

## THE FUTURE OF BEAUTY INNOVATIONS IN FACE RECONSTRUCTION AND AIRBRUSH MAKEUP TECHNOLOGY COMPLETED WITH BIBLIOMETRIC ANALYSIS

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### Abstract

The world of beauty is increasingly developing and innovating, one of which is the visual reconstruction of the face and the use of airbrush techniques in makeup. This research presents an interactive visual facial reconstruction system to increase creativity and makeup results. Face Reconstruction and Airbrush Makeup are technological innovations in the makeup world, making them familiar things in makeup circles. Its use, which can be applied to various forms of media, allows this technology to become an option, and the processing process is shorter compared to conventional work. The effectiveness of this time is what makes airbrushes popular; in addition, the work produced is more durable and not easily erased by the movement of the model. The method used in this research is a qualitative approach using the Miles and Huberman model; the subjects of this research are bridal makeup artists. This research analyses world beauty trends, innovation, and technology integration in makeup. Face Reconstruction can be developed based on the Unity 3D framework. The application will create colours on the model in time with the user's motions when the user applies cosmetics. The user will be able to see which colours match their skin tone by having the results projected onto their face in real time through projection mapping. With our touch-detectable cosmetics tool, users can enjoy realistic makeup effects. According to the study's findings, consumers can use this technique to help them become more creative with makeup and discover a look that suits them.

Keywords: Airbrush, Face reconstruction, Makeup.

## **1. Introduction**

Rapid advances in technology and information have marked the era of globalization [1, 2]. This has impacted the emergence of competitive competition in various fields, including traditional arts-based creative industries [3]. Bridal makeup is not just an artistic skill but an integral part of a rich cultural heritage [4]. According to Storey [5], Cultural heritage includes practices, knowledge, and creative expressions passed down from generation to generation [9].

Bridal makeup artists continue to carry out self-development and innovation to keep up with developments in trends, which involves participating in official courses and State exams to obtain a diploma of expertise, attending seminars to obtain a certificate of expertise, and making observations via social media where many makeup masters create tutorials for learning self-taught. Entertainment media such as YouTube, which displays beauty product reviews by beauty enthusiasts, have gained many followers and subscribers. Makeup artists generally conduct beauty product reviews and makeup tutorials, which their followers tend to follow. Followers who enjoy makeup review shows on YouTube then gain insight into tips and tricks for choosing straightforward facial cosmetics. Self-makeup, a type of self-esteem, seeks to increase a person's self-confidence in front of other people [6].

The main challenge of bridal makeup face is that no comprehensive educational teaching unit is available, so professional skills are often difficult to achieve. To achieve a widely recognized standard of expertise, bridal makeup artists have to rely on self-effort, follow available training resources, and absorb insights from tutorials on social media platforms [7, 8]. The continuation of their self-development often depends on the availability of accessible course or seminar opportunities, as well as the determination to continue learning autodidactically through various online resources [9].

In these changing times, the profession of bridal makeup requires particular expertise and skills in doing bridal and traditional makeup. Increasing professional competence is crucial to meeting growing market demands [10, 11]. Makeup art requires a deep understanding of traditional makeup and the ability to adapt and apply it uniquely to each client. Professional competency in the cosmetology industry also includes communicating with clients, understanding their wishes, and creating a satisfying experience. Increasing bridal makeup's professional competence involves mastering makeup and developing adequate interpersonal skills to meet client expectations in a traditional wedding context. Increasing the professional competence of makeup makespans can be done using various techniques, including visual reconstruction and airbrush techniques [12].

Visual reconstruction of bridal makeup has the advantage of explaining to participants not only the technical stages of makeup but also the philosophy and meaning behind each ornament used [13]. This is important because understanding the philosophy and symbolism of each element of makeup will further enrich the insight and mature the work of makeup artists in creating masterpieces of the Sundanese tradition [14]. Visual reconstructions equipped with philosophical explanations and symbolic meanings are very useful for enriching the insight of Sundanese bridal makeup artists. Understanding the concept behind each makeup element will influence the depth of the resulting work of art. Bridal makeup is no longer just a cosmetic skill but an aesthetic expression that has excellent value [15].

## 2. Method

The research method used in this research is a qualitative approach using the Miles and Huberman model. The Miles and Huberman model is an activity in qualitative data analysis carried out interactively and continues continuously until completion so that the data is saturated. In this research, the author used two data sources, namely: Primary data sources are the main data sources. The primary data source in this research is five (5) make-up artists who have used the airbrush technique to apply bridal makeup. Secondary data sources are data obtained by researchers from existing sources. In this research, secondary data sources are data obtained by studying book sources, journals, and internet sites that are deemed necessary because they relate to research conducted by researchers as complementary data. The technique for taking respondents used in this research is purpose sampling, which is a technique for taking samples using selection based on specific traits, qualities, or characteristics. The characteristics of the sample in this study are as follows: the make-up artist has been working for at least three years and has used the airbrush technique when doing bridal make-up. We used data triangulation, a technique that combines various data collection techniques (combined data from observations, interviews, and initial surveys).

## 3. Results and Discussion

### 3.1. Facial reconstruction

Beauty technology is the meeting point between technology and the beauty industry [16, 17]. *Visual reconstruction* in the context of fine arts can be defined as an effort to recreate or reproduce past works of fine art using existing historical data [18]. Reconstruction aims to re-visualize works of art that have been lost or damaged so that contemporary society can enjoy them again [19]. In the context of facial makeup, visual reconstruction in facial makeup can be defined as an effort to recreate or reconstruct the historical appearance of a person in the past with appropriate makeup techniques and styles [20]. The aim is to re-visualize the faces of specific figures from the past with a high level of authenticity from both an artistic and historical perspective [21].

Visual reconstruction in bridal makeup is an effort to recreate bridal makeup and clothing from the past by applying traditional makeup styles, clothing, and accessories appropriate to the historical period [22]. The aim is to re-represent that era's bridal beauty standards through historically accurate makeup, hair styling, and traditional clothing [23].

A well-designed composition balances and coherently arranges visualization elements. Visual elements can be analysed more deeply in terms of their contents, such as line, shape, light, colour, texture, mass, space, time, and movement, using concepts and theories of fine art elements [24].

Before discussing the visual elements in bridal makeup reconstruction, it is essential to understand that bridal makeup is not just a purely cosmetic or aesthetic measure. More than that, bridal makeup is a cultural heritage that is rich in meaning and symbolism. Each element used in bridal makeup has its history and philosophy, which reflects the life values and traditions of society. Reconstruction efforts require more than just visual aesthetics; they also explore the meanings contained behind every touch and decoration [25]. The results of the visual reconstruction of the bridal makeup that has been created are shown in Fig. 1.



**Fig. 1. Visual reconstruction of the bridal makeup face.**

Visual reconstruction plays an essential role in creating bridal makeup. Through visual reconstruction, makeup artists can better understand the history, meaning, and symbolism behind each makeup element. Visual reconstruction can also reintroduce local traditions and culture to the younger generation so that they remain sustainable and relevant in modern times [20]

Reconstruction efforts require more than just visual aesthetics; they also explore the meanings contained behind every touch and decoration. Bridal makeup often relies on soft, flowing lines and shapes. Smooth lines and curved shapes are used to emphasize elegance and softness. Lighting in bridal makeup is often adjusted to provide the proper spotlight on specific areas, such as the face and hairpieces. The choice of colours in Sundanese bridal makeup reflects cultural meaning and symbolism. Red, yellow, and gold are often used to symbolize good luck, happiness, and harmony [26].

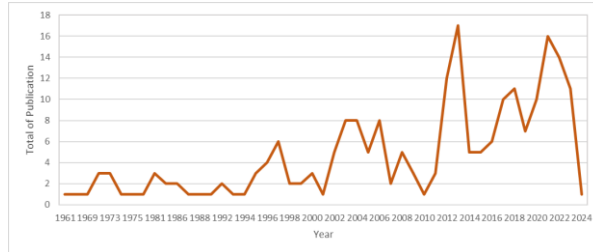
### **3.2. Air brush make up technology trend**

A bibliometric analysis was carried out to see trends in the use of Air Brush Makeup technology. The bibliometric analysis steps were adapted from research by Al Husaeni and Nandiyanto [27], which consists of (i) determining search keywords, (ii) collection of publication data, (iii) bibliometric data processing, (iv) bibliometric data mapping, and (v) data analysis. The search keywords used were “Air Brush,” “Makeup,” and “Technology.” Research data was obtained from the Google Scholar database via the Publish or Perish seven reference manager application. An initial search was carried out on Scopus with similar keywords, but no research regarding airbrush makeup technology was found. So, the search was carried out on the Google Scholar database. Research data regarding airbrush makeup technology was found in 220 articles from 1961 to 2024.

Figure 2 shows the results of recent research trends using bibliometrics regarding airbrush makeup technology. *Bibliometrics* is a method that is considered adequate for understanding research trends. Bibliometric techniques enable analysis, knowledge, global evolution, and future research trends [28]. Several examples of the use of bibliometric techniques are described in the literature from various aspects and fields, such as science and techniques [27, 29- 53], science education [54-67], and religion [68-70].

Figure 2 shows that the first research publication regarding using airbrush technology for makeup in Google Scholar was carried out in 1961. Based on Figure 1, it is known that the development of research on airbrush makeup technology fluctuated from 1961 to 2024. The highest number of publications occurred in 2013, with a total of 17 articles published. The research years with more than ten

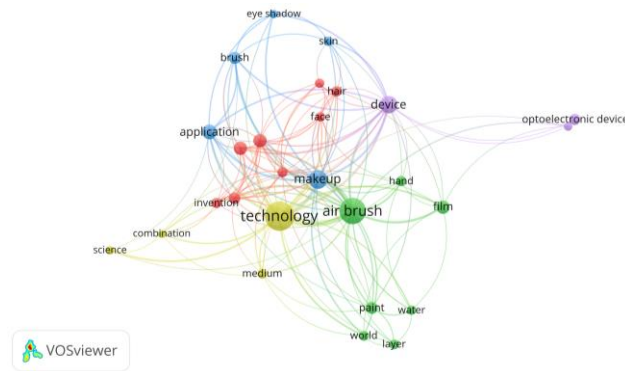
publications on airbrush makeup technology are ten publications in 2020, 10 publications in 2017, 11 publications in 2023, 11 publications in 2018, 12 publications in 2012, 14 publications in 2022, 14 publications in 2021, 16 publications, and 2013 there were 17 publications. This publication data shows that the trend of research publications regarding airbrush makeup technology has increased in the last five years.



**Fig. 2. Research trends in airbrush makeup technology.**

Figure 3 shows a visualization of the bibliometric analysis network of research on airbrush makeup technology. Network visualization shows the relationships between terms frequently used in this research. The bigger the circle or node in the image, the more often the term will be found with a specified minimum number of occurrences, namely five times [27]. Thus, 44 terms were found in this study. After that, we filtered the terms found. Thus, 27 terms are grouped into 5 clusters.

Cluster 1, with red node colour, has eight terms, namely airbrush, apparatus, body, embodiment, face, hair, invention, and nail. Cluster 2, with green nodes, has seven terms, namely airbrush, film, hand, layer, paint, water, and world. Cluster 3 with blue node colour has five terms, namely application, brush, eye shadow, makeup, and skin. Cluster 4, with a yellow node colour, has four terms, namely combination, medium, science, and technology. Cluster 5, with purple node colour, has three terms: device, light, and optoelectronic device.

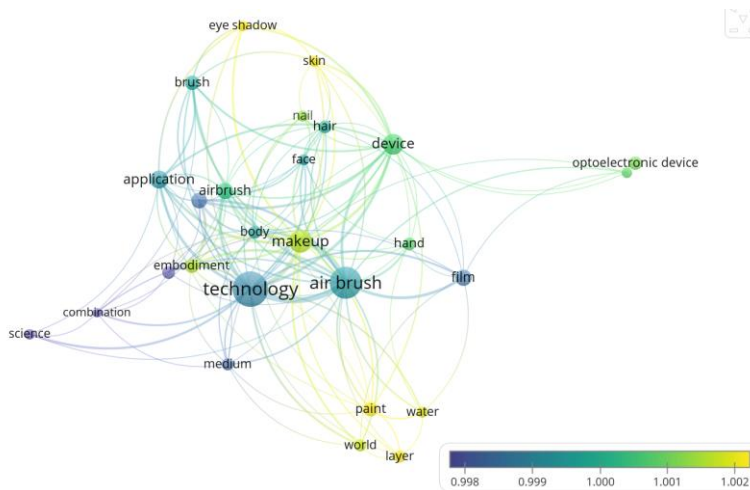


**Fig. 3. Network visualization of airbrush makeup technology research.**

Based on Fig. 3, it is known that the terms technology, airbrush, makeup, device, and application are the terms with the highest number of occurrences and total link strength. Total link strength shows the strength of the relationship between one term and another [56]. Meanwhile, total occurrences show the number of discoveries of

the term from the publication of bibliometric data used in this research. The term technology has a total of 103 occurrences with a total link strength of 131. The term Air Brush has a total of 79 occurrences with a total link strength of 125, the term makeup has a total of 34 occurrences with a total link strength of 85, the term device has a total of 28 occurrences with a total link strength is 71, and the term application has a total of 19 occurrences with a total link strength of 43.

Figure 4 shows an overlay visualization of research regarding airbrush makeup technology. Overlay visualization is identical to network visualization, where the items to, rms, or nodes are given different colours. There are two ways to colour nodes in an overlay visualization where the score of the term on that node determines the colour of the node. By default, colours range from blue (lowest score) to green and yellow (highest score). In Fig. 4, it is known that the colour boxes show how scores are mapped into specific colours. In the overlay visualization shown in Fig. 4, the colours show the average publications per year divided by the average value. Figure 4 shows that in 2008, those in blue had an average number of publications below 0.998, journals in green had an average number of publications around 1,000, and journals in yellow had an average number of publications of 1.002 or higher.



**Fig. 4. Overlay visualization of airbrush makeup technology research.**

Based on this bibliometric analysis, we can find out how research developments or trends are occurring, especially regarding the use of airbrush makeup technology. This bibliometric analysis identifies several terms. These terms impact the discussion of research publications regarding airbrush makeup technology on Google Scholar.

#### 4. Conclusions

Visual reconstruction of the face using airbrush techniques is one of the innovations in the makeup world, as is makeup technology. Technology in the world of makeup can provide convenience and time efficiency; besides that, it can maximize and improve makeup for the better. The effectiveness of this time is what makes airbrushes popular; in addition, the work produced is more durable and not easily erased by the movement of the model: world beauty trends, innovation, and

technology integration in makeup. Using reconstruction techniques, upping facial reconstruction can produce more transparent colours and makeup on the model. The results of the facial reconstruction print are then mapped onto the user's face directly by integrating projection mapping techniques; this can make it easier for users to mix and match makeup and skin tones. Users can experience realistic makeup from our touch-detectable makeup face reconstruction and airbrush makeup; makeup can find a makeup that suits them and get help to increase their makeup.

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