effects created and implemented directly on set, for example, prosthetic makeup, animatronics and creature suits, still plays a vital role in film. For example, *Maleficent* (directed by Robert Stromberg and production design by Dylan Cole and Gary Freeman in 2014). In the film, Angelina Jolie inhabits the aesthetic of the creature Maleficent. In order to transform Angelina into a fantasy creature, SFX played an important role (Figure 3.5). “She ended up with cheek prosthetics, a subtle nose piece, pointy ears and sharp molars. Originally the makeup team gave Maleficent a prosthetic forehead and chin. However, the overall effect was too “devilish”, so they scrapped it. “We did not want to make her a caricature,” Tuiten explained (Wischhover, 2014). The artists finalised her look with contact lenses, a red lip, sharp nails, horns and the perfect Maleficent wardrobe.



Figure 3.5: *Maleficent* 2014, 2019. Image. (Demilked, 2019).

An interview with Alex Mcdowell, who was the production designer on *Man of Steel* (directed by Zack Snyder in 2013), *Charlie and the Chocolate Factory* (directed by Tim Burton in 2005), and *Minority Report* (directed by

Steven Spielberg in 2002), affirmed he said that “digital technology is opening up a growing wealth of new design resources for the film art department. Digital tools are more than just an extension of the design toolkit” (Rizzo, 2014). These films, highly influenced by the production design, can be seen as elements of the film that remain a fundamental part of transforming the final product and useful new aesthetic devices to help lure audiences into the fantasy realm.

The film's production design enhances the overall aesthetic, tone, emotion, narrative and theme/motifs. Fantasy film production design creates a magical and believable universe that audiences can immerse in, and the visual cues assist in audience engagement, meaning the creation and communication of knowledge, themes and ideas.

3.3.2 Production design communication and cognition

According to Ragin (2016), people are visual creatures; when we read or hear information, only 10% of that information is retained. However, it is argued that around 60% of the information is retained when paired with an image. Visual learning encourages better interconnection between teachers and students. This connection between the teacher, student and coursework can become strengthened by how visual learning can create a fun process by establishing an interrelation with the video or image (Sharma, 2021).

Shorter (2021) express that “as an audience member, you have got to be moved, by what you take something away from it, that either it is something that you are connected with, so it is something that you relate to the character on screen, or you relate to the environment therein. That is what absorbs you into it, and production design is what makes that memorable”.

Ragin (2016) answers the question of why are humans willing to watch hours of TV but are not spending the same duration studying? He

explains, “it is because TV is full of emotion and storytelling. Structuring lessons and giving them a narrative that is simple to follow helps people go through the content methodically and with understanding and using emotion to emphasise key points, makes them more invested in what they are learning”. Visual learning is thus more beneficial since it shows us what to do while not telling us what to do (Sharma, 2021). Since production design is responsible for almost the entire aesthetic and visuals of a film, production design may have the ability to create a visual learning process. Film uses visual cues to communicate information to the audience. Production design could reinforce ideas, add visual elements, provide additional information to the audiences, and communicate a subtextual storyline within the narrative. Maasdorp (2021) emphasises that she believes reusable cups and recycle bins send subtle clear meta-communication and has the potential for measurable impact. She continues and expresses that audiences want to model screen behaviour, “if they see that Angelina Jolie, that her character is using a reusable cup in whatever next big Hollywood movie that she is in, people are going to go out and look for that same cup”.

In order for audiences to successfully attain the learning objectives, attention and engagement are essential. Film has a uniquely effective way of affecting and manipulating audience attention through different visual cues. According to Sood (2018), an estimation of one minute of video can be compared to approximately 1.8 million written words; “in addition, 90% of information transmitted to the brain is visual, and visuals are processed 60 000 times faster in the brain than text”.

3.3.2.1 Visual attention: the conscious, subconscious, subliminal and supraliminal

Attention, both conscious and subconscious, is integral to perception. Attention is directly influenced by how visual cues are perceived and interpreted (Montemayor and Haladjian, 2015). Attention is called on to select and process visual and auditory information. “Visual attention is a

powerful mechanism that enables perception to focus on a small subset of the information picked up by our eyes” (Maunsell and Treue, 2006, p. 317). The information that is primarily perceived and given attention tends to be focused on the visual.

3.3.2.1.1 *Forms of attention concerned with visual objects*

- Feature-based attention: This attention emphasises a visual cue in a scene. This visual cue highlights and draws attention to a particular feature; colour, shape, texture, size, object, placement or movement. Using distinct saliency, a “pop-out” effect will be created.

Using contrast in production design can also help distinguish an object. It draws attention to not only the design but also the message communicated (Oleksandrm, 2016). Feature-based attention has the ability to provide information to the audience with a simple image. For example, a scene in *Dune* (2021a) shows a row of palm trees - this greenery is juxtaposed by the beige and grey colour scheme of Arrakis (a desert planet) and draws attention to this vital natural element that provides oxygen.

- Spatial attention: This attention is aligned according to spatial coordinates within a visual scene. This alignment can be directed to objects in space or empty space and is not driven by features but can be covertly recognised in nature. Covert attention involves voluntarily shifting the attention outside of the direct viewpoint without altering the direction of the viewpoint. “The individual is directly focused on what is in front of them, but must see to the sides also, without changing their forward focus, to see the whole field’ (Gaines, 2021).

Spatial attention can create meaning and provide the audience with necessary information. Using production design elements subtly without

placing undue focus can have an impact on the audience's perception of a scene. For example, in *Dune* (2021a), audiences are constantly aware of the surroundings. When Paul Atreides walks next to the coastline, the audience's attention can be shifted to the spacecraft in the background, even though Paul and the foreground are exclusively focused.

- Repetition attention: This attention emphasises visual cues being repeated throughout a scene and the entirety of a film. When seeing repetition in a film, attention is placed on the importance of that element. A pattern within production design is created to establish crucial information. Repetition attention, similar to Feature-based attention, can be achieved through certain features like colour, size, texture, shape, object, placement or movement (Soegaard, 2020).

Using production design elements in a repeated way can have an impact on the audience's awareness and engagement. Repetition attention can place meaning onto an object or element which draws the audience's attention to the importance of that element. For example, in *Dune* (2021a), the repetitive pattern in the sand, due to the sandworm's movement, draws attention to the danger approaching and makes audiences aware of what visual cues to look for in order to ascertain when a sandworm is approaching.

3.3.2.2 *The conscious and subconscious attention in cognition*

Surrounded by various stimuli, the attentional selection determines the level of importance and prominence of these stimuli and objects (Prasad and Mishra, 2019). Conscious and subconscious processes and cues are essential and a long-standing goal of cognitive theory (Cleeremans, 2001, p. 2584). "Within a given film, the viewer is often able to discern the conscious realm from the unconscious realm" films are able to accomplish this by creating different attentions (Stowell, 2015, p. 13).

All stimuli activate associations in the brain; however, conscious processing is restricted while automatic subconscious processing is unrestricted. These associations can be initiated by subliminal and supraliminal subjection to an image. These associations can impact behaviour (Stibel, 2018).

3.3.2.2.1 The conscious attention

Experiences can occur when conscious attention is focused on an object without reducing the object to its features or changing the object that is given attention to. Shifting conscious attention voluntarily is vital for analysing the characteristics of an object in a visual scene for learning and habitual behaviour to occur. This shifting of conscious attention can thus be a form of spatial attention. Therefore, experiences are created by the interaction between attention and interpretation of what is viewed (Montemayor and Haladjian, 2015). For example, when the audience sees a bin on screen, their experiences will make the connection that a bin is used to throw something away. However, when changing the bin to a recycle bin, the audience can make a connection between throwing something away with an environmentally friendly agenda.

3.3.2.2.2 The supraliminal

Supraliminal awareness or messages are presented at the diegetic portal of human consciousness and can be visual or auditory in nature. According to Wang (2020), the supraliminal images are aimed at the conscious part of the mind. The conscious mind does acknowledge the image; as a result, the image is accepted. For example, in *The Joker* (directed by Todd Phillips and production design by Mark Friedberg in 2019), there is a scene where the Joker (Joaquin Phoenix) stands in a clown costume looking in a mirror. On the mirror is written, “put on a happy face”, creating an ironic juxtaposition between the words and the character. The scene is shown from the mirror's perspective, which

indicates how the world only sees the surface and not the reality of the Joker.

The requirements of the storyline will lead the attention to the centre of interest, whether it is a primary element or a secondary aspect in the background. The production design in fantasy films should be laid out to accommodate the best composition for the story (Giardina, 2017b).

3.3.2.2.3 The subconscious attention

Subconscious attention is the involuntary action of information processing that depends not on the viewer's objectives. The conscious perception stimuli are still in control of processing and cognition, although attention to an object is involuntary subconsciously. Involuntary attention is unintentional, uncontrollable and unconscious, and external influences cannot interfere with this process (Prasad and Mishra, 2019). For example, after watching a horror film, some audience members will remember the film and the events in their subconscious and develop nightmares. Imagery perceived on-screen can thus stay in the audience's subconscious mind and later be retracted to form dreams or impact future events.

3.3.2.2.4 The subliminal

Subliminal awareness or messages are presented at the non-diegetic portal of human consciousness and can be visual or auditory in nature. Subliminal images are aimed at the deeper subconscious part of the mind. The conscious mind does not acknowledge the image. Therefore, the image cannot be resisted; however, subconsciously, the image could conceivably be accepted (LaMarco, 2018). For example, in *Lilo and Stitch* (directed by Chris Sanders, Dean DeBlois and production design by Paul A. Felix in 2002), a hidden message in the form of the Mickey Mouse logo is visually shown in the background (Figure 3.6). The Mickey Mouse logo mimics a fruit behind Lilo and Stitch at the market (Yahoo Movies, 2016).



Figure 3.6: Sanders, *Lilo and Stitch* 2002, 2016. Image. (Yahoo Movies, 2016).

An environmental agenda can hopefully be formed using the concept and placement of “eco-easter eggs” in a film, both in a supraliminal and subliminal way. Subliminal messaging can mimic any visual form. Using the concept of zoomorphism and adding subconscious imagery of any environmental, sustainability and animal representation, environmental awareness and an eco-conscious message could be created and communicated to the audience.

3.3.2.2.5 Eco-easter eggs

“Easter eggs open up a whole new realm of understanding media. We learned to look for Alfred Hitchcock’s cameo appearances in most of his movies. Looking for something hidden is a skill that we can now resurrect” (Daniels, 2018). Easter eggs within film emerged in the 1970s and have become an audience engagement hunt for hidden references, clues or jokes that assist in the subtle development of the plot (Hall, 2021). Hall provides an example of *Back to the Future* (directed by Robert Zemeckis and production design by Lawrence G. Paull in 1985), “Marty McFly inadvertently knocks down a pine tree in the past right at the site of the future *Twin Pines* mall. When he returns to the present, the local mall is no longer referred to as *Twin Pines* but rather *Lone Pines*. It is a subtle

(in-joke paratextual reference) that often goes unnoticed, but it is an interesting pickup for those paying attention”.

“Another little easter egg I loved in Villeneuve’s *Dune* was the constant cuts to a statue of a man fighting a bull and a mounted bull on the family’s dining room wall. These details are mentioned in Herbert’s text as something profoundly important to the current House Atreides’ view of the world and the family’s past. It is mentioned in an aside that Duke Leto’s father liked fighting bulls for fun. In fact, the Old Duke died in a bullfight. That statue commemorates the event as does the mounted bullhead and the Old Duke’s portrait seen hanging in the dining room on Caladan” (O’Keefe, 2021).

Easter egg hunting in film has become popular and has developed into audience debate and multiple social media discussions. Daniels (2018) expresses that “easter eggs are a way of bonding and relating on a different level to that show or movie you are watching, the game you are playing or the software you are using. It is a surprisingly personal connection to technology and its producers”. Production design as easter eggs can link films together, create additional messaging and reference a variety of concepts within a film’s subtext. Thus, easter eggs could be adapted to form a sustainable and eco-conscious hidden message, for instance, a recycling bin in a public space rather than a regular bin. Using production design as a form of eco-conscious easter egg or eco-easter eggs could produce new forms of eco-cinema.

3.3.3 Production design as a new form of eco-cinema

Maasdorp (2021) states that “strategic changes to the production design in order to communicate an environmental message could be made, that will not influence how the characters are perceived or the sort of the narrative arc, but that might have a subliminal influence on the viewer”. As previously discussed, eco-cinema creates subtle environmental

awareness within the story of films. However, can non-eco-cinematic film remain to create subtle environmental awareness through production design, as a new form of eco-cinema? Since production design can communicate additional information to the audience and assist in developing a film, production design should be able to communicate other agendas such as eco-conscious, sustainable and conservation information (Shorter, 2021). However, Shorter expresses concerns about whether this is possible to achieve when the story does not involve environmental agendas. “Things like recycling or compost bins can be normalised by being included in standard home sets. We are just like, even the simple act of having a reusable tote bag and not using the plastic single-use bag can really influence folks to be green” (Goodspeed, 2022).

Within *Chapter 4*, a discussion with film practitioners will determine whether production design could assist in creating a subtextual environmental agenda within a film, specifically within fantasy film, by creating a design that could promote eco-conscious mindsets, sustainable behaviour, and environmental ethical or biocentric lifestyles.

3.3.4 Production design as a new form of eco-cinema within fantasy films

Fantasy films have become progressively more popular and impressionable (Sibbald, 2008). Fantasy films convey relatable and relevant content whilst representing the ideas and concepts in a different creative way. Staff (2020) expressed that “fantasy films open up new worlds and new paths of understanding and empathy”. Fantasy films have the ability to communicate different agendas, create awareness on a variety of themes and could hopefully evoke eco-conscious debate and perspectives. Within this fantasy genre, real-world objects and elements are reimaged and reinvented to fit the created universe, thus, eco-conscious production design elements should be reinvented to fit both the story and the subtextual environmental messaging. Maasdorp (2021) states that “if you want to get your message into as many forms as possible, then for the drama, rom-com and thriller, you can have the

recycle bin. However, if it is *Lord of the Rings* or *Marvel*, you have to go a different route because there might not be that many recycle bins inhabitants”. Anthropomorphism is usually depicted in animations and fantasy films. However, the concepts of Zoomorphism were identified to assist in reinterpreting production design within fantasy in order to add these environmental agendas of sustainability and conservation. For instance, filmmakers cannot have a recycling bin within the *Star Wars* universe. However, filmmakers could incorporate a different way of representing the concept of recycling.

3.3.4.1 Anthropomorphism

Anthropomorphism often entails bestowing animals with human qualities and characteristics (Nanay, 2018). Since the conception of Mickey Mouse, anthropomorphism has been a prominent element in animation and stop motion films. An argument can be made that the medium of animation is adaptable to anthropomorphism due to the distinct human personality and traits often given to inanimate objects and animals (Jardim, 2013).

The role of attaching human characteristics and dedicated behaviour to animals and objects in a film is to create a recognised world, wherein audiences identify (mentally) with the non-human elements on the screen, establishing a symbolic connection among human values (Galloway, 2016). *Beauty and the Beast* (directed by Bill Condon and production design by Sarah Greenwood in 2017) uses inanimate objects such as the clock, candlestick, and teapot, which are comparable to the characteristics of ordinary human beings and their everyday existence. They bestow human traits and theatrical “bits of business”, which help to deepen the immersive animated illusion for audiences to engage with.

Anthropomorphism, as constructed in such a nuanced manner, tends to highlight that there is always a human aspect present in the broader natural world. The anthropomorphic concepts used within films could have a risk of promoting an anthropocentric mindset when representing animals in an anthropocentric and stereotypical way.

3.3.4.2 Zoomorphism

Administering animal-like qualities and characteristics onto inanimate objects, humans, and any non-animal elements are called zoomorphism (Nanay, 2018). An example used in many fantasy films is Therianthropy - the ability of a human to transform into an animal (Literary Devices, 2016). In *Harry Potter and the Order of the Phoenix* (directed by David Yates and production design by Stuart Craig in 2007), Sirius (Harry's godfather) transforms into a dog to accompany him undetected through a train station. Sirius has given some dog characteristics, for instance wagging his tail while the human qualities remain.

The assignment of animal characteristics to humans and objects aims to examine and highlight the human-animal relationship (Nanay, 2018). Zoomorphism acknowledges the similarities between humans and animals, and its objective is to create an interrelation within all ecological factors. Zoomorphism can hopefully demonstrate and enhance the notion of what all environmental communicators, including Brereton (2019) affirming, that everything is connected. Zoomorphism depicts how humans, animals and the environment can live as one and can be illustrated by emphasising how these elements are cohered within one in a fictional world. For example, in *The Wolverine* (directed by James Mangold and production design by François Audouy in 2013), the character of Wolverine (Logan) is based on the muscular carnivore, who remains an alpha male as he struts about the cinematic space. Gulo Gulo (the scientific name for the Wolverine animal) and the character of Wolverine has a similar facial hair structure to the animal. Logan's hair bumps mimic this animal's ears (Figure 3.7). Zoomorphism can be used to create environmental and animal awareness and inspire to promote audience empathy and conservation towards ecology.



Figure 3.7: Maritz, *Wolverine* 2013, 2017. Image. (Bryant, 2017).

3.3.4.2.1 Reimagining the concept of biomimicry within zoomorphism

Biomimicry enhances human engineering by adapting natural occurrences into solutions that are transformed to aid human designs (Farnsworth, 2021). For instance, Pigeons and their flight behaviour were used for inspiration, in 1903, for the first flying machine designed by the Wright brothers. Biomimicry has influenced many fields, from medicine and education to film. Designs pursuing biometrics permit human productions to have greater efficiency, resilience and sustainability (YouMatter, 2020). For example, Mercedes-Benz's latest car model made an appearance in James Cameron's film *Avatar*; an electric vehicle wrapped in bionic flaps aims to present how machine and man integrate to effectively live responsibly in nature (Korosec, 2020).

Biomimicry mimics and gains understanding from strategies used by other species, ultimately striving to design products and processes to resolve sustainability issues and create a harmonious cohabitation with the environment (Biomimicry Institute, 2020). The principle of biomimicry explores nature and its components to solve technical constraints (Hashemi and Lindemann, 2019). For example, when looking at how mosquitos suck blood and mimic that motion and the insect's mouthpiece

to produce a micro-needle to create a pain-free and practical blood drawing experience (Holloway, 2018).

Logan's (Wolverine) animal-keen senses are used to fight and underpin his unique special skills by reimagining biomimicry as a sub-section of zoomorphism (Figure 3.7). For example, his animal-like speed and strength are influenced by the Gulo Gulo animal. Another production design detail using this principle is Wolverine's blade-like retractable extensions. This claw-like mechanic aims explicitly to represent and mirror the claws of a Gulo Gulo (Figure 3.7). Although the Gulo Gulo's claws are non-retractable, the blade-like extensions resemble this claw structure by being curved and long. Even though the claws are not an exact match, the biomimicry aspects can still be considered efficient.

3.4 The cinematic experience

A cinematic experience is an interaction between the film, the audience and the formation of attitudes and emotions (Rogers, 2013). Singer (2008) corroborated this by stating that the use of technical devices in cinema, creates aesthetic value, which in turn creates interaction by communicating themes and ideas.

3.4.1 Audiences experience

Numerous films have achieved "iconic status" due to them being memorable to audiences, such as *Alien* (directed by Ridley Scott, production design by Michael Seymour in 1979), and *Indiana Jones* (directed by Steven Spielberg, production design by Norman Reynolds in 1981). Memorable films evoke strong emotions and leave lasting impressions, whether it is fascination, shock, curiosity or elation, and could lead to debate and action (Rogers, 2013).

The behaviour of characters and the props used in film are incredibly influential (Maasdorp, 2021). Shorter (2021) states that "production design

is a character within film”. To reiterate what Maasdorp (2021) expressed, “if they see that Angelina Jolie, that her character is using a reusable cup in whatever big Hollywood movie she is in, people are going to go out and look for that same cup”.

3.4.1.2 Fan culture/fandom

“Fan interaction with media becomes a social activity, and this process allows fans to build their own communities in which they can express themselves. In doing so, they create spaces where they can critique prescriptive ideas of gender, sexuality, and other norms promoted in part by the media industry” (Grinnell College, 2020).

Fan culture and fandoms have become a widespread practise worldwide. Fan culture is the wearing of costumes (cosplay), makeup and taking part in events and activities similar to a character or film. Catherine (2020) expresses that “more and more travellers are visiting locations after seeing them featured in a film or TV show, a phenomenon we saw heightened after the release of the wildly popular film *Joker*, starring Joaquin Phoenix. Residents and tourists alike have been flocking to a formerly incongruous flight of stairs in the Bronx, where one of the film’s most memorable scenes was filmed. Visitors pose on the now-crowded staircase, some in full *Joker* costume, and post their images and videos under the hashtag #jokerstairs”. Fandoms can be formed not only from film and television but also from all platform games and books. Some popular fandoms are *Marvel*, *Star Wars*, *Harry Potter* and *Lord of the Rings* (GeekTyrant, 2020). These fandoms consist of thousands of fans that partake in these activities; according to Krivicich (2019), a fandom's platform consists of more than 200 million monthly users and more than 400 000 communities across TV, film and gaming.

Fan culture can be seen as evidence of how impactful film could be and how film can impact audience behaviour, lifestyle and mindset.

“Regardless of what form their fandom takes, fans are my favourite types

of consumers to learn from. Deeply knowledgeable, forthcoming with information, and passionate about the topic, fans make great teachers” (Kresnicka, 2016). “Entering the Dune fandom after the 2021 movie, to realise it is 80% Timothee Chalamet fans and 20% people who have read the books and memorised the canon in its entirety” (Peach, 2021). *Dune* has spiked a new fandom after the film in 2021, with social media discussions, cosplay, merchandise sales and fanfiction.

Fandoms form a big part of consumer culture; buying film merchandise, cosplay, going to events and conferences like Comic Con, travelling to theme parks or shooting locations. According to the Licensing Industry Merchandiser’s Association (Szalai, 2017), “Global retail sales of licensed merchandise rose 4.4% to \$262.9 billion in 2016. The organisation said results were fueled by movie-based merchandise from the likes of *Star Wars*, *Trolls*, *Batman v. Superman: Dawn of Justice* and *Finding Dory*”.

Through these practices, fandoms can thus have a significant impact on decreasing sustainability, over-consumption and carbon release. The question for a prospective study is when creating an environmental agenda in films that can influence new or existing fandom, can a more sustainable fandom or green fan culture be created? For example, can recycled materials be used by fandoms to replicate a character’s wardrobe for cosplay if the film used recycled materials for the film’s production design?

CHAPTER 4: METHODOLOGY AND CRITICAL ANALYSIS AND INTERPRETATION

A mixed-method and case-study approach will be used to obtain the data for the research.

4.1 Research methodology

In the course of this chapter, both data collected from an online questionnaire and online Zoom interviews will be critically analysed and interpreted in order to examine any potential links between the production design of a film and climate change innovation. A case study will further examine whether production design elements can be used as a framework to develop potential forms of eco-cinematic practices. All required ethical approval for this research project has been obtained from the Dublin City University Research Ethics Committee (REC).

4.1.1 The online quantitative and qualitative questionnaire

As mentioned in the methodology section, in Chapter 1, an online quantitative and qualitative questionnaire (refer to Appendix D) using a Likert Scale grading (1 strongly disagree, 2 disagree, 3 somewhat agree, 4 agree, and 5 strongly agree) will be used. As well as open-ended questions to determine if there are any explicit or even implicit connections between production design and climate change debate and innovation. The study chose to add somewhat agree (Likert scale 3) to give this option to the respondents that agree with the statement but only in certain circumstances. Several qualitative questions will also be included, as it allows the respondent to answer and clarify using as much detail as possible regarding a particular aspect. The questionnaire will consist of 45 questions that can be divided into 28 multiple choices and 9 open-ended questions and 8 personal information questions. Hopefully, these qualitative questions will provide comprehensive explanations toward a

fuller understanding of sustainable production design elements and environmental strategies for audience engagement. The study will be conducted in English.

The respondents will be chosen from active professional film industry members, especially producers, directors and production designers. The questionnaire targets these specialists considering they are the core creatives responsible for the information, tone and mood a film conveys and thus can provide responses most appropriate to this research agenda. Respondents will be recruited via email in the first instance. A contact list of potential respondents will be formed prior to the data collection process. These contacts will be formulated through a web browser, namely Google Chrome, as Chrome provides easy access and privacy and allows for better usage than other web browsers. As there are not many databases available with film production companies' details, the researcher will use Google Chrome and IMDb to compile a list of production companies. Each production company's contact information will be accumulated by visiting their website.

An estimated response of 100 (globally) will be used to obtain the data for the research project. It is agreed that most statisticians state that the minimum sample size for research purposes consists of 100 respondents (Tools4dev, 2021). For acceptable accuracy in such a survey as mine, 100 responses are adequate, and for increased accuracy, 200 responses are needed (Great Book Consulting, 2003). Research studies should have a minimum sample size of 100 respondents. Brock (2018) reinforced this by stating that a sample size of 100 respondents is considered valid for a research project. When using a sample size calculator, with the total population unknown – as it is impossible to calculate the total population for the research - and a confidence level of 99%, the sample size required is approximately 100-200. The confidence level represents the accuracy or surety of the responses. At a 99% confidence level, the researcher could be 99% certain of the responses given and the validity of the survey (Creative Research Systems, 2021). Therefore, for a quantitative

questionnaire, an aimed sample size consisting of respondents between 100 and 200 will be adequate and undoubtedly valid for the research being undertaken. Based on their willingness and availability to help with this research, these responses will be conducted on a global spectrum.

As respondents are experienced, adult professionals, any ethical or other risks for this form of research remain minimum. To ensure clarity and reduce any potential for misunderstanding or other risks, the Pro-forma email (Appendix B) will be sent out to potential respondents and will include a clear outline of the research project, the data collection process and a brief description of the questionnaire that includes an approval form (Appendix D). The respondents will be given an option of whether they require anonymity.

The questionnaire form (Appendix D) will be provided to respondents using a Google form platform. According to Melo (2018), Google forms “allows you to collect information easily and efficiently”. This globally and commonly known platform of the Google form is chosen because it provides an efficient, user-friendly and convenient platform for respondents. This claim is reinforced by Edelmayer (2020), “it is an app that is simple to operate, quick to complete, and easy for participants to respond to”. Google forms stores the responses online in a secure manner, ensuring data protection and providing the researcher access to the data at their own convenience. In addition, the responses will be stored on a password-protected hard drive and will be stored for one year after the completion of the research project.

A pilot study will be carried out with a number of colleagues, who will provide quick feedback to ensure the questionnaire is fully functional, clearly explicit and efficient. The questionnaire will take approximately 10 minutes to complete, depending on how much detail each respondent provides. One hopes, by partaking in this questionnaire, that respondents may benefit by learning different fundamental practices and may lead to an environmental ethical debate through discussing sustainable practices.

4.1.1.1 List of respondents

As stated above, the aim of the sample size is 100 respondents. However, despite repeatedly contacting more than 600 film industry members over a period of 10 months, a total of 57 responses have been collected (Appendix D). The number of respondents did depend on the willingness and availability of film industry members.

4.1.2 The online qualitative interviews

Ascertainment of personal opinions on various aspects of production design elements and climate change innovation will be gathered to help form additional data sets for analysis through the research project. The respondents will have an option to provide additional data by participating in a qualitative one-to-one online interview. The number of interviewees will thus rely on the availability and take-up of the questionnaire respondents. The interviews will consist of several open-ended questions so that these respondents can elaborate on their answers drawn from the questionnaire. In the interviews (Appendix D), the long-established routine of using the same probing questions will be asked in the same order designed to ensure facilitating comparison. Respondents will be audio-recorded and later fully transcribed (for verbatim transcripts, refer to Appendix D) and analysed. A thematic analysis of the data recorded during the interviews will be used. Thematic data analysis of interviews will be used to identify patterns and themes in the interview data. It will be used for both exploratory and deductive analysis due to the flexibility thereof (Mortensen, 2020). Consequently, the interviews' data outputs will be compared by searching for similar patterns and themes as well as identifying contrasting responses. The interview consists of a question that can be referred to as a case study (Figure 4.1 - 4.3). With the data gathered, a further explanation could suggest possible production design additions and alterations that could be made within these selected scenes and films and could be applied to other past and current film production.

The interviews will be carried out over Zoom. Partaking in an online interview rather than in person is more responsible considering the current pandemic, the restrictions imposed and also decreasing the research's carbon footprint. According to Giaquinto (2020), Zoom has an excellent interface that creates an effortless platform for the interviewer and the interviewee. This platform provides an efficient and reliable online interview method and includes an in-platform recorder that will be used to audio record the interviews for the purpose of creating transcripts and analysing the data. Zoom provides security for an online interview as these virtual meetings are encrypted (Elezaj, 2020). Approval forms (Appendix D) will be provided, prior to the interview, in order to state the respondent's permission on the recording and any privacy claims they might have to ensure privacy is regulated. Before a recording takes place, Zoom will automatically ask all interviewees to consent to the recording, creating a secondary approval measure. As stated above, the recordings, as well as the transcripts, will be stored for one year after the completion of the research project on a password-protected hard drive to establish data safety.

4.1.2.1 Case study

The case study of three chosen fantasy films will be discussed with each interviewer and will be used to examine whether it is possible to change or add production design elements to be used as potential eco-cinematic practices. Observation of the production design in each film, as well as a textual analysis of key scenes from the three films, will be examined to configure whether production design has the ability to create compelling environmental themes and a potentially eco-cinematic practice without affecting the integrity of the film. The examination will be carried out using an investigation of core concepts of environmental ethics, ecology, sustainability and zoomorphism. All of which will be designed to examine existing production design that can potentially be altered or enhanced and non-existing production design with additional elements that can be added. The specific data gathered from the questionnaires and interviews

will partially influence the proposed changes that the experts might consider in carrying out production design to take on board the environmental agenda.

The case study will focus on fantasy films due to their popularity in any age bracket and gender, calling on the activation of the imagination, which can have limitless possibilities. According to Newsday (2020), the all-time 50 highest-grossing films worldwide are categorised by 32% fantasy and sci-fi fantasy, 24% animation, 22% superhero Marvel and DC films, 18% action with a CGI element and 4% drama and according to Box Office Mojo (2021) the top 50 highest-grossing films contain 32% fantasy films, confirming the popularity of the fantasy film genre. According to Sibbald (2008), the popularity of fantasy is specifically rooted in the escapism it provides as well as the imagination and creativity it provokes. “There are so many different popular fantastical shows, films, and novels that you can find your own niche. If you do not like hobbits and elves, there are zombies and vampires. If you are not into superheroes, there are fairy tales. This openness to various types of stories may keep the trend from burning out as quickly as other trends do” (Barrett, 2012).

Fantasy films, in particular, are accessible across all age spectrums and remain very influential within fan culture. Fantasy has no limitations and affords endless opportunities for audiences to immerse themselves in another world. “Fan interaction with media becomes a social activity, and this process allows fans to build their own communities in which they can express themselves” (Grinnell College, 2020). “Fantasy film genre has an easier way to engage with this topic” (Donovan, 2021). Edwards (2017) states that fantasy has universal themes as well as the ability to assist audiences to process and exploring complex issues.

4.1.2.2 List of films for the case study

Taking into consideration that the box office ranking is indicative of the success and popularity of a film, three fantasy films are chosen for the

purpose of conducting case studies. Of the 32% fantasy films, excluding sci-fi fantasy, three were chosen as all were highly successful as indicated by their box office ranking, merchandise revenue and an audience score of above 70%. Talented creatives encompass various production design elements such as locations, time periods and style. Due to the broad spectrum of these films' production design components may represent a good cross-section of production design in general. The films are listed in ranking order.

Harry Potter and the Deathly Hallows Part 2 (2011) directed by David Yates, production design by Stuart Craig. Box office ranking 12 with \$1,401,659,552 (Newsday, 2020). Audience rating of 89% (Rotten Tomatoes, 2011)

The Lord of the Rings; The Return of the King (2011) directed by Peter Jackson, production design by Grant Major. Box office ranking 24 with \$1,142,271,098 (Newsday, 2020). Audience rating of 86% (Rotten Tomatoes, 2003).

Pirates of the Caribbean: Dead Man's Chest (2006) directed by Gore Verbinski, production design by Rick Heinrichs. Box office ranking 35 with \$1,066,179,725 (Newsday, 2020). Audience rating of 72% (Rotten Tomatoes, 2006).

4.1.2.3 List of film industry interviewees

Refer to Appendix D.

4.1.3 Academic online interviews

To expand on the research and also help to support the literature review, in Chapters 2 and 3, online zoom interviews will be held with academics (refer to Appendix D). Namely, respondents with extensive knowledge regarding climate change, environmental ethics, sustainability, production

design, biomimicry and zoomorphism, will be executed for the researcher's primary research. These interviews will focus on a general discussion around the set topic. The respondents will be selected from a list of sources used in this research project, and selection will be based on availability. The procedure for carrying out these interviews will adopt the same protocol as for the online qualitative interviews. Transcripts (Appendix D) will be made in assistance to collecting and discussing the respondents' opinions.

4.1.3.1 List of academic interviewees

A total of 9 academics (refer to Appendix D). The additional data for chapters 2 and 3 were collected from academics consisting of; two biomimicry practitioners, one climate change academic, one environmental ethical and eco-cinema academic, two film production academics, two production design practitioners and one sustainability consultant.

4.1.4 Dune

A case study on Denis Villeneuve's 2021 film, *Dune* (2021a), will be conducted. The case study will analyse the film production process, narrative, production design and place emphasis on eco-easter eggs and related concepts such as zoomorphism and sustainability. The opinions collected from the online questionnaire and online interviews will be applied to the discussion of *Dune*. The case study will be conducted to evaluate how the film's existing themes and production design, as well as the opinions discovered within both the questionnaire and the interviews, convey environmental messaging.

4.2 Questionnaire analysis

57 respondents are the final sample size for the online questionnaire (Appendix D for the questionnaire form). The analysis will use the

percentage of respondents to discuss the statistical outcomes found. Due to exceeding the word limit, the questionnaire analysis moved to Appendix C. Since the questionnaire consists of quantitative questions following a Likert scale, which is defined by; 1 strongly disagree, 2 disagree, 3 somewhat agree, 4 agree, and 5 strongly agree, as well as limited open-ended questions. It has been decided to move the questionnaire to the Appendix rather than the more in-depth qualitative online interview conducted with film practitioners and or the *Dune* case study, which provides a more practical assessment of a recent film's filmmaking processes and the production design as a potential new eco-cinematic practice.

4.3 Interview analysis

9.5% (18) of respondents participated in the online interview (Appendix D). A total of 16 interviews are used, in this section, to further analyse and discuss any potential links between the production design of a film and environmental awareness together with climate change innovation. The researcher found it more appropriate for the remaining two respondents' interviews to form part of the academic interviews used within Chapter 2. Similar to the questionnaire analysis, some questions have been conjoined in order to form a more vital understanding and a cohesive discussion. In the process of analysing the interviewee's responses, additional questions have arisen. Thus several questions have been added.

4.3.1 What is your experience of climate change?

Conroy (2021) states that unusual storms and or unusual frequency of storms have become the new normal. "Climate change is, of course, a huge problem, but it is only part of the problem" (Verweij, 2021). When asked whether interviewees believe that climate change is an issue, all acknowledged that climate change is an issue and can have severe repercussions. "I do not think there is any doubt that man-made climate

change is an absolute fact and requires action on a massive scale” (Hofeling, 2021). Such a response was typical of interview responses. With increased temperatures and weather changes, the environment, animals and people have endured numerous adverse effects, such as health issues; the heatwave caused heat strokes, interrupted daily routines and workflows and even caused loss of lives (Cheyenne, 2021). Recalling environmental and ecological disruptions and distractions; floods, blizzards and “when the air is full of smoke, and people cannot heavily exert themselves, it definitely affects things” (Fox, 2021). “The sky was orange”, Fox (2021) helps to explain that when they were shooting a film last September in Vancouver, Canada, they had extreme temperatures resulting in an unsafe work environment and putting the crew and cast at health risk.

Kozlova (2021) also emphasised that the environment and the climate in Canada have changed and have impacted production schedules and workflows; “whether it be more rain or just a way hotter summer and more heat in the summer somehow means more bugs, and just like all these different things that dare play into the difficulty of the shoot” (Kozlova, 2021). Meanwhile, Ordonez (2021) has a divergent opinion, stating that although climate change is an issue, weather conditions due to climate change can be effectively managed and utilised by production. He explains his outlook by expressing that productions can have a seamless schedule due to the warm temperatures and more sunny days, and in case these “ideal circumstances” get interrupted by unseen weather conditions that are not incorporated in the script; it can produce enhanced storytelling. When unseen and unwanted climate change effects occur, it could be embraced instead of film productions being despondent; Ordonez's positive outlook suggests that embracing these deviations could lead to an advanced film production workflow and increasing engaging and enriched storytelling.

Donovan (2021) expresses that the natural environment is being overused and overrun with resources in the construction of audio-visual production. Donovan provides the deterioration of plant, coral and fish life at the Great Barrier Reef as an example of how environments and ecology have changed in a few years due to human activity and therefore a result of climate change. Hofeling (2021) reinforced this attitude by expressing that the Great Salt Lake in Utah, is almost completely dry; he explains that this has never happened before in recorded history.

Few interviewees expressed concerns about how climate change, especially weather changes, directly impacts them personally and within the film industry than this contributor. "Certainly, where I live, we are suffering from the effects on a daily basis at this point" (Hofeling, 2021). Mary (2021) expresses that "I come from a city that has very little water resources left and 21 million people to give it to - having water being cut off for intermittent periods (is a major problem). Moreover, that is something that is very real, and that's already happening, which is a very good reminder of just how serious climate change is". Such evocative 'cautionary tales' of the reality of climate change tend to suggest that creative media producers can be very attuned to the need for a radical transformation in their work practices.

4.3.1.1 Sustainability and climate change

According to Ramsdalen (2021), Arnold Schwarzenegger said, "if you have two garages and in one of them, there is a fancy and expensive diesel car pumping out fumes and gases, and the other one is an electric car, and they are both running. He then proceeded to ask two questions, first, which one would you rather sit down in? Most people will choose the fancy, expensive diesel car. Secondly, which one of those garages would you sit down and then close the door behind you? "It just makes sense that you choose the electric one." Ramsdalen (2021) adds "we all understand that 10 cars will not make a huge impact globally, but 10 cars

in a neighbourhood will make an impact and it will feel a little bit fresher, a little bit quieter and a little more enjoyable”. In order to decrease the effects of climate change, we need environmental ethical innovation and adopt sustainable behaviour.

Fox (2021) provides that Vancouver is slowly enacting a disposable plastics ban. When asked this question, several interviewees referred to sustainability as encapsulating directly to their experience with climate change. For instance, Faber (2021) states that he lives on a “very small piece of Earth (referencing The Netherlands) with 17 million people”, and the pollution generated is very concerning. He added that there is a strong movement in his and several other countries to become environmentally friendly. Some solutions such as single-use plastic bans, recycling and reusing, waste control and minimisation of consumption can be reinforced to help mitigate climate change.

Furthermore, Verweij (2021) says that Japan, for example, has 12 different disposal points per city for all different kinds of plastic, and they have to separate every single thing. Nevertheless, for example, Amsterdam's living spaces are limited, and therefore, the space for different recycling bins is limited. Nonetheless, in Amsterdam, they walk or use bicycles, which is an environmental solution to fossil fuel cars.

4.3.1.2 Film making, sustainability and climate change

“I think, literally, it impacts everybody. Does not really matter what industry you are in, whether it is the paint that painters use or the materials that go into making the cameras that filmmakers use, et cetera, the papers that scripts are printed on, all of that stuff. I feel like you cannot really escape it. It is embedded in the fabric of our everyday lives even more than we realise” (Mpisi, 2021).

Glogauer (2021) adds that we are a throwaway culture, he provides a film industry example of catering during covid; catering was an open buffet where people were able to serve themselves by making use of reusable cutlery, but now in covid times, everything has to be pre-packaged in polystyrene and single-use plastic cutlery. However, some companies did move to recyclable materials, but this small change to one element in the filmmaking process has had a severe impact on the carbon footprint of film production.

For instance, Donovan (2021) emphasised that she has noticed a significant change in the amounts of waste generated. All craft objects like cups, plates, gloves, etc., had to be disposable during the pandemic, the waste generated during film production doubled. Glogauer (2021) adds to this throwaway culture statement that “a film generates a lot of garbage. I suppose people generate a lot of garbage, all the garbage is production stuff, in terms of what is in front and behind the camera”. Glogauer (2021) also expresses concerns about electricity power on set; “power is a huge issue on film sets because in South Africa, particularly because with Eskom (South Africa’s power supplier) is as unreliable as it is, you always take power with you. So you take your own petrol generators, and for the moment, there are not a whole lot of solutions for power, so power remains a problem”. This dilemma across much film production in certain regions of the world, in particular, can add a significant carbon impact since these generators are not environmentally friendly.

Faber (2021) states that green/sustainable filmmaking needs to be adapted within the film industry. “I worked on a film, and the producer at the start of the film had the mindset that we should try to produce as green as possible, so as climate-friendly as possible” (Faber, 2021). Adopting a more sustainable workflow and mindset is the first step toward creating an environmentally ethical industry. Conroy (2021) explains that working on an extensive series of sets, all based on winter and frozen lakes, was an essential part of the story and necessary for the production design. Since

frozen lakes were unavailable, they found a solution by using sculpted ice flows out of polystyrene and covering them with a rubberised medium to stop the polystyrene flaking. He added that since that was not the most sustainable solution and could have had environmental impacts, he would have been interested in a more sustainable solution. However, due to the time and cost constraints that they had, there were no alternative solutions. Conroy expresses that he is constantly looking for more eco-friendly solutions and materials. “I tried to persuade the producer that we put all our timber that was not reusable and gave it to someone so they could use it. But this was a real nightmare. It was a legal problem because they say if anything happened, if there had been a nail left in a piece of wood or something like that, then the production would be liable if somebody cut their hands” (Bunker, 2021). Bunker had the correct mindset in trying to repurpose the wood and giving it to people in need instead of being wasteful. Mpisi (2021) states that a film can be very disruptive to the environment whilst in biodiversity and nature because of a film's extensive raw nature and resource needs for content and story. She further explains by saying, “the movie *Finding Nemo* (directed by Andrew Stanton and production design by Ralph Egglestonin 2003) caused almost all clownfish to get extinct because people were fishing them all because kids wanted clownfish as pets”. Wilson (2020) reinforces Mpisi’s statement and expresses that following the success of *Finding Nemo*, 90% of clownfish has been taken from the Great Barrier Reef due to the increased demand for this specific fish species.

4.3.2 What is your experience with production design?

Fox (2021) “production design is the largest department for a reason, or at least it ought to be the largest department. It is building the world. It is everything that the characters need to handle, everything they need to stand in front of and it even touches on things like wardrobe and makeup”. All interviewees had a similar definition and idea of what production design in fact constitutes. They all agreed that it is visual storytelling and creating

a believable film world. According to Cheyenne (2021), “it is such a visual medium if you think about reading a book like there are so many other words in books that are not dialogue and production design is really filling in all those other words and helping you, understand the world, the people, the situations, and the tone”. The primary purpose of production design is to tell and enhance the story of film through the objects placed in front of the camera, excluding the actors (Berman, 2021).

“You are creating the visual backbone to the story or the narrative of the work. So the choices you make, it is all about enhancing. It is not about being the forefront, it is actually the scaffolding to the work” (Donovan, 2021). Bunker (2021) states that a production designer's obligation is to the overall look and feel. Kozlova (2021) explains Bunker's statement and says that the Production designers are responsible for creating the universe of the story, where the characters exist, and the storyline takes place. Donovan (2021) provides an example of how production design in *Minority Report* (directed by Steven Spielberg and production design by Alex McDowell in 2002) shows the use of advanced technology that inspired accurate technology to excel. Donovan adds that “sometimes production design can push technology, and sometimes technology pushes production design. So to be a production designer. You have to have a sense of childlike wonderment when you approach a project”.

Several interviewees expanded their definition of production design and stated that production design communicates additional information to the audience. Hofeling (2021) express how that production design “is an essential tool of visual storytelling and can tell you more about a character in the first frame of film than a writer can tell you about in 10 pages; I can show you their environment, I can show you their condition in life, how they have created space for themselves, whether intentionally or otherwise”. Similarly, Conroy (2021) highlights the importance of production design being communicated to the audience - the essence of the story and provoking the audience's attention to backstories, themes and additional information that needs to be told. Conroy expresses

concerns regarding the apparent absence or lack of production design, such as the Dogme movement used in *Dogville* (directed by Lars von Trier and production design by Peter Grant in 2003), which can be monotonous, and the lack of visual storytelling and visual cues can create confusion and misinterpretation within the audience. In turn, this can lead to the audience's lack of emotion, knowledge and tonal clarity. These interviewees emphasise that production design is a form of an educational tool within film since production design provides an "essential shorthand for the public" (Bunker, 2021); it gives an additional story without realising they are being told, and production design invites audiences to become immersed in that narrative and film world (Mary, 2021).

4.3.3 How do you see this specialist film area helping to promote innovative environmental learning/education/engagement?

Various interviewees emphasise why film can assist in promoting innovative environmental learning, education and engagement. Berman (2021) states, "films do shape the future. Science fiction shapes the future; talking about production design in terms of showing a film, how life could be posting sorting out the problems with the environment, perhaps that could lead people to try and push towards a future where those ideas become a reality". Film allows audiences to expand their knowledge and has the opportunity to educate people about past and present events, historical facts and social contexts. An example of *Gladiator* (directed by Ridley Scott and production design by Arthur Max in 2000) is provided by Melini (2021). Within this film, audiences get a better understanding of how the Roman Empire looked and worked. Similarly, additional films can educate and better understand other social and environmental issues, cultures, and belief systems. Corresponding to Melini's example, *Pompeii* (directed and production design by Paul W. S. Anderson in 2014) creates awareness of the historical events surrounding the eruption of Mount Vesuvius, taken place in 79A.D, in Naples, Italy.

Several interviewees expressed how film can help promote innovative environmental learning, education and engagement by promoting sustainability by the type of workflow adopted in production as well as how production design is produced. “I believe there are two different possible ways to do it when you are producing a movie; regarding what I am portraying and then the actual impact I have on climate change because every set production has an impact on climate change. So it would be of no use that I am being climate-sensitive in the message, but then I do not apply the same rule when it comes to pragmatic choices on how to conduct my work” (Melini, 2021).

Cheyenne (2021) adds to what Melini said and expresses that making the practice of filmmaking more sustainable is the first step and informing audiences that the film was sustainably produced. Secondly, using eco-friendly product placement companies both supports eco-conscious businesses and provokes eco-conscious consumption. Thirdly making use of eco-conscious production design features, such as using reusable paper towels, water bottles, coffee cups, bags and recycling bins, as well as production design sets, wardrobe and props being sustainably made; “It is a little less enticing if you knew that his costume was made from the slaughter of 10 Tigers” (Ramsdalen, 2021).

Some interviewees state whether it is possible for production design helping to promote innovative environmental learning, education and engagement. Fox (2021) states that “if production design can be done in a way that reflects the values of what it is doing, whether that is with a deep cultural understanding and direct representation by whoever is being represented on film and or if it is about doing things sustainably with an eye towards economic and environmental justice. That is the hidden piece of production design that does not stay hidden. It seeps out in what you make”. Kozlova (2021) believes that it is possible to have production design elements that could suggest environmental consciousness to create a robust form of sustainable learning within film production methods. Kozlova expands that in drama and comedy films, taking place

in the known world is much easier to accomplish since the climate crisis and sustainability exist in the present world. However, in created and or abstract worlds developed in Sci-Fi and fantasy, for example, these known sustainable elements (such as a recycle bin and solar panels) are not known in the set story world, and thus different creative solutions and depictions should be used in order to approach that same environmental agenda. Gloguer (2021) adds to these above statements and indicates that “there is the very obvious or not the obvious, the subtle ways of portraying, of promoting environmentalism - such as zoomorphism and introducing, good choice elements like the coffee cup thing. But then there is also the overall design where you show success in environmental connectedness and disaster in disconnectedness”.

A small number of interviewees expressed concerns about whether production design alone can help to promote innovative environmental learning, education and engagement. For example, Berman (2021) emphasises that “we are past the stage where micro-adjustments to behaviour are not enough even to begin tackling climate change”. Berman further explains that he does not deny that subliminal ideas could be conveyed. Nonetheless, he does not know if such a subliminal message will create any environmental connection, much less change audience behaviour. Because of their subtlety, he insists on writing scripts and producing storylines about environmental issues and climate crises instead. Donovan (2021) provides an example like *Raised by Wolves* (directed and production design by Ridley Scott in 2020) which shows how using the whole narrative can be used to tell the story and is much more powerful than just one element; “post-apocalyptic world and what happens when it is the devastation of the disrespect to the environment and what happens and I think that, in a sense”. When representing how environments and nature might appear, in future, due to human actions, it could emphasise what behaviour and mindset must be adopted to either prevent or encourage such appearance.

Kozlova (2021) counterargues Berman's and Donovan's assertion and believes that "I think that even if it is subtle, even if it is not super on the nose, I do think audience, especially attentive audiences, do pick up on things like that, and it does resonate with people, even on a subconscious level".

4.3.3.1 Credit or title sequence

According to Kozlova (2021), production design should not "bump in the story" and draw away attention. She explains that water running when for example, washing dishes, having a bath or shower and wasting water by leaving taps running can be very distracting in terms of audience members knowing that water is being wasted and this could trigger anger or unwanted emotion. Ramsdalen (2021) suggests that when communicating whether a film has used sustainable solutions to decrease the production's carbon footprint, it could convey an environmental message to the audiences and could inspire audiences' interaction with more sustainably made productions and, at the same time provoke eco-conscious debate.

4.3.3.2 Examples of films and production design that could help to promote innovative environmental learning/education/engagement

"James Cameron and *Avatar* (2009). He is very focused also on climate change, and of course, he is now making parts two to five of *Avatar*, I believe. But I mean, that is very strong, in your face, way of giving an audience entertainment, but also trying to provoke them to think about the world we are living in and how we should act in the world with regard to climate change and everything" (Faber, 2021). A number of other interviewees also responded by providing further examples of films that could be seen as explicitly promoting an environmental agenda. Melini (2021) explains that "if you wear an Omega, you feel like James Bond if you drive an Aston Martin, you are like a cool spy, or as the cool kid. The same thing can happen with sustainability". He further explains that if James Bond makes environmentally responsible decisions in the way he

operates and uses eco-conscious accessories, “maybe if you act that way, you are cool, instead of tossing a can on the floor, you actually toss it in the bin. You are cool because he does it”.

Mary (2021) references *Star Wars original trilogy* (directed by George Lucas (IV) in 1977; Irvin Kershner (V) in 1980; Richard Marquand (VI) in 1983) when comparing the context of The Empire and the protagonist. “The Empire is all technology, it is barren and sterile plastic metals, with no nature and every time we have heroes, there's nature and even messy nature, for instance when Yoda and Luke are training in the swamp, but at the same time, it is nature. Mary explains that when looking at this from all of those perspectives, the protagonists are always connected to nature, and the antagonists are always connected to destruction without nature. The interviewer made use of *The Lion King* (directed by Jon Favreau and production design by James Chinlund in 2019) to expand Mary's point of view; When Simba (the hero with a biocentric mindset) ruled, everything in the kingdom was in unison and thrived, this was juxtaposed with Scar's (the villain with the anthropocentric mindset) ruling, then everything was dystopian. This example provided by the interviewer to the interviewees will be discussed when analysing the case-study section of the interviews.

Hofeling (2021) uses the dystopian environments of *Mad Max: Fury Road* (directed by George Miller and production design by Colin Gibson in 2015) to emphasise a potential strategy of producing environmental awareness and hopefully provoking environmental ethical mindsets and behaviour. Hofeling expands that when the audience sees the destructive outcomes of anthropocentric actions and how the world is diminished it could provoke action since “that world, maybe it is exciting and crazy and the explosions are cool, but that's a terrible world and I don't want to live there”. Moreover, comparing that to the utopian environments of *Avatar*, “audiences will want to live in that world, and it is because the nature is so abundant and there's water and life”.

4.3.4 What is your opinion regarding alterations and additions to production design, to be used as eco-easter eggs?

“At some point, audience members will encounter the story of the production design. People will notice the fashion, people will notice the set decoration, and once they have an emotional relationship with a piece of media, if you can then give them a little something more talking about how or why it was made, they will remember that. That becomes the easter egg that I think you are talking about” (Fox, 2021). Easter eggs have become a successful tool in filmmaking. Mpisi (2021) adds that before audiences started noticing easter eggs, “I think the director of *Twilight* (directed by Catherine Hardwicke and production design by Dan Bishop in 2008) said it was little jokes that filmmakers did with each other, so the editors would include these little jokes that only they knew were there or that only they noticed and then, later on, audiences started picking up. Now, easter egg hunting is a thing on YouTube”.

Several interviewees shared insight on whether it is possible for eco-conscious production design alterations and if additions can be made in order to produce eco-easter eggs. Mary (2021) states that “I think some audiences pick up on subtle clues, and that is important. The more Easter eggs you have in the background, the more those little details will give you cues on what the character's personality is. That is the importance of that and the shorter your narrative, the more important they become”. Mary adds that since subtle clues can tell audiences more about a character, it should be possible for subtle clues or eco-easter eggs to also inform audiences about sustainability and all aspects of environmentalism. Mpisi (2021) echoes Mary's statement and explains the concept of easter eggs and why eco-easter eggs can become a solution in helping to create environmental debate and inspire sustainable behaviour. By stating that she is a huge Marvel fan, she believes that the Marvel universe introduced easter eggs to audiences. Due to Marvel, audiences have adopted a “look for hidden details” outlook, and it has progressed into a hunt provoking

audience engagement and debate. She explains that since becoming a fan she has looked for little details and easter eggs within films. Mpisi further suggests that showing positive, sustainable behaviour along with eco-easter eggs, such as “a character goes to throw away, let us say, a can of Coke, it could be so subliminal in the sense that in the place of one bin, there are three bins labelled: glass, plastic and cans. And they do not have to say a thing. But it is literally like even the character recycles, in your mind, it is like, you should recycle, too”.

Several interviewees provided opinions regarding what alterations and additions could be made to production design to create eco-easter eggs, “we actually gave all the characters their own that they used, and it did not destroy the story; it did not distract the story. It was their modelling behaviour. It will be about putting recycling bins in, it is as far as being environmentally aware” (Donovan, 2021). Mary (2021) emphasises that when audiences see characters interact with recycling bins and sustainable products, that could be a possibility to impact audiences in the same way - “that you use product placement to sell Nike shoes to young kids, even if the villain is the one that's running on them”.

Ordonez (2021) emphasises that it is as simple as replacing plastic with non-plastic, recyclable and reusable materials. For example, plastic cups versus reusable cups, and or characters recycling things and having recycling bins in the background of public spaces. Glogauer (2021) reinforced Ordonez's opinion and stated that film shows less plastic and replaces it with organic, sustainable and recyclable items instead. Placing reusable objects such as cups, containers and shopping bags within a scene, characters can be interpreted as being sustainable and incorporating these elements of reusing and recycling into a scene will subconsciously convey a positive ecological message (Cheyenne, 2021). For instance, in an intellectual character, the office setting can not only inform audiences about the archetype of the character but also come into play when those elements are eco-conscious and depict various forms of

environmentalism and help promote environmental awareness for the audience. Conroy (2021) uses an example of the types of books (as well as book titles), paintings, office supplies and other set decors deployed.

Another suggestion by Faber (2021) is to substitute meals for vegetarian or vegan dishes that were purchased at a local business rather than a sizeable anthropocentric supermarket. Faber explains that he worked on a film, and the scene in the script stated that the family is eating, but did not specify what dish, so in this circumstance, filmmakers can choose the more environmentally friendly option of a vegetarian or vegan meal instead of meat.

Some interviewees expressed concerns about production design alterations and additions and how the audience will react to these eco-easter eggs; “climate change is very important. Definitely. That is clear, no doubt about it. How do you implement it in a story, in a film, or in an audiovisual medium? How do you do that without being a preacher?” (Faber, 2021). Including environmentalism in the subtext of a film by using production design to produce subtle eco-easter eggs could be a way to create environmental awareness and add new modes of efficient eco-cinema production without being, as Faber said; preachy. Ramsdalen (2021) compared easter eggs and a stamp on the picture that communicates that filmmakers have thought about this when producing the film – a bit like the green low-carbon badge of approval. However, he expresses concern with such a process, which connects with worries by Faber, namely that audiences would not acknowledge these easter eggs, if when too profoundly hidden in the diegesis of the film or alternatively that this could break an audience's level of immersion with the narrative when too noticeable. He adds that a second and third rewatch is when the audience will acknowledge and interact with the easter egg, and reading about the hidden messages on social media posts or on a site could provoke debate and action. Ramsdalen’s concerns around the reading about these eco-easter eggs on social connect with what Mpisi (2021)

states about how easter egg hunting has become popular on YouTube and other platforms. Bunker (2021) adds to Ramsdalen's concern and states, if these eco-easter eggs are too obvious, audiences will think, "it is ridiculous". However, one might hope that using easter eggs to communicate practices that we understand, such as recycling, will impact audiences more effectively.

4.3.4.1 Normalising eco-easter eggs

Several interviewees expressed the view that film has the ability to normalise specific social contexts and, therefore, should be able to normalise environmental agendas. Verweij (2021) emphasises that "film is very influential. It is extremely influential. You can see that very clearly, for example, with the whole diversity thing and with people with different cultures, races and sexuality. They go through a bias, and it is really hard to get rid of those ways of thinking, especially for people who are a little bit older and already see that as a certain truth". However, filmmakers can make these concepts more harmonised and acceptable by showing these changes and demonstrating a surfeit of inclusivity within film. Cheyenne (2021) adds to the statement provided by Verweij and expresses that the association of ideas in a bigger context is significant. For instance, films having an LGBTQ+ main character, without the film being about the LGBTQ per se, helps to normalise such groupings within other communities. She believed that films like that do more justice work for equality than having a film explicitly pontificating and talking about the struggle. Having films with sustainable and environmental agendas embedded in them without having a need to explain or comment on these agendas could be extremely important in creating active awareness and promoting more broad-based eco-conscious transformations. An example of how a television show has accomplished normalisation is provided by Conroy (2021), referencing the period drama, *Bridgerton* (Created by Chris Van Dusen in 2020). He stated that environmentalism and sustainable practices, the same way as the colour-blind casting of

Bridgerton, can help to promote familiarity and maybe even change attitudes towards different contexts and issues.

Interviewees are certainly of the opinion that the normalisation of production design as eco-easter eggs can promote innovative environmental learning, education and engagement. "Yeah, you could do it within the same narrative. You can do the same action just with a slight change to what you would normally do. You can convey a different message, and once you repeat a message long enough, it could positively impact" (Melini, 2021). Verweij (2021) states that he believed eco-easter eggs, especially in fantasy films, are an incremental element that, when audiences see this concept enough, they will start to realise how beautiful and balanced out nature could be. He explains further that subconsciousness is seen numerous times in designs; where nature, animals, humans and architecture are harmonised, these eco-easter eggs concepts can promote biocentric mindsets and behaviour. "Subliminally, yes, I think 100% that production design is able to influence people, but it is not a sinister thing. It is just making sure that what we see on screen is something that we inspire that feels normal. We could create a new normal intensity instead of just copying what we have been used to seeing" (Ramsdalen, 2021).

4.3.4.2 *Solarpunk*

Fox (2021) emphasises that her recent science fiction production was about envisioning an optimistic, realistic future; they used cross-cultural and technological research to show people what a "better and greener" future could look like. She provides the concept of Solarpunk (Additional information regarding solarpunk can be requested, refer to Appendix D) as an example of how they accomplish this greener aesthetic; "if you look at green buildings around the world, and how those are incorporating and working with or often directly based on traditional local architecture". Creating a film world using traditional, sustainable and environmentally

friendly solutions together with organic and natural materials, forms and design to suggest how a “better” world can be achieved. These concepts of both solarpunk and zoomorphism could create new forms of eco-cinema.

4.3.5 Do you think the concept of zoomorphism can be used to create forms of eco-cinema?

Discussing zoomorphism and the concept of creating production design to reflect animals, nature and the environment, some interviewees express how this concept can work. “If you push people's attention towards thinking that paradise has a lot of nature incorporated to it, then it would certainly convey the message of paradise has clean water, paradise has trees, paradise has green stuff. If you make people want that and make that desirable and the good thing to do, then that could have a positive impact, and that could incorporate some environmental solutions, through zoomorphic concepts” (Mary, 2021). “I think it is a choice, but obviously, it is not always particularly. It is not always, something you necessarily can embrace, like if you are in a rocket ship, maybe, anything is possible; that is a knee jerk reaction that those rocket ships are all aluminium and shiny panels, they can be more intuitive or textured or nature/natural feeling” (Glogauer, 2021).

In many of the discussions conducted, the interviewees requested an example of zoomorphism - the example provided to them was the previous discussion of *Wolverine* in chapter 2; the character Logan is visually inspired by the Wolverine animal. Cheyenne (2021) places emphasis on the fact that the concept is hard to accomplish for specific environments. She explains that *Wolverine* is effective because it is good desi; it reinforces Logan as a character, enhances the story and communicates the intended super-hero message. She adds that when a message is not clear, a film's themes and motifs are not clear and “people will connect the dots and people will always try and link things together”.

“Sometimes they do pick animals to base the design from”, Donovan (2021) spoke about the costume design of the character Maleficent (*Maleficent*, directed by Joachim Rønning, Robert Stromberg and production design by Dylan Cole and Gary Freeman in 2014) being inspired by nature and that created a uniform visual storytelling element between her, the environment and the humans, connecting her with nature and interpreting *Maleficent* as a story about humans taking from nature and nature fighting back. However, she can be seen as “evil” the visual style of her costume design could communicate environmental motifs and could reference nature's power.

A few interviewees highlighted concerns about zoomorphism; Hofeling (2021) felt zoomorphism might be able to empathise with animals through; “you look at these animals or you see somebody embodying an animal attribute through behaviour or costume or something, and you think, Oh, yeah hawks are awesome and the world needs hawks, so let's protect them but if you are one of the Trump children, you are like, I would love to shoot that thing. I think it is just a matter of how you function as a human being, right”? He also expresses concern about anthropomorphisation, providing an example of *Happy Feet* (directed by George Miller and production design by Colin Gibson in 2006) and “how animals only become important when they become like us. I have no data to support any of that, I am just basing it on some assumptions or by anthropomorphising them. Are we learning to value them as they are”? Mary (2021): although she stated that zoomorphism has the potential to work, she emphasises that anything that is incorporated to evoke nature might be wrongly interpreted as just aesthetic and something historically accurate rather than an ecological or environmental message.

Lorenzo suggests that *Dune* (2021) is a perfect example of how zoomorphism, as well as eco-easter eggs, could be incorporated into a film to create awareness and, at the same time, enhance the storyline. *Dune* will be discussed in 4.4.

The assumption can be made that interviewees think that there is a possibility for zoomorphism to create environmental awareness and promote conservation. Audiences could be exposed to different aspects of the animal kingdom and could become empathetic towards nature. However, these interviewees still remain cautious since the anthropocentric mindset we endure could convert the ecological agenda into an egocentric agenda instead. For instance, having a film creates environmental awareness regarding octopi, hoping to provoke conservation within audiences but instead, audiences develop a need to have an octopus as a pet.

4.3.6 Case study: What production design alterations and additions in each screenshot would you acquire to accomplish conveying environmental awareness, promoting sustainability and creating biocentric subtextual themes?

Several interviewees struggled with this question. In order to create a greater understanding and more debatable environment for the interviewees, the interviewer provided opinions on what production design alterations and additions could be made, in each screenshot, to facilitate new forms of eco-cinema. These opinions were then discussed, and the interviewee's thoughts on the interviewer's interpretation were given. Discussion follows the decreasing Box office ranking order.

4.3.6.1 *Harry Potter and the Deathly Hallows Part 2* (directed by David Yates and production design by Stuart Craig in 2011)



Figure 4.1: Yates, *Common room*, 2011. Image. (*Harry Potter and the Deathly Hallows Part 2*, 2011).

All interviewees were in agreement that the production design in this scene perfectly represents the theme and motif of the story conveyed in the chosen screenshot. Several interviewees expressed that adding or altering production design within this scene could deviate from the intended motifs of the storyline. However, some expressed that certain additions could be made to enhance the essence of this particular scene. “Why that works the way it is now is because of the vastness, their sparsity, and the smallness of the people. The lack of hope and disempowerment is created by that space. If you were trying to put a layer of something else on top of it, you dilute what you are trying to create. If you put greenery in there, you start to make it warm” (Donovan, 2021). Faber (2021) added that when having a scene of hopelessness, nature or any element that could possibly evoke a feeling of hope would not be added. In the selected scene, hope is introduced to the hopelessness that befalls Hogwarts. Thus, the example of using plant growth within this scene was provided by the interviewer, for example, a dead flower being revived or ivy growth on the pillars. Kozova (2021) agrees that the plant growth concept could comment on environmentalism and enhance what is actually happening on screen without being too obvious. Ramsdalen (2021) suggests a character holding a tiny plant and states, “that would be

a nice little eco-easter egg connecting that idea of the leaves of one tiny plant and hope”. Ordonez (2021) connects with what Bunker expresses concerns that adding plants within scenes is environmental-unfriendly and provides the example of when he worked on a large scale set; plants on sets die because of the harsh lighting and extended periods of time plants need to be on sets. “Sometimes we have to have two very similar plants if the scene is divided in a lot of days because after one day and a half, the plants die, and we have to change this, and we are not doing well to the planet with that”. Using plants within this scene could enhance the story being told together with creating an environmental connection. However, it could lose the environmentally friendly intention when not treated correctly. Using reusable plants or CGI could be a solution to decreasing this concern provided by Ordonez.

To connect with the hopelessness motif and the statements above, a few interviewees expressed how the design of the set and the gothic style of the room enhances these themes and how the existing production design could promote a disconnection with nature that has the potential to impact audiences of environmentalism. Glogauer (2021) states that the dark cathedral aesthetic creates a feeling of emptiness and feeling of enclosure. He further states that “in that sense, it is probably very successful in having it taken from the natural world, it is disconnected”, and this could create a connection between loneliness and emptiness and the lack of nature.

In discussing this scene, a couple of interviewees commented on the hammocks. Kozlova (2021) states that “if there is a way you can utilise more natural material here, even like in whatever these hammocks are hanging, if that is natural burlap fibre that you can see more clearly, I feel like that always gives it a nice organic tone. Maybe again some colour palette or some wood elements could create a sense of connectedness with the environment”. The interviewer expressed that by using the concept of zoomorphism, the hammocks could mimic leaves or a seed pod that can reiterate this connectedness motif. “You can maybe shape

the hammocks a little bit more like they are leaves or something because this could also be in the deck of a ship. It looks like hammocks that fit in with *Pirates of the Caribbean* in the lower end of the decks" and making use of candlelight to brighten this scene, as well as in the entirety of *Harry Potter*, organically shaped lanterns could be used as a form of zoomorphism (Verweij, 2021).

Glogauer (2021) explains that in a world of magic, wizards can come up with sustainable solutions to these tasks; Glogauer provides another example with "Herbology and Potions, there could be those sorts of elements that could be bubbling, somebody chopping up fresh ingredients or who knows, in the world of the world of witches often there is a whole lot of references to the natural world, and with the power of wizardry it has an intimate connection to the natural world". And therefore, production design can show this connection and create empathy towards nature within the audience. In connection with Glogauer, Mary also states that "the entire *Harry Potter* world is very much tied into the love of nature and the wonders of the strange creatures", and due to this connection *Harry Potter* could be seen as promoting nature awareness. "So how could we then show in the context of their world that climate change is important as well? I mean, there would be huge possibilities of seeing how. Because I am not that familiar. Obviously, when they go through from our real world, they are leaving a lot of the problems behind. Say, for instance, flooding or violent weather, which seems to be things that they could fix with magic but they do not" (Ramsdalen, 2021). Since anything is possible in this magical film world, several interviewees provided how environmental solutions could have been introduced within *Harry Potter* - "if you live in a tall castle, you do not have modern plumbing, you need to carry your water upstairs. If you do not have windows, light comes from lighting things on fire" (Fox, 2021). Adding production design elements to communicate how specific daily life actions are performed could create a sustainable agenda, for instance, reinventing the concept of recycling to fit into the film world (Ramsdalen, 2021). Faber (2021) suggests, "somewhere in the last scenes, you have a big part of Hogwarts

destroyed, so you could maybe see that in a certain scene that people are already going through debris and deciding on what we can use again to rebuild forward”.

Other solutions to how production design in *Harry Potter* decreased the film's carbon footprint was provided by, Berman (2021) that gives the example of “how this slide here shows an example of how the film industry can help to promote new forms of environmental thinking. Those pillars that you are looking at are turned upside down. They are taken from another set that was used. This is a revamped set. This is basically another set turned upside down, the tops of the pillars chopped off, and those cases have been put in instead. So instead of another 100 tonnes of polystyrene going out the door. Going back to your previous point about how can productions themselves be less wasteful. Revamping is an excellent way of doing that and this is probably the perfect example of revamping” while Ramsdalen (2021) emphasises that the death of Dobby could have a negative impact on the environment. Dobby died at the beach, and Harry left a grave where Dobby was buried. Since this film, fans have been visiting Dobby’s gravesite, leaving rocks as tribute. Even though rocks and pebbles are not considered environmentally unfriendly, the act of hundreds of fans travelling to a film tourist attraction adding numerous amounts of rocks could impact the environment of the beach. Ramsdalen (2021) made the statement of Dobby participating in a type of magical beach clean-up or Harry “picking up a piece of plastic and vanish it away, if everybody went to a beach they would pick up a piece of plastic”. Imagine where Dobby died, they planted a tree. How many trees would have been planted by now?

In summary, the interviewees are of the opinion that adding an additional subtextual story of hope, by reviving a dead plant or having some greenery grow after Harry’s entrance, could create a link between us and the environment, and the connection could possibly create an environmental ethical mindset. *Harry Potter* is a magical, fantasy world where anything is possible, and interviewees believe that the universe of

Harry Potter could showcase various eco-conscious solutions and practices to promote sustainability. The interviewees state that the world of Harry Potter already has the ability to create environmentally friendly awareness and subtle production design additions could prompt debate and hopefully evoke action.

4.3.6.2 *The Lord of the Rings: The Return of the King* (directed by Peter Jackson and production design by Grant Major in 2003)



Figure 4.2: Jackson, *The Ork*, 2003. Image. (*The Lord of the Rings: The Return of the King*, 2011).

“The story itself helps a lot” (Bunker, 2021). Interviewees expressed that *The Lord of the Rings* film franchise and *The Hobbit* film franchise have commentary on environmental issues and these franchises are good examples of films conveying varying levels of environmental awareness. “That is a good one because it does show what happens when the world goes wrong. These films that have evil and then darkness descend, are pro-environmental films because you are showing what happens if we do not act. The unfortunate thing is that the environment goes back to utopianism, but it will not go back easily for us in the real world” (Donovan, 2021). Melini (2021) emphasises that “*Lords of the Rings*” is a great example. He suggests that they achieved impacting the environment both negatively and positively; “the first colossal, they chose to go to New Zealand to shoot pretty much most of the movie, and that had a huge impact on the environment in New Zealand”. He explains by stating that

they build sets into the existing environments for big scenes and only use miniatures for the small scenes. “The second colossal is, if you think about the Shire compared to Mordor, there is a massive difference”. Melini expressed that the juxtaposition between the environments and the creature together with the morals within those environments impact audiences on good and bad acts and environmental behaviour.

Several other interviewees discussed the contrast between the locations, environments, and film settings in connection with the above. Berman (2021) expresses that these films create the “idea that it could make a connection to the natural world because you get people like the hobbits who are very much part of their environment”. He further explains that “the domain of those orcs, live in Mordor, which is burnt and an apocalyptic Earth; it is volcanic, and nothing grows there. Whereas your heroes, the Hobbits and the Elves, live in lush woodland and lush environment. You could make that connection, that good equals green and healthy planet, and Orcs equals bad, scorched Earth kind of thing”. Hofeling (2021) summarise the film world and states that the Shire is a harmonised, balanced environment, whereas Mordor is a polluted, exhausted and trampled environment. Natural elements can be seen throughout the world of *The Lord of the Rings*. The juxtaposition conveyed between the aesthetics of these locations and environments creates an environmental agenda of good and bad environmental ethical behaviour and how our actions impact nature (Faber, 2021). The contrast in the production design between the different locations creates environmental awareness that our actions towards nature have an impact and lead to increasing environmental issues.

“This movie allows you, all these films, allow you to do something more to where your environment can very much serve both the story, but also have some environmental message, even if it is subtle and I think it can be done without it bumping the story” (Kozlova, 2021). A couple of interviewees made suggestions concerning production design additions that can enhance the story and convey even more environmental awareness than

the film already communicates. Glogauer (2021) suggests adding a water supply in the village that communicates pollution, and this idea could also be projected in the sky and the soil. Glogauer further states, "I suppose the way to convey that is to show contrast; this was once a healthy, integrated village, now it is broken and dying or diseased because the connection to nature is cut off". Bunker (2021) suggests creating the concept of composting, recycling and reusing to suit *The Lord of the Rings* world. Bunker provides an example of how this concept could be achieved and states that "Frodo being very meticulous about the house and picking something up, which is obviously recyclable and put it in a different bin, maybe he has two wooden tubs in his kitchen, and he looks from one to the other and thinks to himself, "oh, this is recyclable. I will put it in that bin," and in a sense, because it is not of any period as we know it, people are not going to say, "oh, they would not have had recycling bins in those days," but you could as a hobbit, you could have one and then you might see the Orcs just throwing stuff away carelessly".

Berman (2021) discussed an example from *The Lord of the Rings: The Two Towers* (2002), "the scene you were talking about where those Ent creatures see the chopped forest, whether they were thinking, this will be good. This drives home the thought about deforestation and deciding to fight back". Berman states that audiences could make an environmental connection within that scene and the entirety of the franchise. Cheyenne (2021) reinforced this by stating, "when the Orcs chop down the trees, that is probably the most in your face what happens when; there is the connection to human expansionism and how we treat our planet, chop down trees, burn them and create factories. I think it is quite probably all the films that we are talking about how it is the one that has the most overt environmental themes because it is about the impact of our actions".

Interviewees discussed the overall concepts, motifs and production design in *The Lord of the Rings*; however, when asked explicitly about this chosen scene and screenshot, the interviewer provided the concept of,

similarly to the plant growth and representation of hope under 4.3.6.1 *Harry Potter and the Deathly Hallows Part 2*, substituting the dead plant for a lush green bush, that decays when the Orc enters. “I think that could work, just showing that this evilness is portrayed through killing the environment, and I think it is just those really small associations that go a long way in the long run. If you have many movies using this, then I think it will work” (Cheyenne, 2021). Ramsdalen (2021) states that this concept is more of a direct eco-easter egg that could blend into the film world and create a subtextual environmental message. “I think that could maybe emphasise it even more, but I think it is already very much the theme of the whole thing” (Verweij, 2021). A couple of supplementary suggestions were provided by Mary (2021), including having water sources dry up as Orcs walk past showing the notion that evil destroys nature, adding dead animal carcasses (Kozlova, 2021). Furthermore, Fox (2021) considers “adding the scars of warfare or mining that are a lot more explicit and large, economically-specialised, population-dense cities, people do not just leave them overnight, something goes wrong and if you can show the environmental damage in some way so that it is very clear to the audience what has happened here; why cannot people grow crops anymore? If you show like some tools lying about, if you show that the earth is cracked, that will communicate what you need. Likewise, war is incredibly environmentally destructive”.

In summary, the interviewees believe that the entirety of *The Lord of the Rings* could be interpreted as conveying a climate message and commenting on the climate crises. The contrasting landscapes and environments along with the juxtaposition between the species together with their ethics and environmental morals, create environmental and biocentric awareness and could possibly prompt biocentric mindsets and environmentally friendly behaviour. Additional production designs that enhance environmentalism and or the lack of eco-consciousness could be implemented in order to increase environmental awareness.

4.3.6.3 *Pirates of the Caribbean: Dead Man's Chest* (directed by Gore Verbinski and production design by Rick Heinrichs in 2006)



Figure 4.3: Verbinski, *Captain Jack Sparrow's Cabin*, 2006. Image. (Pirates of the Caribbean: Dead Man's Chest, 2006).

Similar to the responses provided for *Lord of the Rings: The Return of the King*, interviewees express that the world of *Pirates of the Caribbean* display lush environments that encourage a connection between humans and nature. Kozlova (2021) "I think there is already a decent amount of not too on the nose integration of natural world here". Glogauer (2021) states that "in these environments, he goes to very lush kinds of these islands where he stretches in and encounters these other people, so I think there are some natural connections". Donovan (2021) states that the biodiversity seen in these films can create environmental awareness since it communicates numerous aspects of the world to the audience. Mary (2021) explains that even though this film is a period fantasy piece, she believes there is an opportunity to add certain additional elements that will fantastically convey nature.

A suggestion provided to the interviewees is the use of CGI fireflies as a light source; the interviewer gives the example of when learning about how Weavers are born with immediate knowledge of how to tie different knots. Weaver's nests are one of the most intricate nests in the wild, and when learning this fact, the interviewer developed tremendous respect and admiration for these birds. She then made the assumption that when the

audience's environmental knowledge could be expanded that this could create the same greater respect and admiration for environmental elements and lead to environmentally friendly and eco-conscious mindsets and behaviour. Fireflies and or other organic light sources introduced within this scene could produce species and environmental awareness; of course, these elements should be sustainably produced and or use CGI to accomplish this. "It might show, it enhances the look for sure, and it could engage with him; they could pass over the paper and illuminate something. That is a great idea that some of the light is coming from these fireflies" (Glogauer, 2021).

Mary (2021) reinforces Glogauer's comments and states, "that would really carry the message across in a very subtle way but in a very effective way. Fireflies that help flat your path and work together with the good guys. That is a positive all-around". Several interviewees agree with the firefly concept and believe it could enhance the story, film aesthetic and audience awareness. "I could put him in a scene where he does not have access to this light, but he finds these fireflies that would make the impact of actually using the fireflies. It is stronger because we have already shown his dependence on a set of taking away technology, and he has to use the natural world. Fireflies could be something bioluminescent. That effect would definitely work" (Ramsdalen, 2021).

Faber (2021) provides an additional example "there is a certain kind of algae, a natural organism that in the spring, and it is in different parts of the world, when you walk through it, the whole water or the bottom lights up. It is mesmerising. He could be walking on a beach in a certain scene when we could have those elements. It looks really magical, but it is happening in real life. So again, the wonders of nature awareness". Including some natural elements that could make audiences aware of new and different aspects of nature could be highly impactful. Furthermore, Donovan (2021) provides that luminous jellyfish and other insects could be used (via CGI and VFX) in ocean scenes to provide light sources and create awareness of different species.

Mary (2021) states that zoomorphic elements had been used in pirate settings; for instance, “chandeliers would have claws on the bottom part so that the legs would resemble animal legs”. She continues and expresses that “here, you might be able to incorporate in the design that works in context with the time period. Fantastical elements that convey animals and that will tie them to the good guy have decorations that resemble animals, and that speaks to a love of nature”. Taking the concept of zoomorphism into consideration, several interviewees expressed how the candlesticks could mimic nature and animals however prefer to use organic objects and materials, such as reusing seashells for the base of the candles (Mary, 2021). Cheyenne (2021) connects with Mary’s statement and says that “Jack Sparrow is very improvisational and I think that you could show ways that he is maybe resourceful with objects around him and maybe less with recyclability, but with reusability; taking something that is trash and repurposing it into something productive”. Bunker (2021) and Donovan (2021) observed Jack Sparrow picking up seashells and reusing them for candles, bowls and cups which could promote sustainability. “In regards to sustainability, I think if we are talking 16th century, then things are pretty damn sustainable back then if I remember correctly from my time living - going on the assumption that it is in the 1500s, 1600s. If the production design can stay faithful to the types of materials that would have been used, everything’s organic, everything’s natural, then that in itself, I think, would register on the screen. The use of maps is also a nice little just nod to the natural world” (Kozlova, 2021).

Several interviewees provided additional solutions that could be made within the entirety of the *Pirates of the Caribbean* franchise. “The opportunity of having something like somebody throwing stuff off the side of the ship and boasting or something coming up and whipping him for doing it” (Bunker, 2021). Showing wasteful actions and the repercussions could be a way to introduce modes of environmentalism within the films. Like Fox (2021), some interviewees explain that climate issues such as over-fishing, whaling and drilling for fossil fuels could be commented on within *Pirates of the Caribbean* to create awareness and inspire change.

Glogauer (2021) express that adding exotic animal imagery along with Hofeling (2021) and Mary (2021), stating that adding more birds within the world and Verweij (2021) suggests showcasing different seeds, herbs, plants, and flowers could promote animal and nature conservation.

In summary, *Pirates of the Caribbean* have lush environments and are full of biodiversity; this already has the ability to speak on environmental issues and promote environmental awareness. Interviewees believe that using organic and natural solutions, such as the fireflies to illuminate the light, could create environmental awareness, evoke environmental debate, and lead to conservation. These interviewees additionally believe that introducing reused objects and reflecting on reusing behaviour could potentially promote sustainability.

4.3.7 Summary

The findings of the online Zoom interviews suggest that the interviewees do believe that production design can be used as an effective tool for environmental (eco-) cinema practices and, at the same time, help provoke climate change debate and innovation. The deduction can be made that interviewees believe that it is possible for production design to convey additional information to the audience and thus could be an educational tool for environmental awareness, promote sustainability and conservation, evoke environmental debate, biocentric mindsets and eco-conscious behaviour. Zoomorphic concepts could be applied to enhance production design to create these environmental agendas. Facilitate new forms of eco-cinema could be accomplished by considering how production design is produced, used and exposed, along with what eco-conscious production design and eco-easter eggs are used within a film.

4.3.7.1 Key findings

The key findings discovered within the interviews are; first, that film has the potential to mitigate climate change through eco-conscious practices and sustainable workflows. Secondly, a film can be used as an educational tool and communicate environmentalism and create environmental awareness. Thirdly, film assists in normalising concepts and ideas, and with the normalisation of environmental aspects, film could enhance environmentalism and sustainable debate and practises within audiences. Fourthly, the production design is used as additional information for the audience and communicates additional concepts, themes, backstories, characteristics, motifs and ideas. Lastly, eco-conscious production design and or eco-easter eggs within a film, particularly fantasy film, could create subtextual environmental awareness, promote biocentric values and help provoke sustainable mindsets, change and behaviour.

4.3.7.2 Key concerns

Similarly, to the questionnaire analysis, the critical concerns of respondents are whether a film could create an environmental agenda without firstly adopting a sustainable and eco-conscious workflow and perspective. Secondly, whether audiences will wrongly interpret these eco-conscious production designs, especially within zoomorphism and production design, and lastly, could environmental agendas be created by production design when the film's content and the storyline do not address environmental issues and include sustainability.

4.4 *Dune* (2021) directed by Denis Villeneuve and production design by Patrice Vermette

“I must not fear, fear is the mind-killer” (O’Hara, 2020, p. 41).

Frank Herbert’s (an American science fiction author) 1965 novel, *Dune*, has been visually adapted for film several times. A recent adaptation was

directed and co-written by Denis Villeneuve, a Canadian filmmaker, in 2021. Villeneuve brought in Patrice Vermette, a Canadian production designer/art director, to bring the world of *Dune* to life (Dune, 2021b). After conducting the online quantitative as well as, qualitative questionnaire and online qualitative interviews, it has become noticeable that several members of the film industry believe that Villeneuve's film, *Dune* is an all but perfect example of how film production design and concepts of zoomorphism could help create environmental awareness, evoke sustainable and conservation debate and might even provoke climate action. Therefore, an in-depth case study on the most critical production design elements within *Dune* will be highlighted in this case study.

4.4.1 Narrative and general theme of *Dune*



Figure 4.4: Villeneuve, *Harkonnen and the spice harvesters*, 2021. Image. (Dune, 2021a).



Figure 4.5: Villeneuve, *Freman sietch*, 2021. Image. (Dune, 2021a).

The eco-conscious messaging and subtextual environmental agenda created in *Dune*, are predominantly emphasised through the

broad-ranging production design features. The film depicts current environmental issues and comments on the anthropocentric views of the Harkonnen (Figure 4.4) and their need for power, as well as, the more biocentric lifestyle of the Fremen, who lives in apparent harmony with the desert and nature (Figure 4.5). *Dune* also consists of characters from House Atreides depicting general ethical values and in particular, more proactive environmental ethical behaviour. Nonetheless, there is still much to learn before a complete biocentric change can be initiated (Figure 4.6). Audiences also see a small fraction of the Imperial Army (Figure 4.7) and the emperor's greed, connecting with the anthropocentric views of the Harkonnens.



Figure 4.6: Villeneuve, *House Atreides Paul and Jessica at breakfast*, 2021. Image. (Dune, 2021a).



Figure 4.7: Villeneuve, *Imperial army*, 2021. Image. (Dune, 2021a).

Nick Riganas (IMDb, 2021) explains the plotline and states that in “the year 10191, summoned by the emperor to take over the stewardship of the arid, inhospitable planet Arrakis - the only source of Spice, the sacred hallucinogen - Duke Leto of the noble House Atreides and his family travel to the peril-laden exo-planet. But

there, beset by indecipherable visions, Paul Atreides, the duke's gifted son, finds himself caught between two worlds as the grotesque Baron Vladimir of the brutal House Harkonnen plots revenge. Now, the road to legend leads deep into the desert”.

Timothee Chalamet (Farley, 2021, p. 50) insinuate that “*Dune* recognise the ransacking of the earth, which was not without consequence”. While Villeneuve (Farley, 2021, p. 50) emphasises that “*Dune* is a love letter to ecology. And not in a tacky way”.

Villeneuve further explains that “the book for me is about prescience and prediction, a character that can see the future. I feel like Herbert himself had a good view of the future, people exploiting natural resources with brutality and other people fighting for the sake of nature”. He wants young people to discover this story through the film and fall in love with Herbert’s “beautiful ecosystems and unique relationship with nature” (O’Hara, 2020, p. 42).

The mantra “I must not fear, fear is the mind-killer” could be interpreted simply as people fearing the unknown. As several respondents and interviewees emphasised, film has the ability to normalise certain situations, communicate information surrounding situations and circumstances, and create awareness of issues we face today. The film could therefore turn uneasiness into an emotion of content within audience members; since when people understand climate change, comprehend the effect of anthropocentric human activity and are educated on how to decrease their carbon footprint, people are more content with their perspectives and behaviour towards the environment (Goodspeed, 2022).

Javier Bardem (Scott, 2021, p. 43), who plays Stilgar, states that “the earth has given us everything and we have not given anything back in return, other than pollution. *Dune* reflects the way our world has lost love, empathy and care for our planet”. As stated by the cast and crew of the film, *Dune* could clearly be defined as an eco-cinematic film.

Mould (2021) emphasised that “the film highlights how we must change our dependence on extracting resources to start a planetary healing process”. The film expresses how anthropocentric behaviour, represented by the Harkonnen, can lead to destructive circumstances and unhealthy situations in terms of the environment and its people. The Anthropocene gets juxtaposed with the more biocentric lifestyles of the Freman, who lives in unison with nature and are connected with the natural elements. Echoing the more environmental ethical perspective of the protagonist, Paul Atreides, it could be affirmed that *Dune* helps to promote sustainable mindsets (Mould, 2021). The question now is, did the filmmaking process follow in the Freman’s footsteps by also adopting a sustainable production and environmental ethical workflow?

4.4.1.1 Key theme

The key theme identified within *Dune* is the representation of anthropocentrism versus biocentrism while commenting on how we destroy natural resources, ecology and biodiversity for our own gain.

4.4.1.1.1 Key sub-theme

Investigated and discussed under section 4.4.3, a key sub-theme identified within *Dune* is the usage of water, the shortage of water and the importance of water that can be extended towards other natural resources.

4.4.2 The filmmaking process of Dune

Jordan, Wadi Rum and the deep dunes of Abu Dhabi together with the Origo studios outside Budapest and Stadlandet in western Norway were all used for the film’s, four-month-long, shooting locations (O’Hara, 2020, p. 41). According to O’Hara (O’Hara, 2020, p. 43), “I made no compromises, would become a theme when it comes to the scale of the

shoot”. While Villeneuve’s ambitions were “equally enormous” since the director insisted on shooting in desert locations and across vast sets with full-scale spectacular production design elements (Figure 4.8).



Figure 4.8: Villeneuve, Behind the scenes, *The Emperor's palace on Arrakis set*, 2021. Image. (Pierce-Bohen, 2021).

Timothee Chalamet, who plays Paul Atreides, echoes this statement, affirming that (Farley, 2021, p. 37) “thanks to Denis’ directing style, the incredible openness onset, the high level of production design and the limited use of CGI, they were all the things that made a movie of this size feel like such a beautifully intimate experience” (Figures 4.8 and 4.9).



Figure 4.9: Villeneuve, Behind the scenes, *Set for environmental lab*, 2021. Image. (Fixsen, 2021).

Sharon Duncan-Brewster (Farley, 2021, p. 35) expressed that “there was one set that felt like it was maybe half a football pitch”. Scott (2021, p. 42)

confirmed that the most extensive set was 92 meters long, 47 meters wide and 15 meters high (Figure 4.9). *Dune*'s film budget reached a whopping 165 million USD (€152m and ZAR 2.4bn) and, in turn, made over 400.7 million USD (€367.8m and ZAR 6bn) at the Box Office (IMDb, 2021).

4.4.2.1 Production design process

“When it comes to making movies, it is a production designer’s job to transport you to a different world. But in the case of *Dune*, Denis Villeneuve’s epic new film, that also involved creating entire planets” (Fixsen, 2021).

4.4.2.1.1 SFX

Vermette stated that new additional tricks were used, as green screens take actors out of the moment on the set. He expresses that with Paul Lambert's assistance, the visual effects supervisor, many elements were built and accomplished on set rather than in the post” (Bennett, 2021). “For me and Denis, design should be set in something that makes sense,” Vermette says. “When you ground something in a reality we can all recognise, it makes it easier for people to believe in the more fantastical aspects of your story” (Fixsen, 2021).



Figure 4.10: Villeneuve, Behind the scenes, *Sand screen at the spaceport*, 2021. Image. (Failes, 2021).

“We were forever blowing sand around (Figure 4.10)” states Paul Lambert; he explains that the SFX team used 18 tons of dust and sand during the production; “for the spaceport, where Paul and his family first get to Arrakis, we were blowing sand everywhere. Furthermore, the sequence at the very beginning of the movie, where Chani is telling the story of when the Harkonnens are leaving, this was literally just orange/brown plates with swirls of sand blowing everywhere. The plates had to be skilfully composited together to put the Harkonnen Sandcrawler into this swirling environment behind the characters” (Failes, 2021).



Figure 4.11: Villeneuve, SFX, *Vibrating plates*, 2021. Image. (Dune, 2021a).

As stated in Chapter 2, 2.2.1, For example, Failes (2021) explains that “Gerd Nefzer, the special effects supervisor, came up with the brilliant idea of a vibrating plate (Figure 4.11). Villeneuve wanted to see sand vibrating to give audiences a visual clue that a worm was coming, and Gerd built this massive 12 by 12 (3.65 meter by 3.65 meter) wide plate and buried it in the sand”. Even though the production cleared all machinery and apparel after the production and left the environment just as they found it, the disruption of the ground shaking within those four months of filming could have disrupted local desert biodiversity and could have left even more damage to the occurring natural surroundings.

4.4.2.1.2 CGI and VFX

Farley (2021, p. 46) emphasises that the only CGI/VFX added in post-production was the sandworm, with twin moons and spice, and the cast stated that they did not see a single green or blue screen on site. Farley (2021, p. 47) further explains that when set extensions were required, the production team used fabric-based screens that were dyed to the average colour of the set.



Figure 4.12: Villeneuve, CGI, *Brutalist-tinged environmental lab*, 2021. Image. (Fixsen, 2021).

Figure 4.12 illustrates the Brutalist-tinged environmental lab on Arrakis (Figure 4.9 depicts the set). Vermette expresses that “the spokes - which tower more than 24 feet (7.3 meters) above the ground - are made of cloth, which allows the visual-effects team to create texture using CGI” (Fixsen, 2021).

Failes (2021) refer to an interview with Lambert, where he emphasised that fireballs were used for the explosion and fight scene to get the timing and lighting accurate onset. The CGI team then had the correct references and shots to generate the final explosion/fighting scene in post-production.

4.4.2.1.3 Costume design



Figure 4.13: Villeneuve, *Freman Stillsuits*, 2021. Image. (Labonte, 2022).

Over 1 000 costumes were produced for *Dune* (Pierce-Bohen, 2021). Costume designers Jacqueline West and Bob Morgan used a cooling micro-layer between the skin and the famous Stillsuits (Figure 4.13), the costume worn by the Freman (Farley, 2021, p. 49). “The stillsuits are essentially survival gear for the harsh environment on Arrakis, but we were also filming in extreme temperatures,” says Morgan. “They have to look like a functioning water distillery while allowing the actors to move and do their choreography” (Okwodu, 2021).

Morgan told SFX magazine (Scott, 2021, p. 39), “it was a basic 3 part costume although it had about 125 pattern pieces. Each one obviously had to be costume built, but it was basically an underlayer and then a jacket and then a vest to keep it all together. Japanese fabric was used as a wicking layer that pulls moisture, and the base was made from cotton lycra”. He further emphasised that it was like a reverse wetsuit. No additional information was released on whether sustainable materials were used for other outfits, how the wardrobes were utilised after the production and what was done with the scraps.

4.4.2.1.4 Set design and set dressing



Figure 4.14: Villeneuve, *The set of the library in the House Atreides*, 2021. Image. (Fixsen, 2021).

“You need to understand visually that the family has a strong and very long history,” Vermette explains. Set decorator Richard Roberts sourced custom-made furniture, lighting, textiles (all of the rugs in the movie were produced in Denmark), and other dressing (Figure 4.14) and prop items, all of which were then weathered to an ages-old patina (Fixsen, 2021).

4.4.2.1.5 Key props

As stated by the cast and crew, the only elements created in post-production are the sandworms and some of the spaceships (O’Hara, 2020, p. 42).



Figure 4.15: Maritz, Behind the scene, *Ornithopter shoot*, 2021. Image. (Failes, 2021; Fixsen, 2021).

Vermette and the crew built full-scale models of these air transports - the Ornithopter (O'Hara, 2020, p. 42). Villeneuve (Scott, 2021, p. 42) stated that “when we flew in two Ornithopters (Figure 4.15), they had to be driven from BGI (supplies) at Longcross (studio) in Surrey to Stansted, the Ornithopters flown intact to avoid rebuilding when on location” - the biggest Ornithopter was 23 meters long and 15 meters big.

Furthermore, all props have been built or sourced. It is unclear whether the props are locally sourced and or where the prop pieces were acquired and whether they have been sustainably produced, similar to the other production design elements.

4.4.2.2 Summary

In summary, data regarding the film’s total carbon footprint and the implementation of environmental conscious workflows are not available. However, *Dune* has not received an EMA - The Environmental Media Association, Green Seal (explained under section 2.5.2.2). Consequently, an assumption could be made that limited eco-conscious efforts and or none of the sustainable practices had been fully implemented on set, taking into account the extreme sets needed for construction and other

production design used, as well as the locations and the enormous scope and scale of the film. It is unclear how the filmic elements of the film have been acquired and produced, as well as, stored, donated and disposed of. The crew of *Dune* could follow the toolkit created in Appendix A: Green-Production toolkit, in order to create a more sustainable film production and decrease the film's carbon footprint.

4.4.3 *Dune's* commentary on environmentalism and climate change through production design and zoomorphic production design elements.

Vermette (Scott, 2021, p. 42) expressed that “we tried to make everything as immersive as possible for the actors and Denis”. The essential production design elements within the film world of *Dune* are the locations (Caladan, Giedi Prime, Arakkis), set dressing (wall murals, palm trees and the bull imagery), costume design (stillsuits) and props (spice, worm, Ornithopters, hunter seeker, crysknife and desert mouse) as well as some secondary elements of the buildings and other production design components. These visual elements contributed to and strengthened the environmental agenda of the film.

Mould (2021) refers to Villeneuve and expresses that “the themes of his version of *Dune* speak to how fragile a planet’s ecosystem can be”. *Dune* has an underlying theme of how human activities could disrupt biodiversity, nature and the environment. “As climate catastrophe continues to unfold around the world, *Dune* points to the extractive nature of fossil fuel companies” (Mould, 2021).

The discussion will be based on information found, as well as, the researcher's interpretation, together with opinions collected in the online interviews and questionnaire. Since *Dune* is such an intricate and detailed work of art, the most critical storyline and production design elements will be discussed in the sections below.

4.4.3.1 Location and planets

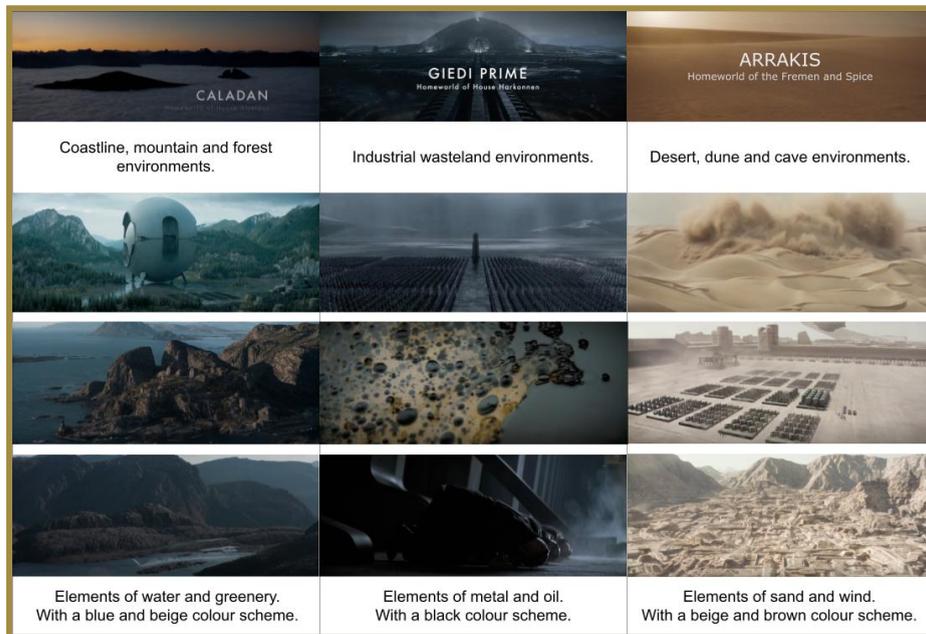


Figure 4.16: Maritz, *Dune location and world breakdown, 2022*. Illustration. (Dune, 2021a).

The visual significance of the locations represented in *Dune* is the contrast created between the ecology, environment and colour scheme (Figure 4.16). These three planets, Caladan (home to House Atreides), Giedi Prime (home to House Harkonnen) and Arrakis (home to Fremen), all have their individual and unique aesthetics that assist in storyline development and communicate both the archetype of people living within each film world and the environmental factors that each planet represents.

- The planet Caladan for instance consists of mountain ranges, forests and coastal environments. This world depicts lush green locations and an abundance of water, representing a healthy ecology and a more utopian atmosphere. To assist with this more utopian feel, a blue and beige colour scheme is created for the Caladan scenes. Homeworld to House Atreides, a noble family representing change, more specifically environmental ethical change.

- The planet, Giedi Prime, consists of industrial wastelands. This harsh, destructive atmosphere created is enhanced with elements such as metal, mist and or smoke, and oil depiction. The hostile planet is further enhanced with dark lighting and black colour schemes. Homeworld to House Harkonnen, the antagonists, are known for their power, brutality and anthropocentric mindsets and behaviour. Oil companies and climate disruption is interlinked with the Harkonnens and Giedi Prime, representing the depletion of natural resources and fossil fuel extraction.
- The planet Arrakis and the primary setting of *Dune* consist of a desert biome. According to Villeneuve (Farley, 2021, p. 45), the sandy, dune and rocky cave environments symbolise “the death of an old-world but also the birth of something new”. The planet’s environments are made of sand and wind. Arrakis makes use of beige colour schemes and organic materials to reinforce the austere environments. Homeworld to the Freman, a tribe that connects with the natural environment, creates sustainable solutions and practises a more biocentric lifestyle. The Freman respect and live in unison with the planet's environments and biodiversity. Together with the Freman, Arrakis inhabits spice, the desert mouse and sandworms. As Villeneuve stated, Arrakis and the Freman symbolise environmental rebirth and hope.

A theme of extracting natural resources along with sub-themes of the importance of water and water conservation is created with the production design used in *Dune*. The aesthetical difference between the planets and people in control of these planets assists in educating audiences on the type of behaviour that lead to dangerous environmental consequences, such as the depletion of specific natural resources. This visual aid could, in turn, contribute to the audience’s eco-conscious engagement with the text and even support perspective changes.

4.4.3.2 Set and set dressing

Vermette expresses that “architecture and design should respond to an environment and also respond to the storytelling” (Fixsen, 2021). The sets and their structures only enhance what the three planets represent.

4.4.3.2.1 Sets, buildings and architecture



Figure 4.17: Villeneuve, *Dune Arrakis Ziggurat architecture*, 2021. Image. (Dune, 2021a).

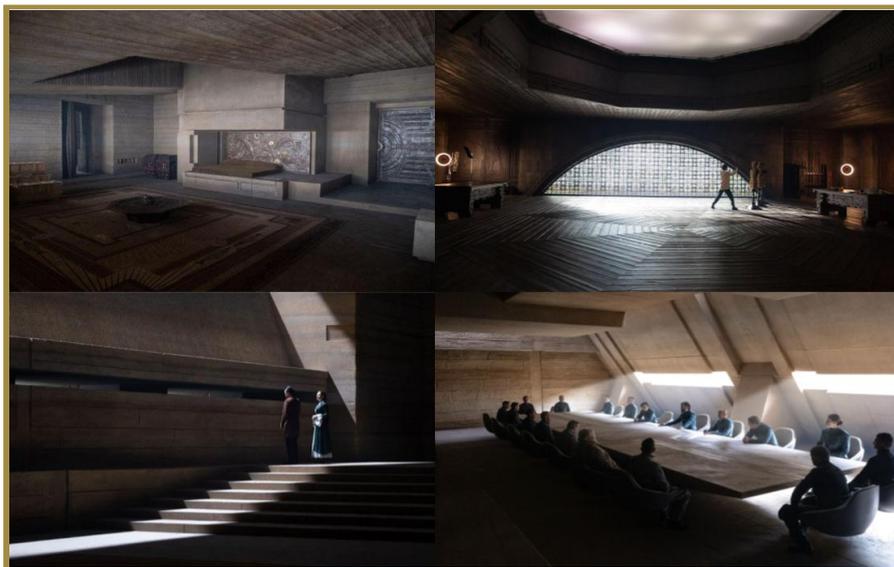


Figure 4.18: Maritz, *Dune interior design*, 2022. Image. (Dune, 2021a).

The exterior set design for Arrakis is highly inspired by Ziggurat architecture, as seen in Figure 4.17 (Scott, 2021, p. 43). Together with the interior set design of Soviet-era bunker architecture - best known for tall, open chambers (Farley, 2021, p. 45). The architecture in Arrakis has a stone and sand texture that emphasise the essence of the planet and the

unique nature of the Fremen. The set dressing, specifically the home of House Atreides on Arrakis and some sets on Caladan, are influenced by medieval Japan (Figure 4.18) “in their spartan furnishings, intricate screens, and diffuse lighting” (Fixsen, 2021).

Vermette explains why they used Ziggurat architecture and states that “Arrakis has winds of up to 850 km/h that would tear the pavement off the ground. You have to be true to the nature of things, the elements of the planet. I would start by setting the foundation of a city on Arrakis in a natural protective environment, which would probably be a mountain bowl. There you have protection from the wind, and the rocks would stop the worm from penetrating. Then you create very angular structures so the wind can just slip past the structure as opposed to smashing right into these buildings” (Bennett, 2021).

Whether the size and strength of the buildings prevent sandworm attacks, or the slanted windows serve as shields from the scorching sun, each visual element has been carefully considered and applied in conjunction with the story being told. “It is a perfect example of how nuanced decisions can play a part in an audience’s perception of a location” (Chrysostomou, 2021). Caladan, however, was explicitly inspired by Canadian architecture. Similar, to how the weather and environmental elements of Arrakis influenced Ziggurat architecture, Vermette chose Canadian architecture as the inspiration for Caladan since the planet has the same weather patterns and environmental elements found in Canada (Bennett, 2021). The set and set dressing assist in creating additional information about the circumstances of the planet and its inhabitants.

4.4.3.2.1 Set design and dressing easter-eggs

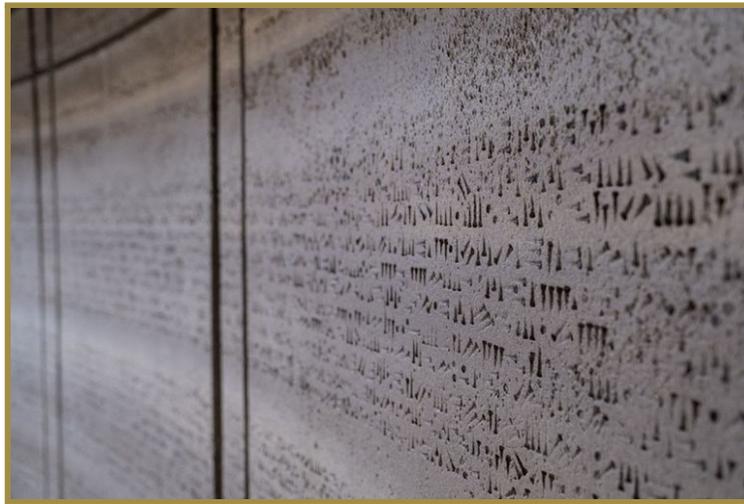


Figure 4.19: Villeneuve, *Dune stone texture as a written language*, 2021. Image. (Fixsen, 2021).

Fixsen (2021) suggests that Vermette divulges that “one nerdy detail that nobody would know about except me is that in the imperial lab, on the walls in the main room, it looks like a stone texture, but if you look closely, it is all a written language” (Figure 4.19).

That text, which looks like hieroglyphics, is the written version of a Fremen language created specifically for the film. Only Vermette and the most observant audiences will notice it, but that level of obsession, according to Vermette, is necessary for successful filmmaking and film (Fixsen, 2021).

4.4.3.2.2 Wall murals



Figure 4.20: Villeneuve, *Wall mural*, 2021. Image. (Dune, 2021a).

Throughout the film, 4 Art-Deco bronze wall murals (Figure 4.20) are seen inside the residence of Caladan and Arrakis. Vermette explains that one of the murals in Paul Atreides's room on Arrakis features a mural with Koi fish. He further expresses that one mural is of Shai-Hulud, the Fremen's sacred sandworm. "If you actually pay attention, they tell the story of Arrakis" (Fixsen, 2021). By using wall art within a film, visual communication on backstories, themes and situations could be provided to audience members. In *Dune*, the murals inform audiences of the characters - the mural in House Atreides depicts warriors. The circumstances of Arrakis - the mural of the worm. The importance of water and nature - is reinforced by the Koi fish mural. And the concept of everything is connected - the circle mural in Duke Leto's room the mural also refers to history repeating itself (refer to 4.4.3.2.4).

4.4.3.2.3 Palm trees

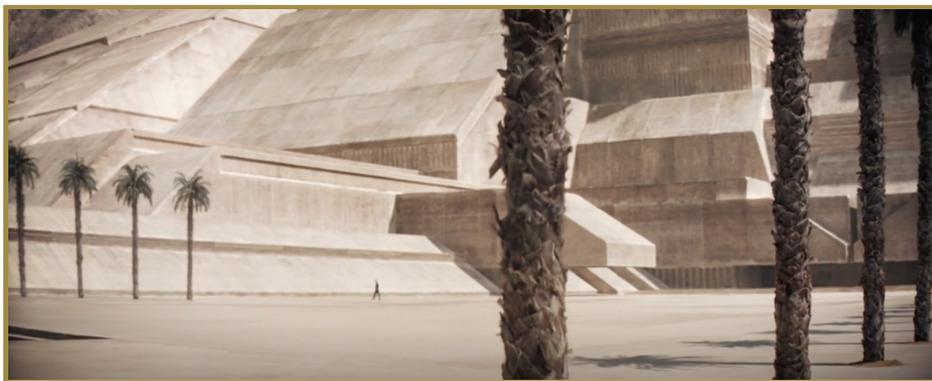


Figure 4.21: Villeneuve, *Palm trees*, 2021. Image. (*Dune*, 2021a).

The only greenery audiences see on Arrakis is a line of palm trees (Figure 4.21). The contrast between the colouring, size and movement of the palm trees, against the beige and sandy background, as well as, the other set dressing used throughout the film, communicate the importance of this natural element to the audience.

The importance and necessity of nature and plants get reinforced by the dialogue provided; Paul and the audience learn that one palm tree consumes as many as five men per day - twenty palm trees equals a

hundred lives (Dune, 2021a). Paul insists on taking out the palm trees in order to save the water and therefore save lives, but the caretaker strengthens the significance of all this by stating that the trees are sacred and need to be planted. The palm trees explicitly serve as a reminder of how valuable nature is as natural capital and connects with the sub-theme of the primary life-giving nature of water.

During the battle of the Imperial army and the Harkonnens against House Atreides, the palm trees are burned (Figure 4.22), symbolising the loss of humanity and environmental remorse of both the Imperial army and the Harkonnens. Audiences could easily make the link between Anthropocentric human activities of deforestation and the release of carbon dioxide, while at the same time, the destruction of palm trees certainly indicates severe environmental depletion.



Figure 4.22: Villeneuve, *Palm Trees on fire during the battle*, 2021. Image. (Dune, 2021a).



Figure 4.23: Villeneuve, *Greenery lab*, 2021. Image. (Dune, 2021a).

Later, audiences witness the Freman having harvested and protecting some greenery (Figure 4.23) in a lab setting. In many ways, this helps to

juxtapose the Imperial army and the Harkonnens through framing the Freman as a conservationist. This imagery unlocks the audience's memory of the palm trees and our dependence on nature. This palm tree production design element will hopefully influence or nudge audiences to become more empathetic towards nature and hopefully promote more conservational behaviour.

4.4.3.2.4 *The bull imagery*



Figure 4.24: Villeneuve, *Bull statue*, 2022. Image. (Dune, 2021a).

During the entire film, the audience sees visual cues (specifically, the bull is shown eight times) which are presented in different forms (Figure 4.24). The bull was represented in statues, taxidermy and engravings. In the film, audiences learn that Paulus Atrides, Duke Leto's father fought bulls for sport and died in a bullfight (Dune, 2021a). Silliman (2021) explains the bull's predominant visual cues, inferring that Paulus, who is full of both honour and a form of arrogance, walked willingly into the arena. He never expected to die, but Salusa Secundus killed him. Leto does the same thing by walking into the same self-righteous trap. He has no intention of dying but later dies at the hands of the Harkonnens.

“The bull from Salusa Secundus is emblematic of the Sardaukar, in turn, emblematic of the Emperor, who conspired to topple House Atrides. Not only that, but House Harkonnen possibly takes its name from the Finnish “Härkönen.” This name may come from the word härkä, which translates to “ox” (Silliman, 2021).

Silliman (2021) continues by expressing the notion that the bull represents both the Harkonnens and the Emperor. Since both parties were conspiring to kill Duke Leto and destroy House Atreides. The rich iconography of the bull indeed represents human egoism that could, in turn, lead to anthropocentric mindsets and regressive forms of behaviour. This bull imagery encapsulates the theme of *Dune* by foregrounding and creating a link between human egoism, the Anthropocene, the environmental crisis and climate change. Furthermore, by repeating this imagery, the production design highlights the central importance of this theme. The bull can also be interpreted as allegorically inferring that humans simply end up interfering with nature, with all negative consequences that follow. The repetition of this production design motif could help assist in the audience's realisation that human egoism and anthropocentric lifestyles could thereby lead to health- alongside environmental deterioration.

4.4.3.3 *Costume design, hair and make-up*

Costume designer West expressed that “costume is the bridge from actor to a character” (Okwodu, 2021). Okwodu (2021) emphasises that wardrobe adds an additional layer to the story and can communicate further information to audiences. The discussion below explores how the costume and wardrobe used in *Dune* reinforce the theme by calling attention to the character's archetypes and characteristics.

4.4.3.3.1 *Stillsuits*



Figure 4.25: Villeneuve, *Chani's stillsuit*, 2021. Image. (*Dune*, 2021a).

“A real functioning distillery” - O’Hara (2020, p. 41) references West, who explained that Stillsuits (grey in colour and resembling rubber material) - the desert wardrobe, was designed to “protect every drop of moisture in the body and recycled wastewater back into portable supplies”. The stillsuit reinforces *Dune*’s sub-theme of the primary importance of water for all life forms. Javier Bardem reinforces this by stating “in order to survive in the extreme situations of the desert, in order to recycle everything that is liquid and that includes saliva and urine” (Farley, 2021, p. 45).

“A Freman woman, Liet Kynes, also a planetologist, explains the stillsuits to Duke Leo Atreides. She states that “with a Fremen suit in good working order, you will not lose more than a thimbleful of moisture a day” (Foy, 2020).

The stillsuit (Figure 4.25) is a critical element for survival in Arrakis. The suit reinforces the theme of Arrakis’s need for water and connects with the motif of water shortage and the importance of such an essential life-giving liquid. These wardrobe elements could hopefully, in turn, help to inspire audiences to conserve water. The production design of these stillsuits serves to address audiences on sustainable solutions.

4.4.3.3.2 *Lady Jessicas and other House of Atreides and Fremen wardrobes*



Figure 4.26: Villeneuve, *Lady Jessica’s wardrobe on Arrakis*, 2021. Image. (Dune, 2021a).

Apart from the stillsuits, other Fremen wardrobes, as well as wardrobes worn on Arrakis by Paul and other members of the House of Atreides,

have an organic-like aesthetic. Loose, breathable clothing dyed in natural colours is given to the residents of Arrakis (Figure 4.26). This perfectly mimics Paul's and Lady Jessica's ability to adapt to the environment of Arrakis and could be interpreted as them becoming more biocentric, just like the Freman, as the film progresses.

Ferguson, who plays Lady Jessica, states, “the masks, veils, and bejewelled finery that Jessica wears during the film’s first half illustrate her position as a concubine, not a noble”. Refer to Figure 4.27. Ferguson continues to express, “she gets to wear the regal clothes, but when we meet her, she is still in chains”. “There is still a big hierarchal difference between her and the men making all of the decisions. She has this eye pendant that is a wonderful symbol of that and is paired with a gorgeous veil. Jessica gets to be in the big room, but there are no other women there. Still, she has power and can kill anyone with a snap of her fingertips” (Okwodu, 2021).



Figure 4.27: Villeneuve, *Lady Jessica's Wardrobe*, 2021. Image. (Okwodu, 2021).

“Part of capturing Jessica’s unique mix of vulnerability and strength came via the costumes” (Okwodu, 2021). The clothing of Jessica's character thus depicts character development, and as stated above, her eco-conscious perspective changes. As seen in Figure 4.27 that is in contrast with Figure 4.26. Paul’s character, however, is more or less in the same clothing style throughout the entire film (Figure 4.28), except for his noble outfit and black suit. This could indicate that he is already more environmentally conscious at the start of the film and through the acts of him studying the Freman language, sandwalk and how to properly wear a

stillsuit. The audience might infer that he respects the Freman culture and the environment and possesses more biocentric ideas and behaviour than the rest of House Atreides.



Figure 4.28: Villeneuve, *Paul's wardrobe*, 2021. Image. (Okwodu, 2021).

4.4.3.3 Harkonnen wardrobe



Figure 4.29: Villeneuve, *Harkonnen's wardrobe*, 2021. Image. (Dune, 2021a).

Harkonnen's wardrobe (Figure 4.29) is in stark contrast to other wardrobes found in the film. The never-changing black armour and bald hairstyles of the Harkonnens - which mirror and camouflage into the environments of Giedi Prime - emphasise the difference between the Atreides and Fremens, as well as their planets of Caladan and Arrakis. This contrast could imply the never-changing, anthropocentric mindset they possess and embody.

4.4.3.4 Props

4.4.3.4.1 Spice



Figure 4.30: Villeneuve, *Spice*, 2021. Image. (Dune, 2021a).



Figure 4.31: Villeneuve, *Spice particles*, 2021. Image. (Dune, 2021a).

“Spice (Figure 4.30) is a valuable substance that extends life, sparks prophetic trances and enables the galaxy’s guild of navigators to travel faster than light between the stars (O’Hara, 2020, p. 41). This also functions as a potential metaphor for oil and can also extend to other natural resources. O’Hara (2020, p. 41) explains that spice is a potential goldmine and powder key precious natural resource like oil, with the Harkonnens representing big oil companies and one of *Dune’s* themes speaking on fossil fuels extraction.

The sandworms produce spice, and - Ingolfsland (2020) explains that “the sandworms’ larvae produce the melange, also simply called the spice. In *Dune*, the spice is a mildly addictive drug that provides the user with medicinal and mystical abilities, such as long

life, greater vitality and prescience. The benefits of 'prescience' allow for interstellar travel, making the spice a key prize in the universe. Even more, the spice is only found on Arrakis, making the planet a key strategic outpost for the empire”.

Spice (Figure 4.30) is the crucial substance and the main spark for conflict that drives the narrative within the film. Basically, spice connects all planets and their inhabitants by allowing interstellar travel (fuel). Alternatively, Freman uses spice for its healing properties that increase their life expectancy (Scott, 2021, p. 30).

The contrasting usage of spice between the Harkonnens and the Freman calls attention to the contrasting values of anthropocentrism versus biocentrism. Although House Atreides travel to Arrakis to harvest spice for the emperor, Leto tackles the task differently by adopting a more ethical (in terms of the Freman and the environment) approach.

The contrast in behaviour and actions, with the production design aiding in this contrasting depiction (refer to 4.4.3.1 and 4.4.3.3), further communicates the importance of more sustainable, ethical behaviour and could assist in promoting the audience's eco-conscious perspectives changes. When someone respects- and embraces nature, healthier and more utopian environments/circumstances will be created. Although spice is used as a narrative tool, the production design of the spice dust particles (Figure 4.31) throughout the film reinforces this contrasting use and related ethical values.

4.4.3.4.2 Sandworm

Ingolfsland (2020) explains that aerial transport (Carryall) carries the harvester (Crawler), which is used to collect the spice and monitor sandworm activity. He further explains that the Carryall pulls the Crawler away to safety when a sandworm is detected. However, malfunctions could put men in danger (Figure 4.32).



Figure 4.32: Villeneuve, *Sandworm consuming a Crawler*, 2021. Image. (Dune, 2021a).



Figure 4.33: Villeneuve, *Sandworm*, 2021. Image. (Dune, 2021a).



Figure 4.34: Villeneuve, *Sandwave*, 2021. Image. (Dune, 2021a).

Sandworms are attracted to motion and detect when harvesters, as well as people move and are active (Figure 4.32). Sandworms will then create a sandwave, mimicking ocean waves (Figure 4.34) and move toward the vibration and consume the source. Similar to the spice, sandworms are used as a narrative tool and assist in the progression of the film (Figure 4.33). “Since sandworms are directly responsible for producing the spice, though, it is more advantageous for humans to keep them alive” (Ingolfsland, 2020).

Villeneuve stated that “for us, it was important that the worm looks like an animal that makes sense. To live through millions of years in the desert, you need a species that has evolved and has built protection against the elements. Its skin has to look thick enough to protect itself in the worst environment. The most important element is that when you see it, it has a sacred quality to it too. You will feel

like you are in a huge presence, a different kind of intelligence, something that is beyond our way of thinking” (Romean, 2021).

4.4.3.4.2.1 *Sandworm and an elephant metaphor*

While watching the film, the researcher interpreted the production design aesthetic (the look, texture and shape) of the sandworm as an elephant trunk (Figure 4.35).



Figure 4.35: Maritz, *Sandworm and an elephant trunk*, 2021. Image. (Dune, 2021a; Maritz, 2022).

The visual similarities (Figure 4.35) of the sandworm and elephant trunk:

- They both have a thick outer skin with a leather, wrinkly texture.
- The mouth of the worm is in a similar shape to the trunk.
- The movement of the sandworm and a trunk’s mobility is the same.
- The hairs from the worm’s mount reference the hairs within the elephant trunk.

The narrative similarities of the sandworm and elephant similarities:

- Sandworms follow vibrations, and elephants communicate with vibrations.

- Sandworms are the largest animal on Arrakis, as elephants are the largest land mammal.
- Sandworm heads and elephant trunks both act as their mouth, nose and hands.

According to Sheldrick Wildlife Trust (2021), trunks are used for smelling, breathing, picking up objects, touching and hugging.

- Trunks are a “very powerful yet delicate instrument, strong enough to break a branch from a tree and yet delicate enough to be able to pick up a blade of grass” (Sheldrick Wildlife Trust, 2021). Similarly, sandworms have the ability to break through metal.
- Sandworms, just like elephants, attack unwanted and non-naturally occurring objects to protect their young and their existence from danger. Elephants would not attack when they are unthreatened, similar to how the Freman respect and are non-threatening towards the sandworm.
- Sandworms are essential to keep spice production as elephants are a keystone species and play an important role in the environment.

Elephants are a keystone species, which means that entire ecosystems would look dramatically different or cease to exist without them. Key attributes of elephant as pro-environmental:

- Their dietary habits help control an ecosystem.
- Their movements could create new habitats for other animals and insects.

For instance, elephants can travel over 80km a day, and when it rains, their large footprints act as water collectors and serve as water sources for smaller animals (Sheldrick Wildlife Trust, 2021).

- Elephants face the biggest threats to their survival due to ivory poaching, human-wildlife conflict and habitat destruction. This could be interpreted by the sandworm tooth being removed in order to create the Crysknife (Figure 4.36) - a weapon used by the Freman. As well as the circumstances that the sandworm is in.



Figure 4.36: Villeneuve, *Crysknife*, 2021. Image. (Dune, 2021a).

With the similarities established, it could be possible for audiences to draw a link between the zoomorphic production design, animals and their ecological importance. The zoomorphic production design aesthetic of the worms thus communicates environmentalism. Using the sandworm as an educational tool for species and their contribution to ecosystems, environments, biodiversity and enforcing the notion that humans are dependent on these species and nature. Furthermore, the sandworm, as seen as elephants, could contribute to the importance of the water sub-theme by emphasising the lack of water and juxtaposing the idea with elephants' water dependence.

4.4.3.4.3 Ornithopters



Figure 4.37: Villeneuve, *Ornithopters*, 2021. Image. (Dune, 2021a).



Figure 4.38: *Dragonfly*, 2021. Image. (Maritz, 2021).

“The Ornithopter (Figure 4.37) is a critical ship for House Atreides, utilising its quick takeoff capabilities in both battles and to travel across Arrakis itself. Their design emulates the movements of a dragonfly, with the wings moving in such an insectoid manner” (Chrysostomou, 2021).

Figure 4.37 (compared to Figure 4.38) illustrates the dragonfly’s visual design of the Ornithopter. The zoomorphic design, similar to the design of the sandworm, communicates the importance of ecology and biodiversity to the audience.

The visual similarities and characteristics (Figure 4.37) of the Ornithopter and dragonflies:

- Both fly in the same motion and have the ability to hover above an area.

“Much like dragonflies, Ornithopters achieve flight by rapidly beating their wings up and down” (Northrup, 2021). Dragonflies can hover for up to a minute in one position. As well as change directions in flight and fly backwards and sideways (Picker, Griffiths and Weaving, 2019, p. 36).

- The metal structure of the Ornithopter follows the same exoskeleton structure of a dragonfly.
- Dragonflies are territorial, and their habitat, as well as a breeding site, consists of streams, rivers, ponds, lakes, and wetlands (Picker, Griffiths and Weaving, 2019, p. 36), reinforcing the importance of water and reiterating the abundance of water and more utopian environments of Caladan (refer to section 4.4.3.1).

Taking the characteristics of dragonflies and the zoomorphic production design into account, the more direct link between the desert, spice, sandworm and Ornithopter, as well as the more indirect link between the Freman and House Atreides, could be made while creating explicit environmental awareness and communicating the importance of water and natural resource as the core sub-theme, to the audience.

4.4.3.4.3.1 Other interstellar travel

Furthermore, other interstellar travels and imagery mimic additional species and environments, further reinforcing this sub-theme. For instance, a whale in the ocean (Figure 4.39).



Figure 4.39: Villeneuve, *Interstellar travel*, 2021. Image. (Dune, 2021a).

4.4.3.4.4 Hunter Seeker



Figure 4.40: Villeneuve, *Hunter Seeker*, 2021. Image. (Dune, 2021a).

The Hunter Seeker drones (Figure 4.40) are potentially lethal devices used for an assassination. To avoid detection, the biomimicry machine is small, and its design incorporates elements of other technologies seen throughout *Dune*. The device resembles the Ornithopter - mimicking a species' quick-moving wings and the proboscis (mouth) of a mosquito (Chrysostomou, 2021).

The mouth of a mosquito is a complex system of six thin, needle-like mouthparts that pierce the skin, locate blood vessels, and make sucking blood more convenient for the mosquitoes (Quirós, 2016).

This biomimicry and zoomorphic production design element is used as another educational tool for creating animal and environmental awareness. Audiences get exposed to different levels of biodiversity (loss) and can expand the audience's understanding of the ecological significance of different species. Even though the Hunter Seeker is represented negatively, displaying the ability to reinforce all the environmental themes (as stated above) within *Dune*.

4.4.3.4.5 *Desert mouse*



Figure 4.41: Villeneuve, *Desert mouse*, 2021. Image. (Dune, 2021a).

In connection with all zoomorphic production designs already discussed within *Dune*, a representation of a naturally occurring species - not a machine that mimics biodiversity, is illustrated by a desert mouse. The desert mouse, Muad'Dib (Figure 4.41), could survive the harsh environments of Arrakis (Dune, 2021a). Within the film world it represents Paul's willpower to become a more environmentally ethical protagonist.

Stevenson (Stevenson, 2021) expresses that the mouse has been associated with Fremen mythology. The mouse illustration is seen depicted on the planet's second moon. The mouse and the Fremen share the ability to survive within the open desert, creating a symbol of perseverance and ecological behaviour.

This desert mouse thus has the ability to promote the audience's environmental ethical thinking and eco-conscious perspectives. Together with the visuals of the small desert mouse, illustrated in Figure 4.41, the depiction of water droplets on the ear also reinforces that sub-theme around the importance of water.

4.4.3.4.6 *Other notable props*

In connection with the sub-theme of the importance of water and the biodiversity motif, several other props are used to emphasise these specific tropes, namely the sand, the tent and the beetles. The production design elements reinforce the eco-conscious perspective of Paul and the Fremen, communicating these perspectives to the audience and helping to provoke environmental ethical behavioural changes.

4.4.3.4.6.1 *The tent*



Figure 4.42: Villeneuve, *The tent*, 2021. Image. (Dune, 2021a).

Audiences witness Paul and Jessica in a tent (Figure 4.42), which has overlaid visuals of a dragonfly wing vine-like roof, helping to communicate the recycling of water and further symbolising the inter-connectedness of nature.

4.4.3.4.6.2 *The sand's movement*



Figure 4.43: Villeneuve, *The desert, sandwave and dunes*, 2021. Image. (Dune, 2021a).

As mentioned above, the movement of the sandworm creates sandwaves and the visual depiction of these waves, as well as the dunes, reinforces the idea of the desert (Figure 4.43) representing “an empty” or what once was an ocean, juxtaposing Caladan and Giedi Prime while emphasising the importance of water, with the assistance of the previously mentioned production design elements.

4.4.3.4.6.3 *The beetles*

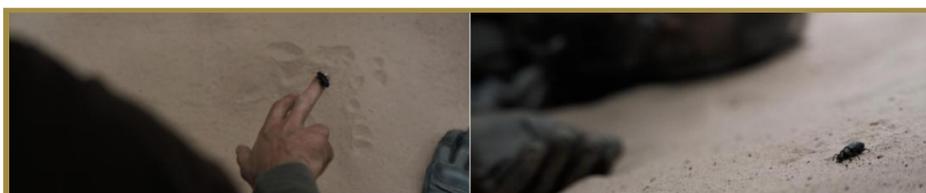


Figure 4.44: Villeneuve, *Beetle*, 2021. Image. (Dune, 2021a).

Audiences are shown two visual cues of black beetles standing out against the beige background (Figure 4.44). The beetle foreshadows Harkonnens and their return to reclaim Arrakis, as well as Duncan's fate within the second film. However, the beetle also dramatises Paul's gift of foresight and in turn, connects the audience with his more biocentric progress towards the end of the film.

4.4.4 Summary

Several production design elements have been left out of the discussion, and only the most essential elements have been discussed. "*Dune's* complex conspiracies, elaborate social structures and philosophical musings are a lot to explain and hold an audience's attention", however, the use of production design has achieved communicating the important messages to the audience without being too incomprehensible (O'Hara, 2020, p. 41).

The findings of the *Dune* case study suggest that the production design can be used as an effective tool for environmental (eco-) cinema practices. The production design within the film help communicate the film's environmental agenda and strengthen environmental awareness. Furthermore, a study with audience members should be conducted to determine whether the film provokes the audience's climate change debate, eco-conscious perspectives and evoked sustainable behaviour. Help provoke climate change debate and innovation. However, it is possible for the production design to convey additional information to the audience. Due to a *Dune* fan culture that sparked after the film's release and the high Box Office, an assumption can be made that *Dune* did indeed leave an impact on audience members.

As seen in *Dune*, it is possible to use eco-easter egg and zoomorphic production design concepts to enhance a film's environmental agenda. *Dune* is in fact, an eco-cinematic film while depicting production design as

a new form of eco-cinema (more about solarpunk and *Dune* as a solarpunk aesthetic could be requested).

4.4.4.1 Key findings

The key findings discovered within the case study are firstly, that *Dune* has an eco-conscious motif and promotes environmental ethical perspectives. Showing that anthropocentric behaviour are destructive while leading to health and environmental issues versus biocentric responses that lead to healthier and more utopian environments. Secondly, *Dune*'s production design enhances the environmental and climate crisis narrative. Thirdly, *Dune*'s production design is an eco-conscious educational tool that communicates environmentalism and conservation and creates non-narrative additional environmental awareness. The production design creates a sub-theme of the importance of water and comments on the lack of water and biodiversity within the film world. The production design is thus used as additional information for the audience and communicates different concepts, themes, backstories, characteristics, motifs and ideas.

4.4.4.2 Key concerns

The key concern found within the case study is the question of; how can a film, such as *Dune*, have an environmental agenda, eco-conscious messaging and promote environmentalism and conservation without implementing sustainable production processes and eco-conscious practices? *Dune*'s carbon footprint should be decreased in order for the film to be a full eco-conscious inspiration. The toolkit in Appendix A could assist in creating an understanding among filmmakers and crew of what possible sustainable practices could be implemented in order to decrease their production's carbon footprint and environmental risk.

CHAPTER 5: CONCLUSION

5.1 Conclusion

In conclusion, the medium of film is a powerful educational tool for communicating important information and normalising concepts that are hard to comprehend and accept. Film could be one of the most influential media for the production of environmental awareness, and according to respondents and interviewees from this study, film has the potential to communicate sustainable modes of behaviour and even help to promote eco-conscious lifestyles. In particular, production design and eco-easter eggs, although being a more subtle tool in filmmaking, has the ability nonetheless to expand a film's environmental agenda. The concept of eco-easter eggs can therefore assist in creating and promoting an environmental debate focused around biocentric perspectives and sustainable action. Filmic production design could thus be used and deployed as an educational tool to help assist in stimulating and provoking climate change debate and even support innovation. The film text itself could also become a beacon of light in helping to speak to climate change and promoting sustainable transformation, through adopting eco-conscious workflows and helping to decrease a film production's carbon footprint. Together with all aspects of sustainable film practices, creating new forms of production design that feed into the arsenal and grammar of eco-cinema production can further assist in creating a biocentric and greener world.

5.1.1 Eco-easter egg toolkit

Production design could help promote new modes of sustainability by adopting a sustainable and eco-conscious workflow and production (Green The Bid, 2022b). Together with information from the list of '*Characters Modelling Sustainable Behaviours*' found on Green The Bid (2022a), as well as sustainable product placement found on Green Product Placement (2022), alongside opinions collected from respondents

and interviewees (analysed in chapter 4); all of these are gathered and collated in order to compose an *Eco-easter egg toolkit* listed in Appendix E.

This composed list could be interpreted as a starting point for scoping out the production design elements that could be used within a film in order to create greater environmental awareness and even promote a biocentric mindset transformation. For instance, see Appendix A, *Green-production toolkit*, for an exploration of how production design could be sustainably produced while privileging the biocentric application of production design. The *Eco-easter egg toolkit* (Appendix E) will follow the order of set and set dressing, props, hair and makeup, wardrobe and costume.

These toolkits created within this thesis are produced to help assist and educate film practitioners - firstly, with the *Green-production toolkit* and possible changes film crew could make to their film production process in order to decrease a film's overall carbon footprint. And secondly, with the *Eco-easter egg toolkit*, the possible new production design elements that can be used to assist in creating an eco-conscious message and even support a subtextual environmental agenda. These tentative and first stage toolkits aim to inspire more sustainable filmmaking and the production of eco-cinematic production design and the promotion of biocentric-like output. As stated above, the toolkits are composed using information and expert opinions garnered from interviews.

5.1.2 Limitations and current research

This research report was only able to gather a limited amount of information from film practitioners and could use a greater sample size to generate more robust and concrete conclusions around whether film practitioners believe production design could be used as a new form of eco-cinema and assist in communicating an environmental agenda and at the same time provoke sustainable mindsets together with nudging towards eco-conscious lifestyles. In order to evaluate whether production

design and eco-easter eggs could indeed help in creating environmental awareness, which could help provoke eco-conscious perspectives together with promoting sustainable and conservation acts and lifestyle changes, data collection protocols taking into account audience members' needs could be ascertained and analysed. Furthermore, research in this field could be further augmented by an ongoing iterative and co-created a practise-based research approach to such new production modalities.

5.1.3 Future research and prospective study

The existing question of *How can filmic production design assist in provoking climate change debate and innovation*, could be further investigated by collecting opinions from audience members and analysing how the public will respond to these specific eco-easter eggs. A new secondary question on how audiences interact with film and specifically filmic production design could be addressed. Together with sub-questions related to eco-conscious production design, audience response and audience environmentally friendly behavioural changes could be investigated within a prospective future study. As stated within chapter 3, section 3.4.1.2: *Fan culture/fandom*, the question for such a prospective study can explore whether creating an environmental agenda in films can in turn influence new or exciting modes of fandom. Alternatively, can a more sustainable form of fandom or what might be characterised as green fan culture be created? For example, can recycled materials be used by fans to replicate a character's wardrobe if the film used recycled materials for the film's production design? The future research could be performed similarly to the current research project, with the same data and methodological approach, while generating a sample population from global audience members for investigation rather than just film practitioners. A different approach, in addition to an online questionnaire, could be to produce two short films, one with and one without eco-easter eggs and eco-conscious production design, and analyse the responses from audience members after viewing the two films.

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APPENDICES

Appendix A: Green-production toolkit

This toolkit is composed through conjoining and paraphrasing information from various sources, including the green filmmaking guides and toolkits found on Green Filmmaking (2022), Green Production Guide (2016), Green The Bid's (2022a), and Sustainable Production Toolkit (Banta *et al.*, 2022, pp. 1–101) together with the information gathered in an *Earth Angel's* interview with Meagan Goodspeed (2022).

How to guide for productions

This toolkit is compiled by the researcher and designed for user-friendly access for all industry members.

The green-production toolkit will follow the four key areas identified in Chapter 2, section 2.2.2, namely 1 - fossil fuels, 2 - pre-production, facilities and administration, 3 - production and waste generation and 4 - distribution and promotion.

1. Fossil Fuels

Goodspeed (2022) emphasises that the most significant impact would be to 100% utilise renewable energy, as fuel and energy use is the most egregious form of waste in any production. In the academic interview with Goodspeed, she suggests that the most critical sustainable choice is green-energy use when limited to one eco-conscious change.

- Travel
 - Mainly makes use of public transport and carpooling.
 - Reduce transport distances.
 - Try to lessen or eliminate unnecessary air travel.
 - Encourage the crew to use cars with fuel-efficient and environmentally friendly engines.
 - Encourage cast and crew to use bikes.
 - Find convenient locations - that are not too far to travel and not far apart.
 - Combine travel for orders, equipment and apparel transport, and shipment.
 - Never have a running engine when a car is in idle.
 - Hire sustainable transport, such as hybrid cars and electric cars.
 - Never use transport when unnecessary.

- Electricity use and or generator use
 - Reduce energy use.
 - Eliminate unnecessary energy use.
 - Reduce energy use in air-conditioned trailers.
 - Plan shoots at daylight - to make use of natural lighting.
 - Be energy efficient by using LED lamps and turning off lights when unused.
 - Additional sustainable lighting options are Plasma, solar and fluorescent.
 - Try to configure computers and laptops as energy-efficient as possible.
 - Use energy suppliers that provide eco-conscious/green electricity and gas.
 - Try not to use air conditioning but fans instead.

- The possibility of installing solar panels.
 - Make use of renewable energy, solar generators or if that is not possible electric generators rather than diesel/petrol generators.
 - Make use of electricity from the grid.
 - If you still need to use a standard generator, see if you can fuel it with HVO biodiesel - HVO biodiesel is produced from 100% certified waste streams and is 90% carbon neutral.
 - On location, try to connect to the grid or use electric generators and battery packs or, better, more renewable solutions like solar or wind power and solar generators.
 - Do not have two generators on set.
 - Use reflectors rather than lights.
- Shipping
 - Eliminate unnecessary shipments by reducing equipment, gear and apparel or locally sourced equipment and apparel.
 - Reduce the use of materials and apparel.

2. Pre-production, facilities and administration

- Housing and accommodation
 - Rent out a house rather than accommodation for individual crew and cast members.
 - Stay at sustainable accommodations.
 - Before renting out accommodation, research if they are eco-conscious and provide sustainable solutions - recycling, bamboo towels, etc.

- Paperwork
 - Reduce paper consumption.
 - Recycle any paper used.
 - Print and use recyclable paper.
 - Print double-sided and choose the option “eco printing” if your printer supports it.
 - Use eco-ink and refillable cartridges.
 - Print signage on paper or other biodegradable material instead of plastic.
 - Work digitally - share documents through Dropbox, Google Drive, or on your own server.
 - Do not print any call sheets, scripts and script changes anymore, but e-mail them.
 - Use scripts on tablets or phones.
 - Use erasable boards for planning - use whiteboards or chalkboards.

- Location
 - Note the impact on your location and if any special rules apply, for example, in a nature reserve. Think about sound and exhaust levels.
 - Collaborate with a specialist if possible.
 - Acquire a local shooting location.
 - Try to minimise any damage and disruption to the environment and biodiversity.
 - Leave the location as you found it.

- Equipment hire and usage
 - Reduce use of unnecessary gear.
 - Reuse equipment.
 - Use equipment that uses low energy consumption.

- Reduce energy use on this equipment.
 - Use LED lighting and low-energy lighting options.
 - Minimise energy by using eco-friendly equipment and or less equipment use.
 - Opting for digital filming.
 - Use rechargeable batteries where possible.
 - Recycle any used disposable batteries.
 - Recycle any broken hard drives (and any other electrics that are no longer working).
 - When travelling, rent local equipment rather than shipping equipment.
 - Use sustainable and eco-conscious products, equipment and gear.
- Crew and cast, vendors and recruitment
 - Encourage digital communication and work digitally.
 - Recruitment is done digitally to reduce travel and unnecessary fossil fuels.
 - Recruit cast and crew locally.
 - Work with sustainable and eco-conscious companies.
 - Create crew environmental ethical, and sustainable awareness.
 - Appoint a sustainability manager.
 - Share knowledge and sustainable innovation.
 - Use sustainable vendors and additional options.

3. Production and waste generation

“It is just like when we are done, we just throw it out. And while that is very easy for them to do, it costs them so much money to have those dumpsters. So they can actually save money by donating because they do not need to purchase dumpsters for all these landfilled items” (Goodspeed, 2022).

- Catering
 - Encourage organic or (partially) vegetarian catering.
 - Reduce the use of cutlery, food, packaging and utensils.
 - Reuse the cutlery, packaging and utensils.
 - Recycle the cutlery, packaging and utensils.
 - Used biodegradable cutlery, packaging and utensils.
 - Compose and donate leftover food and coffee/tea.
 - Introduce a “veggie day” or offer a vegetarian options each day.
 - Healthy meal options.
 - Premade meals with sustainable packaging and cutlery.
 - Use food with the correct labels - such as MSC fish quality label, Fair Trade, Beter Leven and EKO.
 - Make good deals with a wholesaler that purchases sustainably.
 - Throw away as little as possible and be creative by creating a new meal out of the leftovers.
 - Arrange sustainable containers for leftovers that the crew can take home at the end of the day.
 - Food donations.
 - Rather than plastic and polystyrene use materials such as bamboo, plant-based and compostables for packaging.
 - Replace plastic straws with glass or metal straws.
 - Provide reusable mugs for coffee and water.
 - Avoid wrapping individual foods or snacks in plastic.
 - Use delegated bins for any kitchen waste - peelings, packaging, etc.
 - Provide vegetarian meals, meals made from free-range or sustainably sourced produce.
 - Buy produce in bulk - since bulk lessens packaging.

- Plastic bottled water use and on-location water use
 - Recycle single-use plastic.
 - Avoid single plastic use.
 - Make use of reusable water bottles and cups.
 - Use compostable disposable cups.
 - Use reusable water bottles and portable refill stations.
 - Do not leave taps open.
 - Do not use excessive water.
 - Invest in products that have low water usage.

- Production design

This will be discussed further within A.1; however, a few solutions are:

- Reducing materials.
 - Reusing production design elements.
 - Recycle materials.
 - Upcycle production design.
 - Donate production design.
 - Source from sustainable materials or companies.
 - Use eco-conscious and vegan clothing and make-up options.
 - Use CGI and VFX when it calls for less damaging environmental impacts - for an instant, an explosion could rather be made digitally than disrupt nature.
-
- Waste and disposal
 - Encourage waste sorting.
 - Recycle all that can be recycled.
 - Compost leftover food that can not be taken home or donated.

- Store production design, equipment, cutlery, utensils and any other apparel for later use.
- When on location use an economical vacuum toilet trailer or the WC Flex for the bathroom.
- Use ecological detergents and cleaning products without chemicals.
- Separate your waste - plastic, paper, glass, organic waste, batteries.
- Use only non-toxic, biodegradable cleaning products.
- Bulk purchasing so you have less packaging material.
- Do not use disposable wipes but use washable sponges and dishcloths.
- Clean any oil spills immediately and prevent them from sinking into the soil.
- Minimise consumption and rather hire items instead.
- Further use correct eco-conscious disposal.

4. Distribution and promotion

- Events, film festivals and advertising
 - Reduce travel and materials used.
 - Reduce energy and water use.
 - Recycle or reuse any necessary items.
 - Work digitally.
 - Share eco-conscious and sustainable knowledge/innovation.
 - Print advertising materials on recyclable paper and dispose of them correctly.

- Distribution
 - Reduce energy use.
 - Reduce travel use.

- Digital communication and distribution.
 - Work digitally, share documents through Dropbox, Google Drive, or on your own server.
- Merchandising
 - Produce sustainable and eco-friendly merchandising.
 - Similar to above - reduce travel and materials used, energy and water usage when producing them and recycle or reuse any necessary items.
 - Reinforce sustainable shipment.

*Remember to state at the beginning/end of your film that sustainable practices and eco-conscious workflows were used during the production process. This could provide additional environmental awareness to the audiences, evoke eco-friendly curiosity and could lead to the audience's eco-conscious debate and perspectives.

A.1 Sustainability, specifically in production design

“Zero Waste is a goal that is ethical, economical, efficient and visionary to guide people in changing their lifestyles and practices to emulate sustainable natural cycles where all discarded materials are designed to become resources for others to use. Zero Waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them (Giménez, Rocío and Steward, 2019)”. When producing and sourcing production design elements, the art department should attempt to adopt a zero-waste workflow and work environment. When following a sustainable production design toolkit, the art department could assist in decreasing a film production’s carbon footprint.

The sustainable production design toolkit below is created through various information gathered on Green Filmmaking (2022), Environmental Media Association (EMA, 2020b), Goodspeed (2022) and Green The Bid (2022a).

How to guide for the production design team and art department

This toolkit is compiled by the researcher and designed for user-friendly access for all industry members.

1. Set building

- Use existing locations.
- Decrease travel and shipment during set building.
- Use local materials, art department crew and hardware.
- Go paperless.
- Work digitally when communicating with the art department - drawings, plans and blueprints could be done and shared digitally.
- Reuse existing sets.
- Use nails instead of screws - easier to take apart the components and reuse the flats.
- Use materials with eco-labels, such as FSC timber.
- Use of second-hand building materials.
- Use and reuse sustainable hardware.
- Use eco-conscious and sustainable materials and products such as wood, paper, brushes, tools, varnish and paints.
- Use biodegradable materials.
- Recycle all building materials.
- Reusing and or upcycling building materials, hardware and flats.
- Donate what you can - to the local community or other film productions.

2. Set dressing

- Decrease travel and shipment while creating or sourcing set dressing.
- Use local materials, art department crew and hardware.
- Again, go paperless.
- Share ideas, plant ect. digitally.
- Reuse set dressing.
- Source set dressing locally - purchase at a thrift store or flea markets.
- Use second hand set dressing elements.
- Purchase your set dressing from sustainable businesses.
- Source sustainable set dressing - eco-conscious and sustainably made furniture, curtains, bedding, wall art, kitchen utensils, stationery and clutter elements.
- Reuse set dressing pieces.
- Upcycle set dressing pieces - for instance, creating a desk through upcycling boxes used in catering.
- Use sustainable materials when producing new set dressing pieces - sustainably sourced wood, paper, paint, hardware, wool and cloths.
- Avoid toxic and unrecyclable materials - polystyrene, single-use plastic and paints - when producing set dressing.
- Rent set dressing and resend out set dressing to other productions.
- Donate to second-hand stores or charities.
- Recycle any set dressing that cannot be reused.

3. Props

- Decrease travel and shipment while creating or sourcing props.
- Use local materials, art department crew and hardware.
- Again, go paperless.
- Work digitally when communicating with the art department.
- Reuse old props.

- Purchase your props locally - second-hand stores and thrift stores or at flea markets.
- Purchase your props from sustainable businesses.
- Upcycle prop pieces.
- Use sustainable materials when creating props - eco-conscious and sustainably sourced wood, hardware, paints, clothes, fabrics and bamboo.
- Avoid non-recyclable and nonreusable props - single-use plastics and polystyrene.
- Make use of props that can promote sustainability and model environmental conscious behaviour - recycle bins, reusable coffee cups and glass straws.
- Store props for future use.
- Rent props and rent out props to other film productions.
- Donate to a second-hand shop or a charity.
- Recycle any props that cannot be donated or reused.

4. Costume and wardrobe

- Decrease travel and shipment while creating or sourcing wardrobes.
- Use local materials, art department crew and hardware.
- For the fourth time, go paperless.
- Work digitally.
- Reuse costumes and wardrobe.
- Upcycle accessories, costumes and wardrobe.
- Purchase your wardrobe and accessories locally - local businesses, second-hand stores and thrift stores.
- Purchase your wardrobe and accessories from sustainable businesses.
- Borrow or rent clothing and accessories.
- Hire any robes and towels or use stock, rather than buying fresh ones.
- Use cloth clothing bags instead of plastic clothing bags.

- Avoid throwing out hangers.
- Sustainably produced costume, wardrobe and accessories - sustainable materials, fabrics, cloths and wool.
- Use your creativity and reuse and upcycle scraps and other waste materials.
- Wash clothes with an energy-efficient and water-efficient washing machine and eco-friendly washing powder.
- Use environmentally friendly ecological detergents and soaps.
- Use energy-efficient irons, steamers and kettles.
- Use reusable laundry baskets.
- Donate clothing and wardrobe after use.
- Recycle all wardrobe and accessories pieces if they cannot be donated or reused.

5. Hair and make-up

- Decrease travel and shipment while sourcing make-up.
- Use local art department crew.
- Reuse make-up, wigs and other hair accessories.
- Buy second-hand accessories.
- Use sustainable, cruelty-free and vegan makeup and brands.
- Use eco-conscious makeup artists and hairstylists.
- Use environmentally friendly products - eco-friendly hairspray, tools, makeup, cotton balls, swabs, remover and lotion.
- Use carbon neutral, biodegradable and compostable packaging.
- Use rechargeable batteries in electric - razors, hand fans, hairdryers, and curling tools.
- Reuse electrical items.
- Adopt energy-efficient workflows and decrease water waste.
- Donate what could be donated to charity.
- Recycle all items that cannot be reused or donated.

Appendix B: Pro-forma email

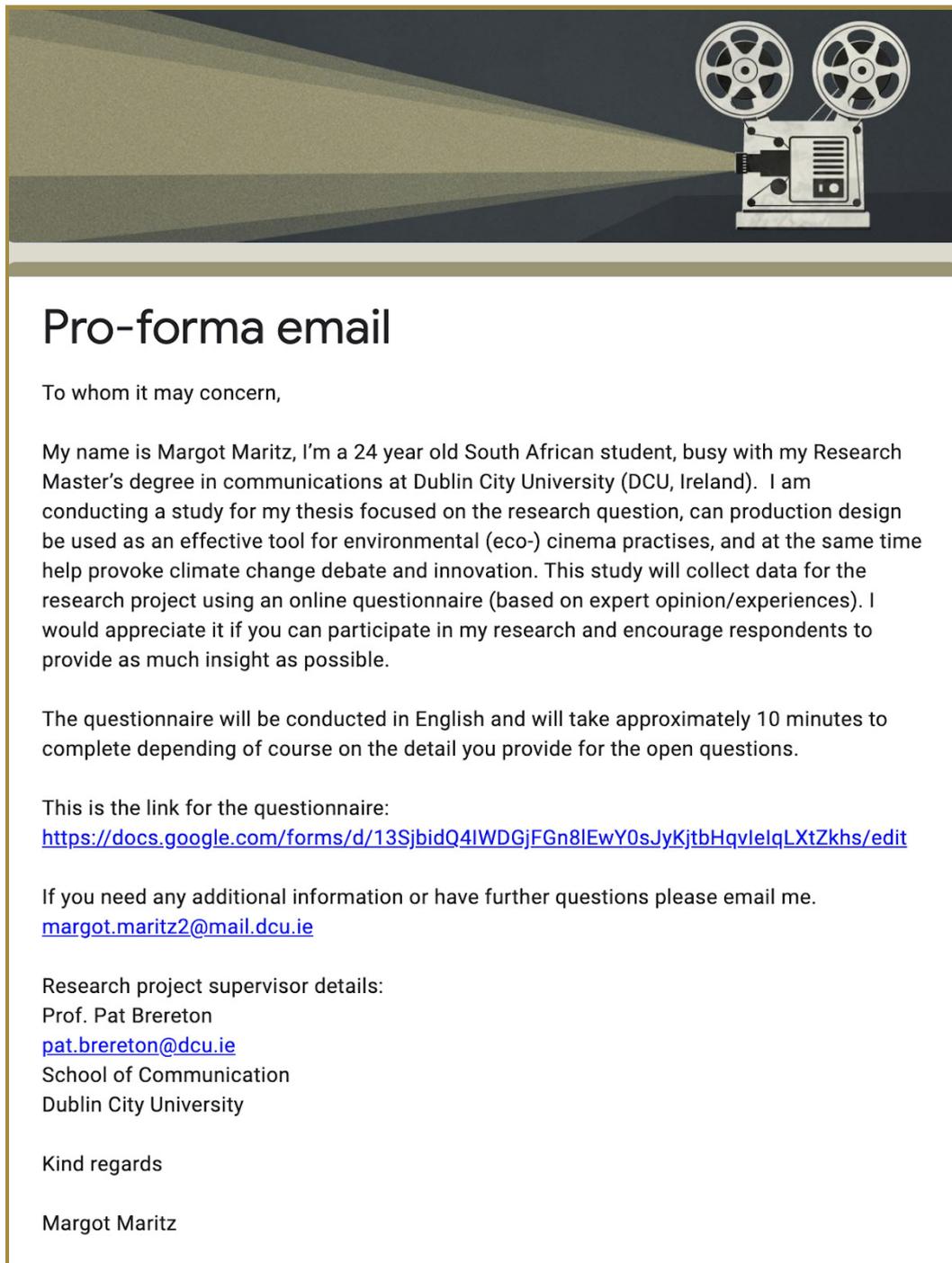


Figure B.1: Maritz, *Example of email Pro-forma requisition industry professionals to fill in the questionnaire, 2021*. Illustration.

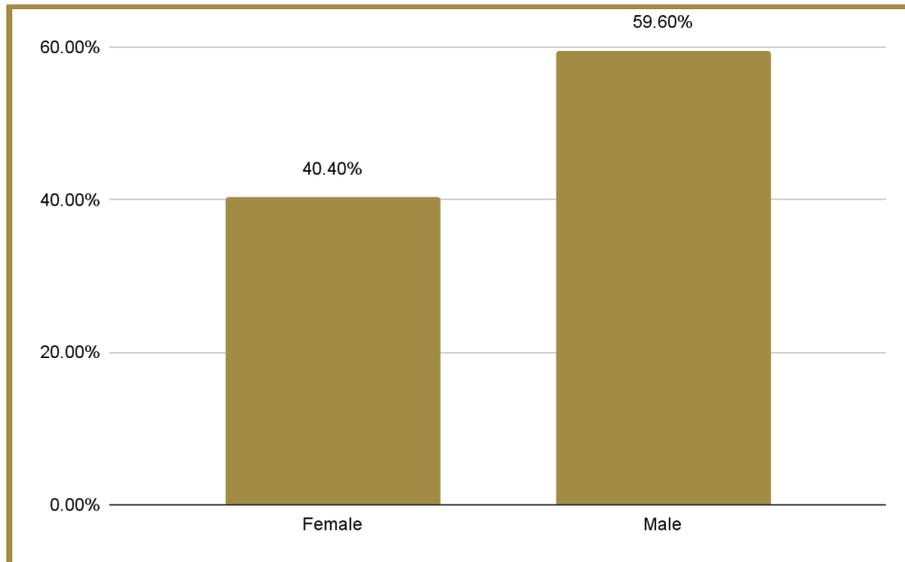
Appendix C: Questionnaire analysis

To recapitulate, 57 respondents are the final sample size for the online questionnaire (available on request). The analysis will use the percentage of respondents to discuss the statistical outcomes found. The graphs below make use of a Likert scale, which is defined by; 1 strongly disagree, 2 disagree, 3 somewhat agree, 4 agree, and 5 strongly agree. Some questions that provided unnecessarily and or repeated data have been removed, and a few questions have been conjoined since the data collected formed a more substantial analysis when discussed simultaneously.

C.1 Demographic questions

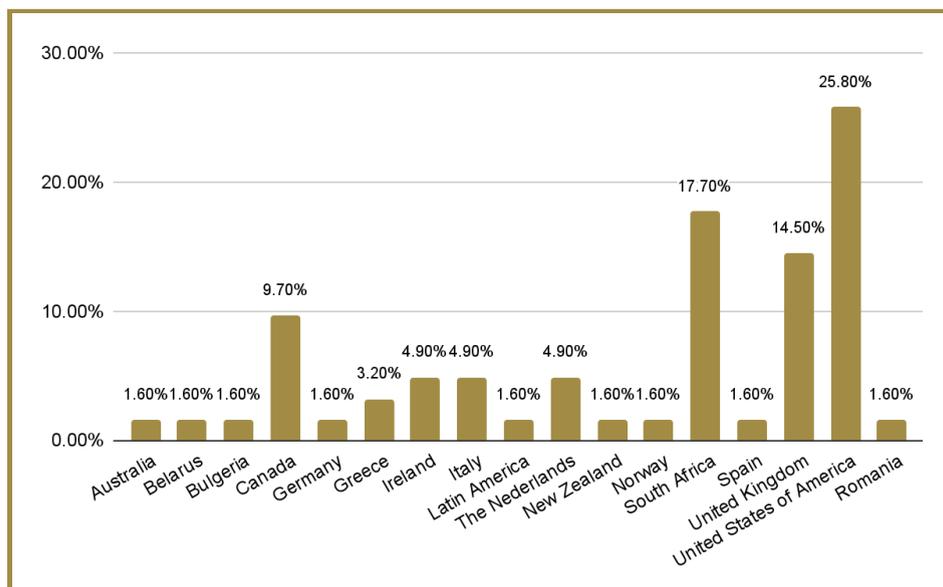
Despite the possibility that demographic questions may be an indicator of how certain factors, namely; gender (graph C.1), location (graph C.2) and workplace position (graph C.3), can influence a respondent's answer and knowledge provided within the questionnaire, however, for the purpose of this research, these demographic questions will not be discussed in depth since the research is focused purely on the general opinion of film industry members regardless of any secondary factors, and thus would not affect the end results.

The demographic questions' findings, illustrated in graphs C.1 - C.3, are based on the unpredictable sampling of respondents within the film industry willing to participate in my research.



Graph C.1: Gender of respondents

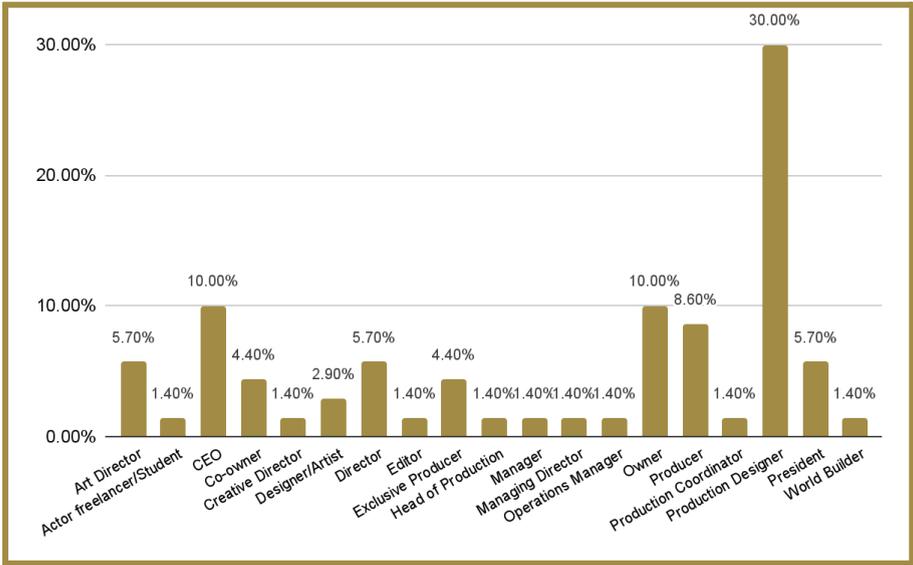
In graph C.1, the respondents' gender consists of 40.40% females and 59.60% males. Some factors that could indicate the difference between the gender statistics are: That more males were targeted, more males were willing to respond, or there are more males than females in the film industry. But since this is purely speculation, as there is no concrete evidence to confirm these factors, due to the unpredictable sampling, the results provided in graph C.1 can be dismissed but are included solely for informational purposes.



Graph C.2: Location of respondents

Due to three respondents adding more than one location, graph C.2 shows a value of 62 rather than the accurate value of 57.

As a consequence of the unpredictability of the sampling, the assumption can be made that the results are shown in graph C.2, are due to the possibility that the USA has more film industry members and a larger film industry, more USA members were targeted or more USA members were willing to participate.



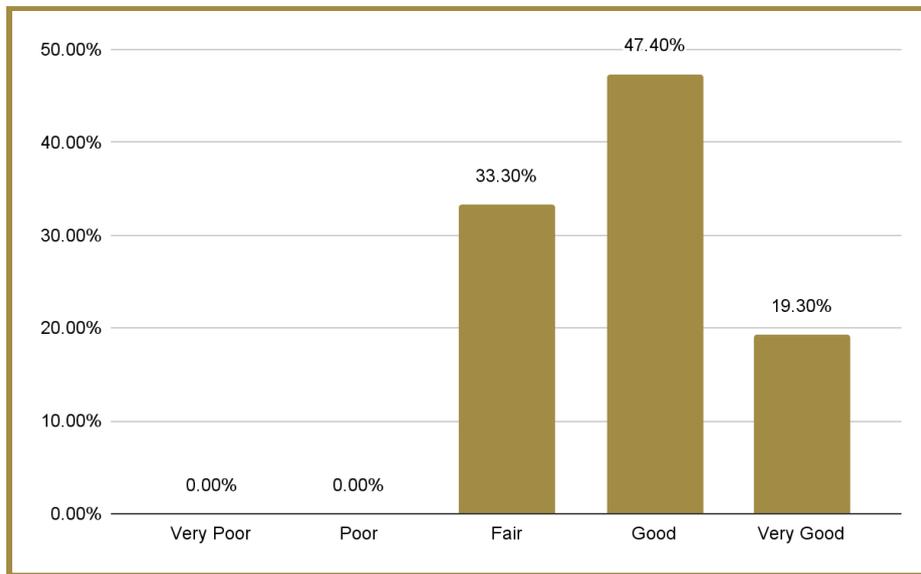
Graph C.3: Respondent's position within the film industry

Although the aim was to include mostly production designers, as confirmed in graph C.3, the respondents' position within the film industry fluctuates; however, the difference in position does not necessarily impact the data received since film is a collaborative art form.

C.2 Climate change perspective

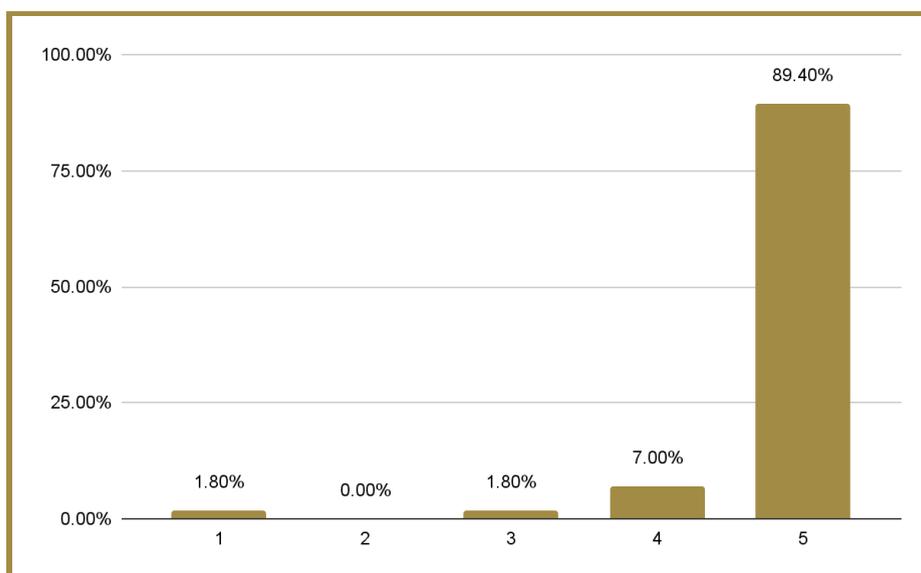
Climate change: Is the process of the earth heating up and includes; extreme changes in weather patterns, increased natural disasters, the rise of ocean levels, droughts, etc. (McCabe, 2019)

C.2.1 Please rate your knowledge of climate change

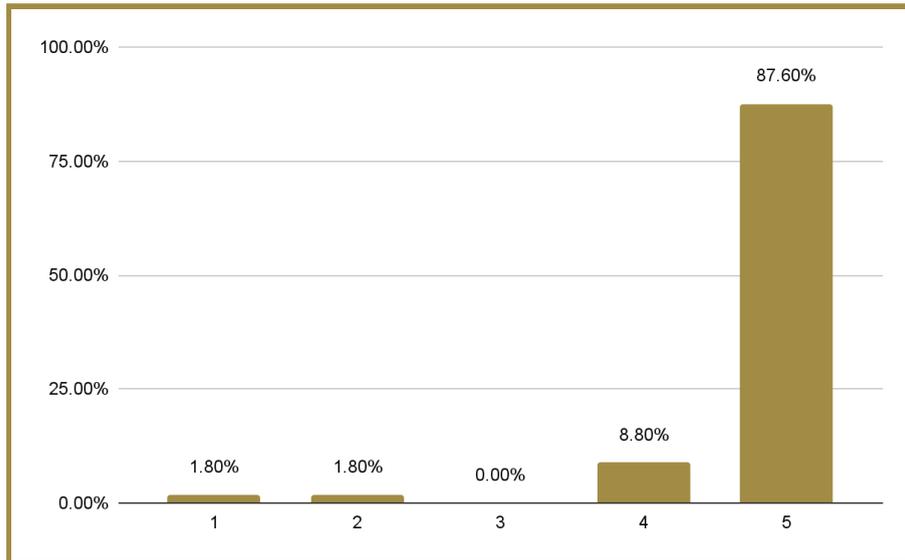


Graph C.4: Please rate your knowledge of climate change

All respondents have an indication of what climate change entails, and the majority (66.7%) have a good to a very good understanding of climate change, as seen in graph C.4. As all respondents are in the film industry and have an approximate representation of climate change knowledge, it infers that no respondent had a disadvantage when answering the questionnaire.



Graph C.5: Do you consider that climate change is an issue



Graph C.6: An urgent action towards addressing climate change is needed

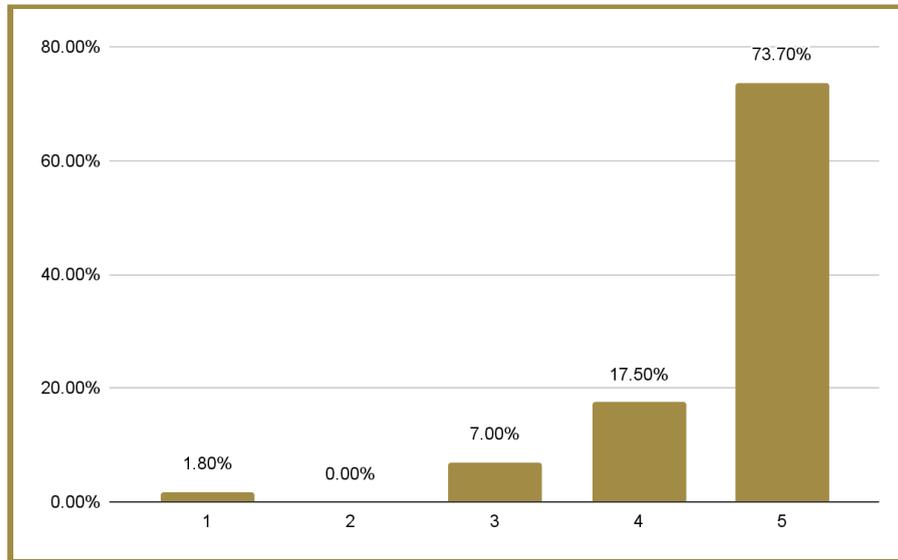
A total of 89.40% consider climate change as an issue (graph C.5). The result indicates that the film industry is aware of the environmental challenges we experience and as seen in graph C.6, 87.60% strongly agree that urgent action towards addressing climate change is needed. Both these responses somewhat correlate and can suggest that film industry members are inclined towards reducing the carbon footprint of their media production and adapting a sustainable mode of behaviour within the film industry. This assumption will be explored within the sustainable film and production design workflow section (C.3).

C.3 Sustainable film and production design workflow

Sustainability: An activity in which a company might help to address environmental issues by decreasing its carbon footprint (Spiliakos, 2018).

Production Design: This is the creation and organisation of the physical world surrounding a film story (Nashville Film Institute, 2020).

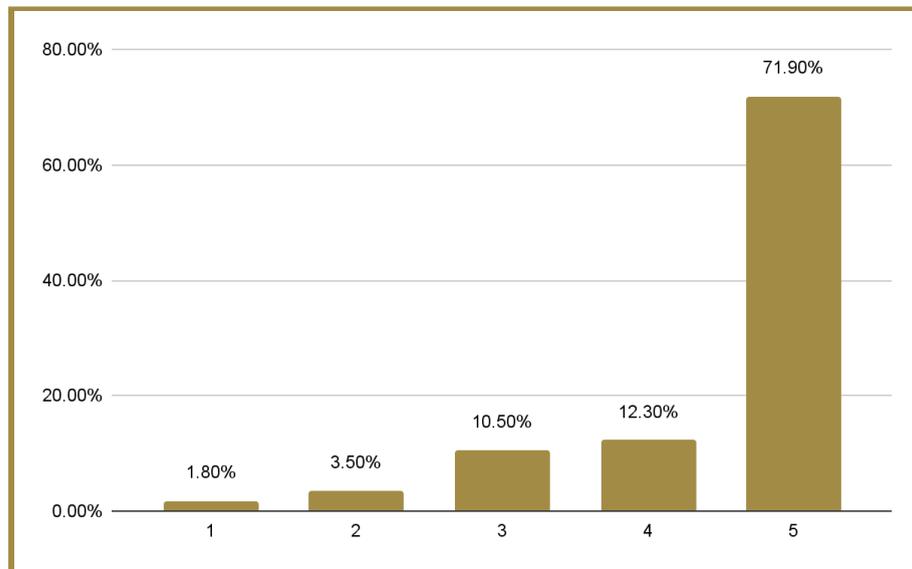
C.3.1 A film's workflow should be more sustainable



Graph C.7: A film's workflow should be more sustainable

Bradley (2021) “we need to create a greater awareness of the impact that we make. Film production can include a terrible amount of waste. We can also impact locations very easily - trucks, construction etc”. Graph C.7 illustrates that 1.80% of respondents suggest that a sustainable workflow is not needed, where 7% somewhat agree, 17.50% agree and 73.70% strongly agree that a sustainable workflow is needed. This suggests that the respondents would value sustainability and carbon footprint change within the film industry. It is essential to note cast and crew perspectives when trying to create a sustainable production (Harris, 2021).

C.3.2 Production design should be produced more sustainable

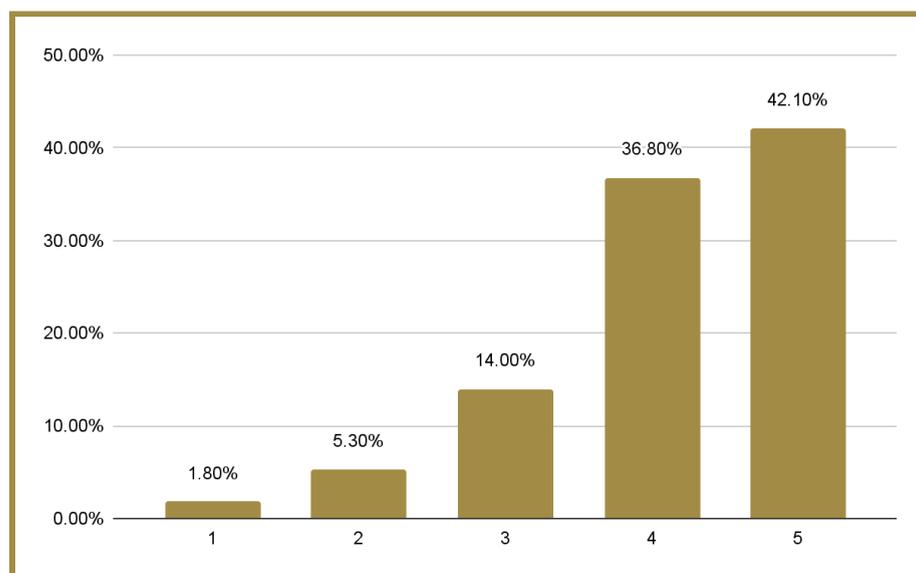


Graph C.8: Production design should be more sustainable

The majority of respondents agree that production design should be more sustainable, with 71.90% (graph C.8) strongly agree with the notion. The slight deviation in results between only 1.80% strongly disagreeing against film becoming sustainable, in graphs C.8 and 5.3% (1.80% strongly disagree and 4.50% disagree) disagreement on production design sustainability, in graph C.8, can imply that respondents are of the opinion that sustainability should rather come from other areas within the industry's workflow. Mary (2021) explains that "production design caters to the needs of the project, the director and creative team's vision. It is the production that should implement better practices; it is not at all the responsibility of the production designer to create something sustainable as a priority. There should be a policy in place for them to proceed in eco-friendly ways". Verweij (2021) responded with "by recycling materials, by paying attention to suppliers and their supply chains (they should be sustainable)". McAnney (2021) added by stating that using environmental product placement opportunities and making use of eco-sponsors would create sustainability within film as well as create an environmental agenda, more specifically, promote eco-friendly product consumption and use while supporting sustainable, eco-friendly businesses.

Clancy (2021) explains that “I agree with all the above, but practically I do not see how a lot of this can be implemented by production designers. We have no control over the schedule, we are not involved in the writing of the scenes and sets sometimes get destroyed rather than recycled because of crazy turnarounds. The Producer of the show needs to be the catalyst to implement and allow the time and resources (extra personnel etc.) to accommodate environmentally aware content and have that trickle down into the departments, as a department head, I do what I can to ensure that paint/construction/set decor are being as aware as possible, but with the gruelling schedules and turnarounds this is often not implemented”.

C.3.3 Film can help mitigate climate change by creating environmental awareness



Graph C.9: Film can help mitigate climate change by creating environmental awareness

Whelan (2021) clarifies that, in this opinion, film can help mitigate climate change from both production and on-screen perspective; “from a production perspective, to have a certified carbon footprint per production. On-screen, from subtle non-plot driven scenes, i.e. recycling, to specific plot-driven scenes like tackling known political, economical and societal drivers behind pollution. Have existing, proof driven technology (solutions) on-screen demonstrating their purpose”. 42.10% strongly agree (graph

C.9) that film can help mitigate climate change by creating environmental awareness; however, there are still a few respondents (1.80% strongly disagree, and 5.30% disagree) claiming film can not help mitigate climate change. Harris (2021) “also as we see with how smoking was made 'cool' by tv and film, films can make sustainable behaviour 'cool' by representing it not as a characteristic of one character but that all characters do it”. Films should have a component that helps create environmental awareness without interrupting the integrity of the film (For example, adding reusable cups to a coffee takeaway scene). Landin (2021) explained that “choice of topics and strong storytelling is more important. The story should give the viewer a sense of the importance of the topic and convey a feeling of how each one of us can be involved; learning and acting”.

C.3.4 How can a film production create an environmentally aware film in general?

During the analysis of this open-ended question, three main categories were identified, namely (in declining order of total responses): sustainability, narrative and characters, and production.

- Sustainability

The answer of 44.86% of respondents involves how the film industry’s workflow, along with the production of a film, can become sustainable, by decreasing the carbon footprint of a film and the industry in general. “Taking steps to minimise any environmental stops throughout all processes, including those on and off camera” (Glogauer, 2021). The majority of these responses include reducing and recycling of materials and mention the immense amount of waste generated by the film industry. In order to decrease waste, the respondents recommend avoiding single-use plastic and making use of reusable items, for example, Hammer (2021) said that set building materials, food containers should be recycled,

plastic bottles should be replaced with water dispensers and removal paint waste should be monitored. Throughout the responses, the agreement is to generate environmentally ethical work practices, decreasing the carbon footprint by implementing “green solutions”.

- Narrative and characters

44.86% of respondents commented on the film’s narrative and characters. “Actions of characters reflecting positive change” (Henry, 2021). Several respondents suggest making films about the climate crisis and the repercussions of being apathetic. Gerriety (2021) explains that content awareness such as overt and subtle topics and themes can create an environmentally aware film. Respondents also suggested avoiding the portrayal of poor environmental practices. Koseli (2021) reinforced this by stating, “I think when screenwriters and scripts focus more on this issue like when we started to see more diverse characters in the movies, it will help”. These respondents added emphasis on the plot and story and how these film elements can be used to create an environmental agenda.

- Production

A total of 8.70% of respondents state that the aim of a film should not necessarily be to aid an environmental or sustainable agenda. Goluzov (2021) explains that “film creation is a unique art that must not be spoiled for the sake of the environment or any other fashionable matter - in case environmental awareness is not a part of the screenplay. Please leave artists alone doing wonders and focus on industrial giants wasting our planet much worse daily than the whole film industry throughout the history of existence”. A few respondents clarify that they do not believe adding sustainable practices and environmental cues would help mitigate climate

change. “I do not think micro-lifestyle adjustments like putting reusable cups in scenes would make much difference. The changes needed to avoid climate breakdown are so far-reaching that it would require an entire script and movie premise to be readdressed to be useful. But this is not how movies are financed, written and made” (Berman, 2021). These respondents believe that ‘art should be art’, film should be a mode of escapism and be a form of entertainment. Film according to this 8.70%, should just be what it wants to be, and we should allow the creators to create what they want to create and that there is no need to interfere.

- 1.80% responded with; no idea and the remaining 1.80% responded with a suggestion to contact Emelie O'Brien, founder of Earth Angels.

C.4 Production design as a potentially eco-cinematic practice

Eco-cinema: is a broad range of filmic output that often comments on environmental issues either explicit and or through its subtext (Brereton, 2019).

Production Design: This is the creation and organisation of the physical world surrounding a film story (Nashville Film Institute, 2020).

C.4.1 In your opinion, what is the primary purpose of production design with regard to filmmaking?

During the assessment of this open-ended question, three main categories were identified, namely (in declining order of total responses): world-building and environment, aesthetic, and the audience and emotion.

- World-building and environment

40.40% of respondents defined production design as creating believable environments and constructing the film world wherein the characters exist. Bradley (2021) explains that production design is “creating the world of the story. Sometimes that needs a lot, and sometimes it is just a small amount of enhancement of what already exists”. McAnney (2021) reinforced this statement by saying she believes that production designers create story worlds. “Anything the light touches is our domain, and we are humbly charged with the responsibility to manufacture a believable environment for the narrative to take place”. These respondents clarify that production design creates the physical world of the story and is the film's environment that reflects the script.

- Aesthetic

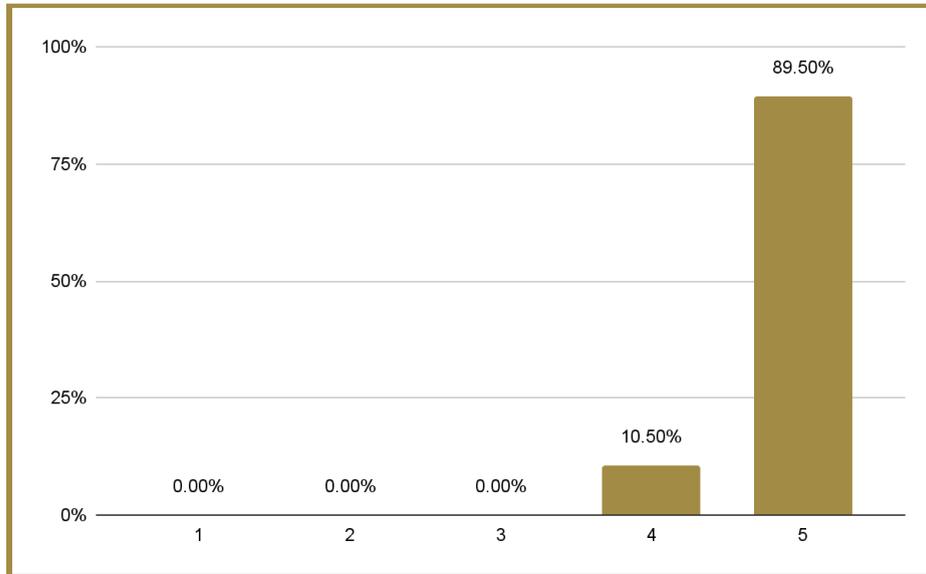
The aesthetic, look and visual appearance of the narrative and its characters were defined as production design by 36.80% of respondents. Cheyenne (2021) explains that production design is the creation of a visual language that amplifies the story being presented. “In film and television, the production designer is the individual responsible for the overall aesthetic of the story. The production design gives the viewers a sense of the time period, the plot location, and character actions and feelings” (Mkhwanazi, 2021). Several respondents added that this aesthetic, look and visual appearance serve the believability of the overall film. “We transform written stories into physical or virtual environments crucial to the story's visual authenticity so that viewers can suspend belief for a moment and be transported to another reality. These environments must also fit the characters and the circumstances of the story” (Gramatky, 2021).

- The audience and emotion

“Production design enhances the story” (Forrest, 2021). 22.80% of respondents defined production design as a storytelling tool and providing the subtext to the audience. Helen (2021) emphasises that production design is used to “communicate and inform the viewer sometimes subconsciously about the characters and settings in a film”, and Harris (2021) aids by stating that production design tells the story through its visuals and provides visual information in a film’s subtext. The respondents all discuss the storytelling benefits of production design and most of these respondents include the advantages production design creates within the mood and tone of the film, as well as audience emotion. According to Alexandra (2021) production design advances storytelling and creates an emotion within the audience. Fox (2021) adds to the above statement by expressing that production design provides “immersion in the story”.

- All 100% of respondents agree that production design creates the overall look, feel and believability of a film and assists in telling the story.

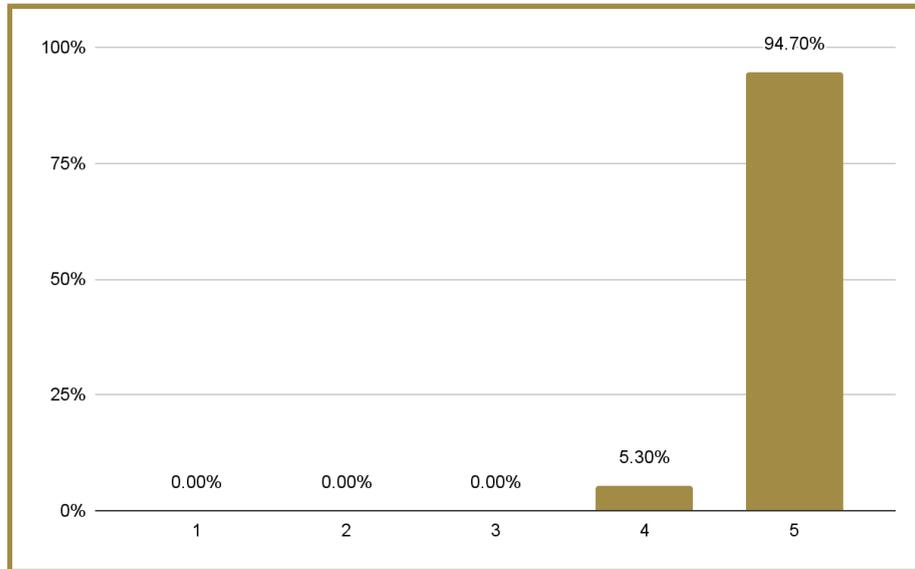
C.4.2 Production design can help convey important information regarding the film's theme



Graph C.10: Production design can help convey important information regarding the film's theme

All respondents agree, with 89.50% strongly agreeing (graph C.10), that production design can be used as a creative tool in conveying more information about the film and its themes. Imai (2021) said that “production design is storytelling without words”.

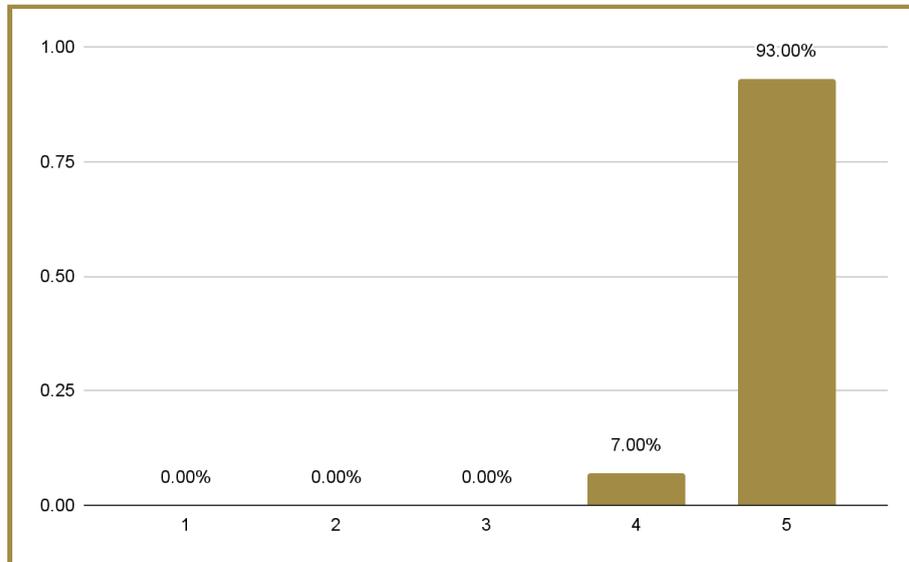
C.4.3 Production design can help convey important information regarding the storyline



Graph C.11: Production design can help convey important information regarding the storyline

Dillon (2021) said that production design “reflects the script, characters and vision of the director to tell the story”. 94.70% of respondents strongly agree (graph C.11), along with the remaining 5.30% agreeing with the notion that production design can be used as a storytelling medium within a film. Barkham (2021) explains that the primary aim of production design is to further and enhance the narrative. Williams (2021) reinforces Barkham’s opinion and states that production design supports the narrative and communicates other storyline aspects to audience members. Production design elements provide additional information about a film’s theme, motifs and film and character backstory. “Creating a suitable and engaging environment for the given narrative as well as using the visual to create backstory and narrative itself” (Hofeling, 2021).

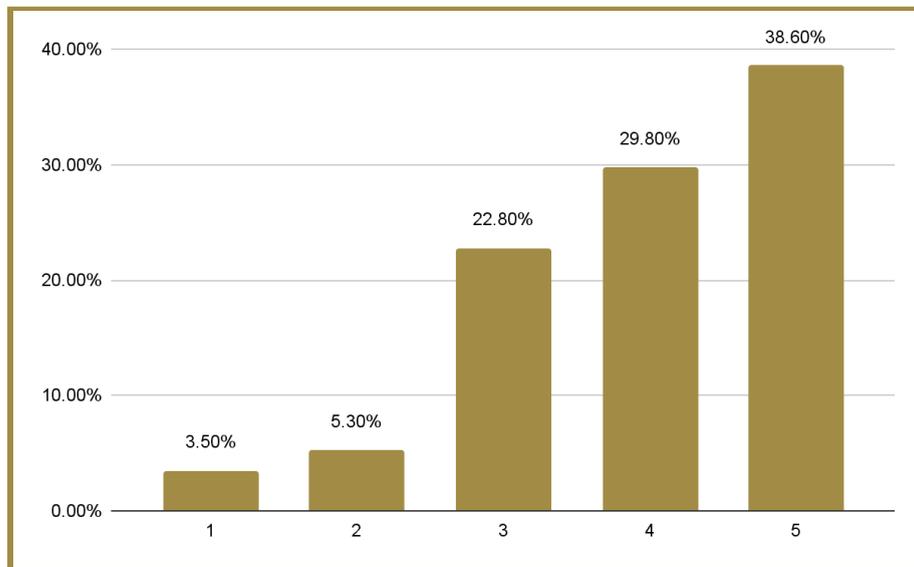
C.4.4 Production design can help convey important information regarding the personality of the characters



Graph C.12: Production design can help convey important information regarding the personality of the characters

“Production design gives the context and depth to the character's environment. It can send all sorts of subtle messages about the backstory of the characters” (Conroy, 2021). All respondents, namely; 7% agree, and 93% strongly agree that production design can be used as a narrative tool to inform the audience about a character and their background (graph C.12).

C.4.5 Production design can help convey important information regarding environmental awareness



Graph C.13: Production design can help convey important information regarding environmental awareness

91.2% of respondents are inclined to agree with the statement, 22.80% somewhat agree, 29.80% agree, and 38.60% strongly agree (graph C.13) that production design can be used as an ecological tool to convey critical information regarding environmental awareness. Clancy (2021) states, “yes, I agree it can help in some cases, especially if it is a contemporary piece and not a period or sci-fi piece”. “Give me a script and I can tell you how production design can be used to help facilitate new forms of eco-cinema. We reach the audiences sub-conscious, of course, we can influence them on any level; albeit violent or loving, destructive or constructive, people who do not ‘believe in’ climate change or advocate for eco changes - it is the power of filmmaking” (Gramatky, 2021).

C.4.6 Provide examples of subtle changes in production design that can help lead to environmental awareness, without compromising the integrity of the film?

When evaluating this open-ended question, three main categories were identified, namely (discussed in declining order of total responses): props, set-dressing and sustainability, narrative and characters and production.

- Props, set-dressing and sustainability

52.60% of respondents gave props, set-dressing and or sustainability solutions as examples of subtle changes in production design that can create environmental awareness. Several respondents mentioned substituting plastic and single-use materials, props and set dressing for more sustainably sourced materials and sustainable and reusable solutions, for instance; “substitute plastic bags with cloth tote bags, add more locally sourced decor” (De Felice, 2021), choosing appropriate materials on set build (Hodges, 2021), “show more electric cars rather than regular cars, houses with solar panels, traffic lights with backup solar panels, more bicycle lanes, more reusable items” (Gerriety, 2021) and Harris (2021) thinks that “having characters use their own straws and bring grocery bags to shops. It does not change the plotline but is a subtextual layer that the characters are aware of the environment”.

- Narrative and characters

26.40% of respondents claim that the narrative should rather speak on the environmental issues instead of subtly showing these issues within the production design. Bradley (2021) emphasised that “everything begins with the script, characters and storylines. Within that, we can look for ways to inject environmental subtext”. The respondents believe that a film’s context should primarily be about

sustainability and or environmental agendas in order to create environmental awareness. A film's context must desire environmentalism to be effective in creating environmental awareness (Mary, 2021). These respondents are thus concerned with the subject matter of the film; "It depends on the subject, for instance, a sci-fi film could contain a lot of 'backwards looking' nods to the follies of mankind" (Jonnathan, 2021) and some suggested making environmental changes to the character's perspective and practises, for example, Brett (2021) said "characters acting in an environmentally responsible fashion, and not drawing attention to it", could be a solution.

- Production

"The bigger issue is really the overall sustainability of the film industry and the department. Beyond what is just on camera, the art department (and others) creates enormous amounts of waste" (Kozlova, 2021). 10.50% of respondents raised concerns with the production itself and behind the scene workflow, rather than in a film. "The industry standard must be set, per genre, location etc., as the expected carbon footprint" (Whelan, 2021). A respondent also added to using eco-sponsorships and reaching out to environmental companies for product placement and sourcing (Harris, 2021).

- The remaining 8.70% did not respond to this question, and 1.80% responded with "there are no such 'subtle' changes. Leave filmmakers alone" (Goluzov, 2021).

C.5 Production design in fantasy films, as a potentially eco-cinematic practice

This research project focuses on the fantasy film genre; however, the information provided is applicable to all film genres.

Easter eggs: Hidden references or clues to the plot's development that are subtly incorporated into the on-screen action (Hall, 2021).

Eco-easter eggs: Adding subtle environmental friendly production design elements into a scene.

C.5.1 Can you give examples of landscapes/milieu alterations in fantasy films that in turn, can facilitate environmental awareness?

The responses to this open-ended question can be divided into four main categories, namely (in declining order of total responses): landscapes/milieu suggestions and alterations, production and sustainability, narrative and context, and film examples.

- Landscapes/milieu suggestions and alterations

Solutions, suggestions and alterations of landscapes/milieu within fantasy films have been discussed by 28.10% of respondents. Several respondents suggest landscapes showing environmental issues. "By showing unintended consequences of climate change on our environment" (Alexandra 2021), for example, "futuristic landscapes with rising water levels, smog" (Cheyenne, 2021). Some respondents suggest a counter approach to the above by showing lushes environments to promote environmental ethical behaviour for example; "all films in which nature is represented in its integrity and richness without exaggerated human contamination" (Fred, 2021) and "to show the relationship between personal life and the wellbeing of an intact ecosystem will create awareness" (Landin, 2021).

A few respondents added emphasis on the contrast between a healthy, lush environment compared to a dull, broken environment within the film world. According to Hofeling (2021), he used lushness and abundance to create a theme of healthiness and safety while contrasting that with bleak environments that convey unhealthiness and danger. He continues by saying that these visual cues evoke responses within audiences without having to explain anything.

- Production and sustainability

10.60% brought forth concerns with the physical, real-world consequences certain films have created through landscape changes and environmental impacts, whether that is due to the filmmaking process and or the aftermath of fan culture. Bradley (2021) explains, “in New Zealand, we all live in the aftermath of the *Lord Of The Rings* series. It has become a huge tourism industry, drawing many thousands of people to the country to visit the landscapes that were featured”.

- Narrative and context

“I think this would depend on the premise of the fantasy film” (Gerriety, 2021). 10.50% comment on fantasy films being a mode of escapism for audience members but include that if the context of the overall film has an environmental agenda, then elements of landscapes/milieu could be of assistance. Cripps (2021) explains that production design serves the script and narrative, and thus the landscapes/milieu within production design should further what the film story tells. The speculation could be made that responses like the above indicate that first, the context of a film and, secondly, the story’s setting or film world within the script should serve environmentalism before production design can.

- Film examples

“When you see *Wall-E* you want to save the trees” (Aidoni, 2021). Although this 8.80% of respondents did not provide a description of landscapes/milieu suggestions and alterations, they did offer film examples that consist of landscapes/milieu can facilitate environmental awareness and or films that have a film world that encourages environmental awareness because the narrative directly deals with environmental issues. Berman (2021) suggests “films like *Silent Running* where the entire movie premise is about preserving life on earth might help change perceptions”. Several respondents used the world design and world-building in *Avatar* (a utopian setting) as an example for creating an environmental agenda. Zollenkopf (2021) suggested *Blade Runner* (a depiction of consumption and destruction) as an example of impactful landscapes and design.

- 31.60% of respondents opted not to provide a response. 10.50% of respondents did provide remarks that landscapes/milieu alterations in fantasy films could not facilitate environmental awareness.

C.5.2 Can you give examples of props alterations within fantasy films that can facilitate environmental awareness?

Four main categories, namely (in declining order of total responses): prop suggestions and alterations, production and sustainability, narrative and context, and film examples, emerged within the analysis of this open-ended question.

- Prop suggestions and alterations

19.30% of respondents suggested practical props that can be used and or substituted. Most responses included examples of sustainable substitutions such as; reusable bags and containers

rather than plastic bags (De Felice, 2021), “reusable mugs” (Mkhwanazi, 2021), “no paper, all tech, recycling facilities built into society instead of just being a bin in the room” (Cheyenne, 2021) and transport vehicles having green-energy solutions and or using environmental transportation (Faber, 2021). In addition to these sustainable suggestions and alterations, there are 4.5% of responses indicate contemptuously how reusability is the fundamental way of creating environmental awareness and promoting a sustainable mindset. Goluzov (2021) gives the example of using “macaroni instead of magic wands - you can eat them afterwards” this could be interpreted as using reusable props and or repurposing props, and Barkham (2021) suggest “swapping guns for flowers” as a solution. Barkham's idea could be interpreted that films’ destructive narratives and themes could be “swapped out” for sustainable and environmental ethical themes and narratives.

- Production and sustainability

15.80% of respondents focused on how props are manufactured and sourced. According to Brett (2021) props produced in an environmentally friendly manner and according to Glogauer (2021) sustainably sourced props and recyclable props (Mpisi, 2021) are essential in creating a more sustainable production. Respondents expressed that “the reusing of props across films would help with this as the swords needed for *Game of Thrones* could also be used in the *Lord of the Rings* series. It is about potentially also building a network across production designers to share and use each others’ prop pieces and expand on them” (Harris, 2021).

- Narrative and context

8.80% emphasised that sustainable alteration and substitutions of props, for instance, replacing a standard bin with a recycle bin,

paper cups with a reusable mug/bottle and plastic shopping bags with reusable organic bags, should mainly be done when the narrative and context involves sustainability. “I can imagine it could be incorporated, but also I do not think it would be a priority in the design concept unless it was scripted” (Clancy, 2021). Some responses did express that “this (referring to props within film) is not the most effective option” (Fox, 2021). These respondents emphasise that props alone can not affect audience perspectives and should instead be combined with the narrative and context to achieve facilitating environmental awareness.

- Film examples

Respondents did not provide a description of props suggestions and alterations, this 7% of respondents did, however provide film examples that consist of props that can facilitate environmental awareness and or props that used sustainable solutions in the manufacturing process and or the disposable process. Donovan (2021) explains that *Pacific Rim* made use of old scrap items to assemble the small robot and adds the importance of “ultimate recycling”. Fred (2021) provides the example of the animated film *WALL-E* (story themes of overconsumption that depicts the “rubbish” humans have left behind on earth) and explains that, in his opinion, it is an example of “characterisation of objects (animated in this case) that have both a function of denouncing a dying world and of hope for a better future”. *The Lord of the Rings* (an adventure that the characters are placed in lushed green storytelling worlds contrasting dead villainous environments) series (Daki 2021) and Zollenkopf (2021) example of *Dune* (a film depicting characters making use of the natural environment), was also listed by the respondents as impactful use of not only prop design but the overall visual design of the film.

- The conclusion can be made that the 38.60% of respondents that did not provide a response did not know which answer to provide since comments such as; “I would have to think about this” (Gramatky, 2021), “I can not think of any off the top of my head” (Hofeling, 2021) and “I can not say, but the list is endless” (Hodges, 2021), was made.
- 10.50% of respondents thought that props can not generate environmental awareness, and should not attempt to facilitate environmental agendas, as stated by Mary (2021) “no, and I do not think they should. Let entertainment be entertainment”. This 10.50% believe that film should be what the creator intends it to be.

C.5.3 Can you give examples of set dressing alterations used within fantasy films that can help facilitate environmental awareness?

For this open-ended question, the majority of 36.80% did not provide a response, 19.30% believed that set dressing could not help facilitate environmental awareness and that this question is irrelevant; “set decoration is, like design more broadly, in the service of the narrative and the service of giving backstory to a character in their environment. I am not sure how a choice of draperies could necessarily inspire a viewer to greater environmental awareness. It is generally considered unprofessional to embed agendas that do not connect at least somewhat directly to the script and the studio/director’s vision into design” (Hofeling, 2021). And a total of 14% referred to their previous answer.

The remaining 29.90% can be classified into four main categories, namely (in declining order of total responses): set dressing suggestions and alterations, production and sustainability, narrative and context, and film examples.

- Set dressing suggestions and alterations

8.80% of respondents, similarly to the prop suggestions and alterations in C.5.2, explained that having sustainable solutions and or changes to everyday objects within the background of a film can help facilitate environmental awareness. “Showing things that are reusable: grocery bags, food containers, paper towels, etc.” (Cheyenne, 2021). Harris (2021) states that “this is a way where you can place subtle environmentally friendly or aware items in the film, i.e. the mediaeval people know they need to compost their veggies for their farm and so have a composting space within their garden set dressing”.

- Production and sustainability

This 8.80% of respondents are more concerned about the manufacturing of set dressing rather than the visual aspect of set dressing, for instance; “It could be possible to use more eco-friendly materials or ones that could be recycled” (Clegg, 2021). Making use of recycling and reusing set dressing to decrease a production's carbon footprint, “set dressing that has been used in other fantasy films could be reused” (Aidoni, 2021).

- Narrative and context

8.80% responded that the set dressing depends on the narrative context of a film and can thus only help facilitate environmental awareness when the entirety of the film inhabits environmental concerns. Faber (2021) explains, “it starts with the story world. Where are we? When are we? And why are we in this particular story? If those questions are answered, you can start by defining the look of the world and with the set dressing”.

- Film examples

4.50% of responses are film titles, namely; *Greenland* (Zollenkopf, 2021) and *Avatar* (Fred, 2021). These films consist of sets and set dressing that can help facilitate environmental awareness.

C.5.4 Can you give examples of costumes, hair and makeup alterations within fantasy films that can facilitate environmental awareness?

The analysis of these open-ended questions identified two main categories, namely (discussed in declining order of total responses): production and sustainability and film examples. 0% of respondents included suggestions and or alterations that can be made in the costumes, hair and makeup sector of production design.

- Production and sustainability

26.30% of respondents emphasised that costumes, hair and makeup should be sustainably sourced and consist of environmentally friendly products and materials. A few examples provided are; animal-friendly products, as well as products made from natural materials, should be used (Glogauer, 2021), using recycled textiles (Faber, 2021), “the use of natural fibres like bamboo, recycled paper, vegetable dyes” (Jonathan, 2021) and using vegan makeup and hair products (Mpisi, 2021). Several respondents added that reusing, borrowing, and lending costumes can contribute to the sustainability of a production, as stated by Harris (2021), “reusing pieces where possible”.

- Film examples

5.30% of respondents used film examples to explain what type of costumes, hair and makeup can work within fantasy films to

facilitate environmental awareness. These examples are *Mad Max*, Donovan (2021) explains that “the films show found objects in hair and makeup”, “*Avatar* can be an example of excellent characterization of make-up and hairstyles, in fact, even in this case, they harmonise the protagonists well with their environment” (Fred, 2021) and Zollenkopf (2021) responded *Dune*’s costumes as an example.

Stillsuits filter and repurpose moisture and salt, keeping people from losing water while cooling the body and providing drinking water. A planetologist, Liet Kynes, in the book, explains, “with a Fremen suit in good working order, you won’t lose more than a thimbleful of moisture a day.” This recycling and reusing technology avoids being wasteful towards the body and nature (Foy, 2020). The Fremen stillsuit forms an essential part of the narrative and story of the film; it communicates sustainable awareness and conveys environmental solutions.

- “I do not know” (Sam, 2021). Almost half (49.10%) of the respondents opted not to provide a response. The assumption can be made that these respondents did not know which answer to provide. “I can not think of an answer that would be of any value” (Hofeling, 2021). Bradley (2021) states that “I can not really imagine how”, together with 19.30% do not believe that costumes, hair and makeup can facilitate environmental awareness within fantasy films.

C.5.5 Can you give examples of colour scheme alterations within fantasy films that can facilitate environmental awareness?

Two main categories, namely (in declining order of total responses): suggestions and communication and messaging, were identified when inspecting these open-ended questions.

- Suggestions

15.80% of respondents suggested natural colour schemes and a neutral colour range use within production design. Glogauer (2021) states that non-natural colours like neon should be avoided. Gerriety (2021) says that moving into more earth tones could work and expresses concern that the colour scheme will still depend on the premise of the fantasy film.

- Communication and information

14% emphasise that colour within a film is already used as an effective communication method and colour theory already conveys information to the audience. Landin explains that “colour will always affect emotions, and in that sense drive the story. An item (of less importance for the story in the scene) in a set, with a strong colour (red), can distract the viewer from the important part of the scene which is coloured differently”. Cheyenne (2021) reinforce this by saying “I think the colour scheme can help an interpretation of the message of the film, so if the message of the film is about a smog induced world and the problems that climate change caused to bring us here, then you can have a smog heavy palette to help bring that visual world to an extreme but the colour scheme should always be related to the main themes of the movie discussed with the director”.

- 1.80% used a film example of colour use that may facilitate environmental awareness. Fred (2021) believes that *What Dreams May Come*, made in 1998, is a forerunner in colour use and is a fantastic example of “exaltation and enhancement of a wonderful world”.

- 35% of respondents highlighted that they do not believe colour schemes and colour use could convey an environmental agenda.

Harris explains that she is unsure “whether colour schemes would have an effect on that as I do not think people would be able to distinguish it clearly”. The final 34.30% offer no response.

C.6 Zoomorphism in production design

Zoomorphism: Giving animal-like qualities and characteristics to inanimate objects, humans and any forms of non-animal elements (Literary Devices, 2016). For example, the cave in Aladdin looks like a lion.

C.6.1 Can you give some examples of how production design might incorporate these concepts of zoomorphism, especially in fantasy films?

General agreement and environmental awareness, narrative and context, and film examples are the three main categories that were identified when inspecting these open-ended questions (discussed in the declining order of total responses).

- Zoomorphism suggestions and environmental awareness

A response of 22.80% claims that the concept of zoomorphism could help facilitate new forms of eco-cinema. Several respondents gave suggestions on how, in their opinion, zoomorphism could facilitate environmental awareness. Mpisi (2021) states that “having important elements in the film looking like animals could give a sense of compassion to the audience for the object”, Tobar (2021) explains that “zoomorphism could be a way to bring awareness to a world without animals, which are usually a soft spot for humans” and Harris (2021) reinforced this idea by saying “zoomorphism is a great way to engage people with animals and wildlife and create connection and correlation with inanimate objects, say a mountain range”. “It is seen all the time when you are realising a place/world that is better connected to nature; natural forms are in their

designs” (Brett, 2021). Some respondents emphasise that this concept is already seen within production design, namely; floral shapes and patterns in elf costumes (Verweij, 2021) and film worlds depicting a variety of real-world based on utopian aesthetics (Fox, 2021).

A key response to keep in mind when analysing the data further is, Hofeling (2021) who expresses “I tend to agree a bit more with these propositions because I believe the more a viewer can empathise or be excited by a natural element - an animal through biomimicry or zoomorphism - for instance, the better. But, oftentimes (and I've done it many times myself as a designer), if we use a lion's head or the form of a cobra, etc., it is extremely reductive to the average viewer, reducing a lion to a basic symbol of strength or a cobra to nothing but a danger. Also, though this is not specifically the question, I think anthropomorphising animals as characters is a double-edged sword from a biodiversity/conservation perspective. Yes, making a crab or a baboon come to life as a comic element of the villain makes us consider these animals and their special attributes, but are not we also then saying they only matter when they become more like us”? Although these respondents believe zoomorphism is an efficient tool for environmental awareness, the use of zoomorphism can become damaging when treating it in an anthropocentric way. This will be further explored under the 4.3 interview analysis.

- Narrative and context

According to Glogauer (2021), “if the film conceptually supports these, then, of course, they could be used”. 14% of respondents believe that Biomimicry and Zoomorphism could be of use but only when the context and story of the film call for it. “I think this relates more to the story and needs to be a result of the themes. If you have too many ideas and themes going on, people are going to

interpret your work incorrectly. Good design is cohesive and central and most people do not even notice it” (Cheyenne, 2021).

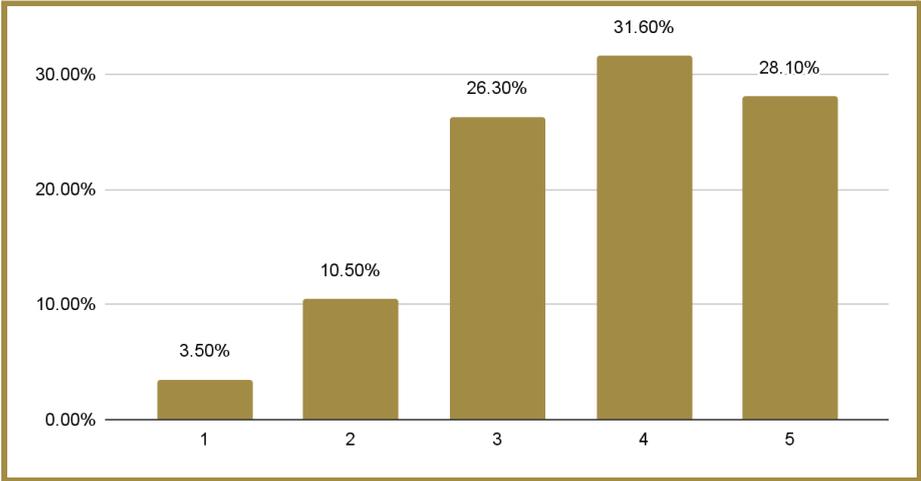
- Film examples

5.30% film examples were provided as support of biomimicry and zoomorphism use. According to Fred (2021), *King Kong* has compelling examples of zoomorphism and biomimicry. The other models that included excellent biomimic and zoomorphic design are *Black Panther*, a design that draws inspiration from a panther (provided by Conroy) and *Dune*, a design inspired by the desert, water and animal life (provided by Zollenkopf).

- 28.10% did not supply a response. The remaining 29.80% of respondents express doubt that biomimicry and zoomorphism can help facilitate environmental agendas. Harron (2021) expresses that “in science fiction, both of these are heavily deployed in the design process currently, but I do not think they actually resonate or bring awareness to eco-cinema”. Several respondents are also of the opinion that these concepts should not be incorporated into production design. “I do not think these should influence a look one might be trying to create. A bird's beak shape might look cool as the front of a train, but if you are designing a brutalist looking movie, the front of the train should follow those design rules” (Hodges, 2021).

C.7 Developing new forms of eco-cinema as strategies for engaging audiences to become more environmentally friendly.

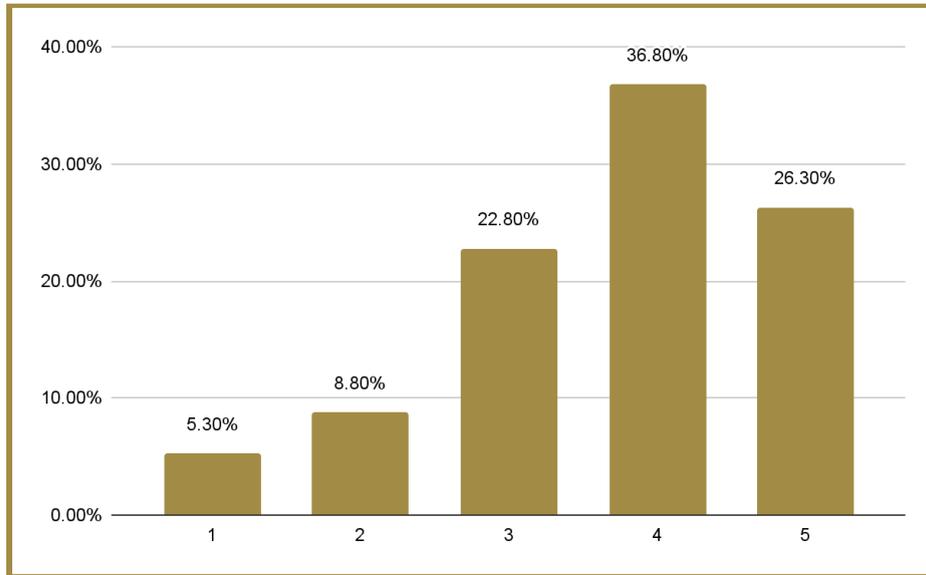
C.7.1 Environmental production design strategies can have an impact on the audience's evolving environmental awareness



Graph C.14: Environmental production design strategies can have an impact on the audience's evolving environmental awareness

The majority of respondents, as seen in Graph C.14, are placed on the “agreeing side” of the Likert scale, namely; 28.10% strongly agree, 31.60% agree, and 26.30% somewhat agree with the statement that environmental production design strategies can have an impact on the audience's evolving environmental awareness. Faber (2021) “take, for example a story that is set in a world where you see the consequences of all the pollution. Think about the giant trash heaps in certain countries; trash that comes from one part of the world and is shipped to another part of the world”.

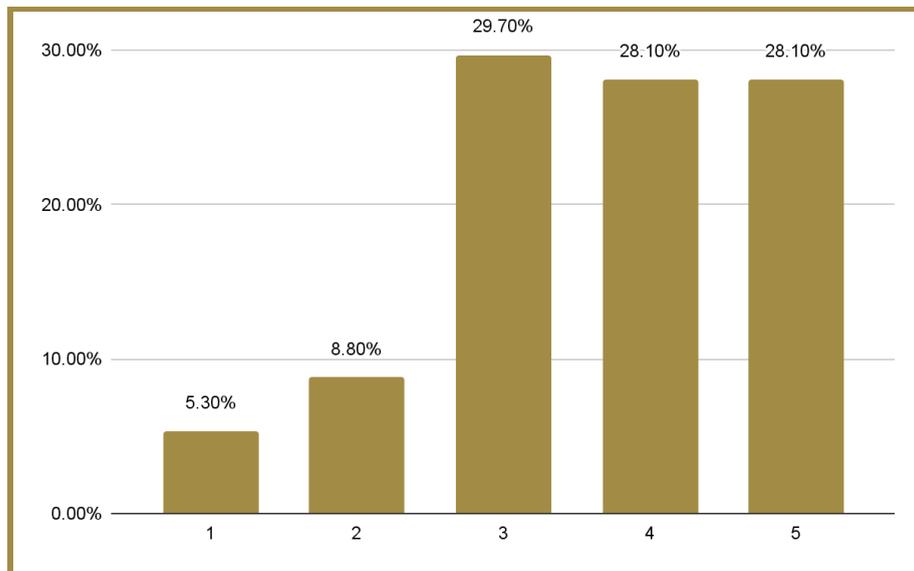
C.7.2 Eco-cinematic production design strategies can lead to an environmental discussion and debate in audiences



Graph C.15: Eco-cinematic production design strategies can lead to an environmental discussion and debate in audiences

The majority of respondents, in Graph C.15, are in agreement that eco-cinematic production design strategies can lead to an environmental discussion and debate in audiences. More specifically, 26.30% strongly agree, 36.80% agree, and 22.80% somewhat agree with the statement. Fred (2021) expresses that, in his opinion, “every change within a film project must be deeply considered in order to avoid the spread of an erroneous message in the viewer, a message perhaps not even desired by the director's narrative. In fact, not always a change, even if thought with noble intentions, can be well interpreted by all the spectators of the film; for example, the representation of a heavily polluted environment contrasted with an uncontaminated environment can sometimes generate a strong sense of denunciation and disapproval in the viewer making him responsible for behaviour that respects the environment more”.

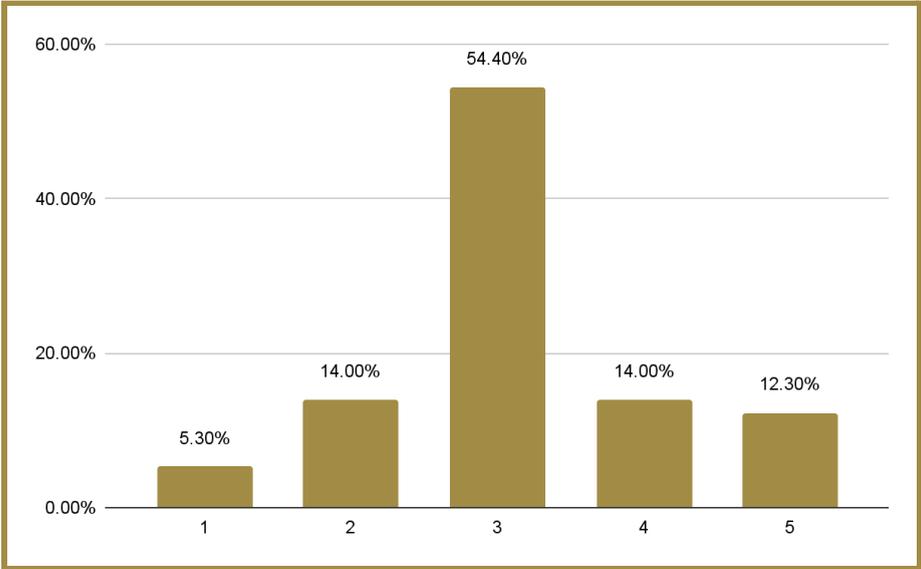
C.7.3 Eco-cinematic production design strategies can have an impact on the audiences in supporting lifestyle changes and innovation, especially in supporting sustainable behaviour



Graph C.16: Eco-cinematic production design strategies can have an impact on the audiences in supporting lifestyle changes and innovation, especially towards supporting sustainable behaviour

Graph C.16 shows a more equal representation between respondents who strongly agree, agree and somewhat agree, with a breakdown of; 28.10% responses for strongly agree and agree. Along with 29.70% somewhat agreeing with the statement that, eco-cinematic production design strategies can have an impact on the audiences in supporting lifestyle changes and innovation, especially towards supporting sustainable behaviour. When more environmental production design strategies are used, for instance, the use of visible recyclable materials and sustainability items, more audiences are subconsciously introduced to this concept and it becomes more normalised, it can affect audiences' perspectives toward an environmentally ethical mindset and mode of behaviour (Henry, 2021).

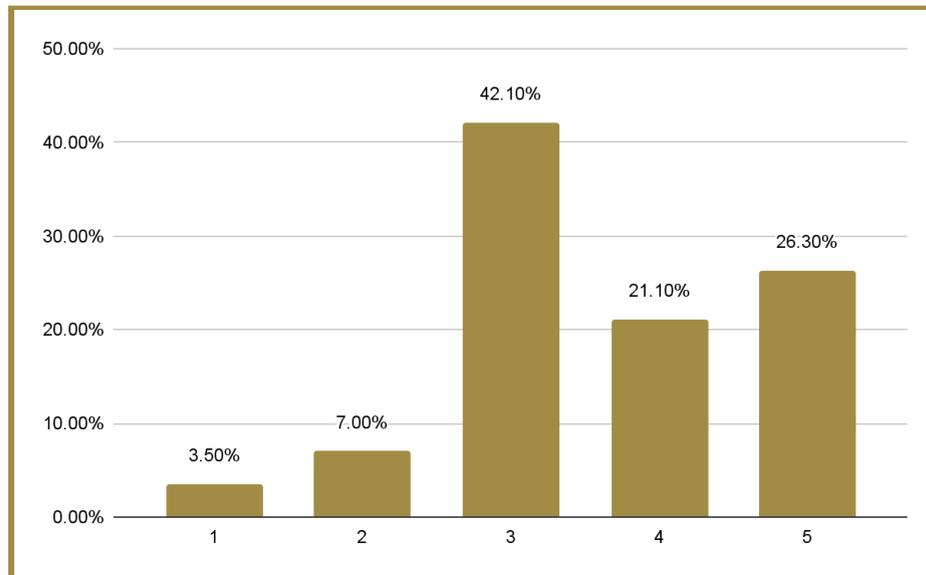
C.7.4 Using zoomorphism in production design can help change audience perspectives toward an environmentally-friendly mindset



Graph C.17: Using zoomorphism in production design can help change audience perspectives towards an environmentally friendly mindset

Subtle changes like this would affect the audience (Berman, 2021). 54.30% (Graph C.17) of respondents somewhat agree that zoomorphism in production design can help change audience perspectives toward an environmentally-friendly mindset. “It is an interesting theory. It may lead to different developments” (Henry, 2021).

C.7.5 It is possible for “eco-easter egg” elements in films to become popular and help facilitate an environmental (eco)-fan-culture



Graph C.18: It is possible for “eco-easter egg” elements in films to become popular and help facilitate an environmental (eco)-fan-culture

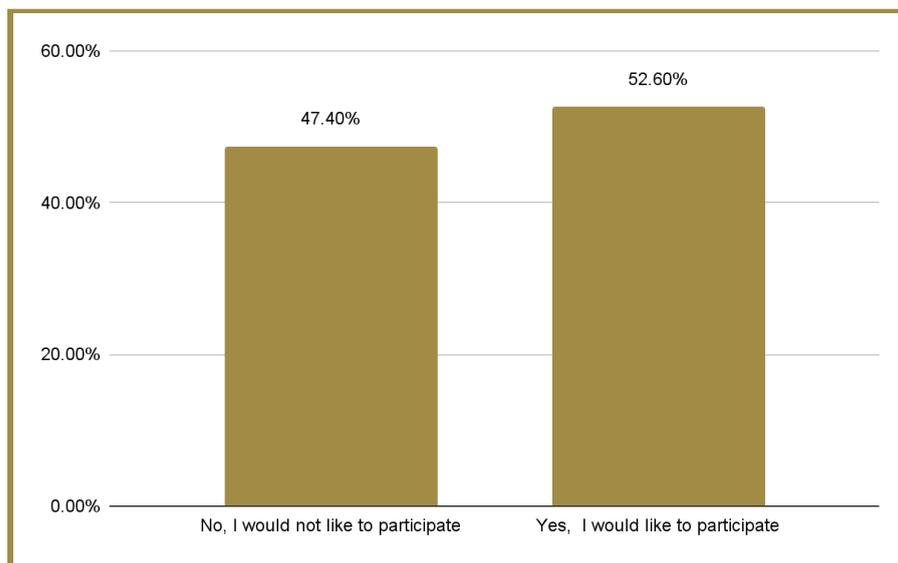
10.50% (4.50% strongly disagree and 7% disagree, as seen in Graph C.18) respondents are of disagreement that “eco-easter egg” elements in films become popular and help facilitate an environmental (eco)-fan-culture. Thus the respondents are somewhat in agreement that it is possible for “eco-easter egg” elements in films to become popular and help facilitate an environmental (eco)-fan-culture. Kozlova expresses concerns and states that “the problem with this is that the film aims to not break the illusion of reality (of course in a realistic, modern storyline). So the introduction of production design elements that are intentionally different for the sake of environmental preservation may seem jarring to audiences who are not expecting to see anything out of the ordinary. We are all so conditioned to see paper take out containers that if those suddenly become “reusable”, an audience will undeniably notice that and it could break the authenticity and draw too much unnecessary attention pulling away from the storytelling”. Although Kozlova’s statement does resonate, audience members, even when “startled”, will notice these environmental changes and will hopefully be remembered, and entice discussion. The more this occurs, the bigger the chances are that

“eco-easter eggs” will become popular and morph into an environmental fan-culture.

C.8 Online Zoom interview

An additional online Zoom interview can be arranged with willing respondents to help expand on the questionnaire and provide supplementary and more in-depth data for the research project.

C.8.1 *Would you like to participate in an online Zoom interview?*



Graph C.19: Online Zoom interview participation

More than half (52.60%, as seen in Graph C.19) of the respondents opted to participate in an additional online interview. Only 9.5% of the 52.6% followed through with participating in an online Zoom interview. All film industry interview transcripts can be requested.

C.9 Summary

The findings of the online questionnaire suggest that the majority of respondents do believe that production design can be used as an effective tool for environmental (eco-) cinema practices and at the same time, help provoke climate change debate and innovation. The deduction can be

made that respondents conclude that the use of production design can both promote a sustainable workflow within the film industry and filmmaking and facilitate environmental awareness within the audience through conveying visual environmental and ecological information. Although several respondents have concerns about how environmentally conscious production design strategies could be created without the premise that a film is about sustainability and or environmentalism, the respondents do consider that in certain circumstances there could be an opportunity for production design to facilitate environmental awareness.

C.9.1 Key themes

The key themes discovered are; first, that filmmaking should adopt a sustainable workflow and should attempt to decrease their carbon footprint. Secondly, film is an effective medium for communicating and creating awareness of environmental issues together with additional concepts such as sustainability and conservation and thus, film could assist in mitigating the climate crisis through creativity and education. Thirdly, that eco-conscious production design elements (together with the concept of eco-easter eggs and modelling environmental ethical behaviour within production design) could assist in communicating biocentric ideas and aid a film in having an environmental agenda within its subtext. Fourthly production design as zoomorphism could help create an empathetic perspective towards nature, the environment and animals. And lastly, respondents are of the opinion that production design could possibly evoke eco-conscious debate and perspectives and provoke sustainable and conservational behaviour.

C.9.2 Key concerns

The key concerns of respondents are whether a film could create an environmental agenda without firstly adopting a sustainable and eco-conscious workflow and perspective? Secondly, could environmental agendas be produced by production design when the film's narrative and

the storyline do not address environmental issues and include sustainable concepts? And lastly, whether audiences will wrongly interpret these eco-conscious production designs, especially within zoomorphism and production design - having zoomorphism provokes anthropocentric behaviour instead of zoomorphism, promoting an empathetic and conservation agenda.

Appendix D: Appendices on request

Due to the length of this research project, unnecessary data have been removed. However, a separate Appendices document with the following information could be requested:

- Online interview transcript example.
- Questionnaire form.
- Online interview questions.
- Questionnaire approval form.
- Film industry members online interview approval form.
- Academic online interview approval form.
- List of interviewees.
- *Aladdin* case study.
- *Beauty and the Beast* case study.
- Additional *Dune* case study elements.
- Solarpunk.

Appendix E: Eco-easter egg toolkit

Production design could promote sustainability by adopting a sustainable and eco-conscious workflow and production (Green The Bid, 2022b). Together with information found on Green The Bid (2022a) list of *Characters Modeling Sustainable Behaviours*, Green Product Placement (2022) and opinions of respondents and interviewees (analysed in chapter 4) will be composed to form an Eco-easter egg toolkit.

How to guide for production design as an eco-cinematic tool

This toolkit is compiled by the researcher and designed for user-friendly access for all industry members.

1. Set and set dressing

- Adding recycling bins and replacing regular bins with recycling bins.
- Hang posters and signs with eco messages.
- Add environmentally friendly barcodes/QR codes that audiences could scan and get redirected to green websites.
- Use eco-product placement or green product placement.
- Put earth-friendly dishwashing soap and earth-friendly laundry soap on counters.
- Show sustainable alternatives to objects found in the house, for instance, bamboo tissues, reusable water containers, etc.
- Show appliances with energy star labelling.
- Show off eco-labels when applicable.
- Use solar energy for outdoor fairy lights and patio lighting.
- Have laundry drying on a clothesline.
- Plants throughout the house: as decor and to reiterate air purification.
- Flowers and shrubs: use those that are indigenous to the show's fictional location.

- Overall using sustainable, reusable or recyclable items as set dressing.
- Avoid using paper, plastic and polystyrene and other non-sustainable elements.

2. Props

- Characters using reusable grocery shopping canvas bags.
- Driving electric cars, carpooling, using eco-conscious transport and riding bicycles.
- Characters putting food into reusable storage containers.
- Characters using glass/metal straws.
- Characters using reusable mugs and cutlery.
- Having organic and vegetarian or vegan meals/produce.
- Show labelled organic products on the kitchen counter, offices and school.
- Reusable coffee cups, reusable food containers and reusable lunch bags.
- Use eco-product or green product props.
- Same as above - overall, using organic, sustainable, reusable or recyclable items as props.
- Avoid using paper, plastic and polystyrene and other non-sustainable elements.

3. Hair and makeup

- Characters using vegan and cruelty-free brands.
- Characters avoid non-sustainable hair and make-up tools and accessories.
- Characters having culture appropriate hairstyles - showing the natural texture of certain hair types.

4. Wardrobe and costume

- Characters using vegan and cruelty-free brands.
- Characters wearing t-shirts with green slogans.
- Wearing sustainable and organic outfits.
- Showing costumes that are inspired by nature.

5. Production designs that are context-driven

- Turn off lights when leaving the room.
- Donate to charities, shelters, schools etc.
- Buy organic food and other products from farmer's markets or health food stores.
- Turn off the water when brushing teeth, and washing dishes.
- Volunteer for environmental and social causes.
- Throwing away recyclables and sorting items into different trash bins.
- Picking up trash/not throwing trash on the ground.
- Not harming animals and promoting conservational practises - for instance, do not harm spiders.

By using this Eco-easter egg toolkit as a starting point for film productions, as well as incorporating creative zoomorphic- and solarpunk aesthetics, filmmakers, could create environmental agendas within their films, which have the possibility to create environmental awareness and promote the audience's sustainable behaviour and eco-conscious perspectives.