

Identifying Augmented Reality (AR) Design Component for Mural Design In Kuala Lumpur

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Received: 16 February 2025; Accepted: 31 March 2025; Published: 1 April 2025

ABSTRACT

This study investigates the design components for enhancing engagement and accessibility of augmented reality (AR) murals in Kuala Lumpur. Augmented Reality (AR) technology within the existing murals can revitalize public areas and bring new interactions to the public. The main objective of this study is to explore the key design elements that make Augmented Reality (AR) effective and to understand how these elements work together to enhance AR experiences. It looks at how the visuals were put together, how users interact with the technology and how AR blends with physical spaces. By implementing content analysis on existing murals in Kuala Lumpur, this study observes the design principles used to achieve immersion and interactivity. The results of the study are to understand the importance of interface aesthetics and user experience, the role of colour, intuitive design experience and space in developing engaging AR experiences. According to the study, integration of these design features can make AR murals more interactive, visually engaging, and culturally significant, offering a stepping stone to developing immersive urban arts. The findings of this research present a definite guideline for the application of Augmented Reality (AR) to revitalize Kuala Lumpur murals to be more accessible and enjoyable for a broader audience.

Keywords: Street art mural, Visual Communication



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1 INTRODUCTION

Augmented reality (AR), which offers a creative fusion of the real and virtual worlds, is revolutionizing the way public art, like murals, interacts with audiences. Augmented Reality (AR) integrated into already-existing murals improves their accessibility, storytelling potential, and interactivity. Augmented reality (AR) offers a chance to revitalize public spaces and engage audiences in new ways in places like Kuala Lumpur, which has a rich tapestry of murals reflecting its cultural diversity (Smith & Wilson, 2020).

Cultural expression and social commentary have long been facilitated by murals (Dovey, Wollan, & Woodcock, 2012). They tell tales of community, heritage, and identity in Kuala Lumpur, which makes them perfect candidates for AR integration. These static works of art can become dynamic through Augmented Reality (AR), where they are layered with digital content like soundscapes, animations, or interactive stories. This creates an immersive experience that unites technological innovation with cultural storytelling (Billinghurst, Clark, & Lee, 2015).

Furthermore, AR-enhanced murals support educational goals by incorporating interactive content about history or social issues that audiences can explore at their leisure. By opening up access to art and preserving its cultural significance, this digital augmentation makes murals more accessible and interesting for a wider range of viewers (Augmented Island Studios, 2024; Digital Meets Culture,

2024). This study aims focuses on AR design components user interface elements that enhance accessibility and engagement. By analysing existing Augmented Reality (AR) applications in urban art, this research aims to propose a framework for the integration of AR in Kuala Lumpur murals.

1.1 Research Objective

This research objective to is to explore the key design elements that make Augmented Reality (AR) effective elements work together to enhance AR experiences.

1.2 Problem Statement

Augmented Reality (AR) technology has revolutionized the way we interact with visual media, offering immersive and interactive experiences. However, integrating AR into existing murals in Kuala Lumpur presents unique challenges. The digital evolution of street art raises concerns about authenticity, preservation, and the artist's voice, as digital art can be manipulated, copied, or deleted, threatening its long-term integrity (Smith, 2021). Despite the cultural significance and widespread recognition of murals in Kuala Lumpur, they often lack features that enhance viewer engagement and interaction. Integrating AR into these murals offers an opportunity to add a new dimension of interactivity and enrich the overall experience (Tanner & Meyer, 2020).

2 LITERATURE REVIEW

Understanding Augmented Reality design components user interface elements that enhance accessibility and engagement in AR Fest in Kuala Lumpur murals. Given that it to enhances the experience study on framework of visual experience as it can be utilized as design component such as interface aesthetic, user experience, colour, Intuitive design experience and space. This review aims to provide audience some experience the variety of elements in mural art.

2.1 Augmented Reality

Augmented Reality (AR) is a groundbreaking technology that enhances real-world environments by adding digital overlays, creating immersive and interactive experiences. In the world of urban art, AR is increasingly being used to add new layers of storytelling, preserve historical narratives, and engage audiences in creative ways. Research has shown that AR can transform static murals into dynamic, multi-sensory experiences, making art more accessible and even driving tourism (Billinghurst et al., 2015). For instance, AR applications have been used to enrich cultural heritage sites, increase public interaction, and support urban regeneration (Caggianese et al., 2021). In cities like Kuala Lumpur, where murals are already celebrated for their cultural significance, AR has the potential to elevate these works into living cultural assets, blending tradition with technology. This integration not only enhances the artistic experience but also preserves historical narratives, making urban spaces more dynamic and appealing (Chung et al., 2022). By adopting AR, Kuala Lumpur can create a fusion of art and innovation that captivates audiences, promotes tourism, and showcases the city's rich cultural heritage.

2.2 Street Art

Human being has been drawing on cave walls ever since the prehistoric era and this could be seen on artifacts found in Spain and Southern France which historian believe it was made for communication purpose. Until today, human still expresses their feeling and emotion into different types of artworks. Street art and murals are forms of visual art created in public spaces, often with the intent to communicate messages, provoke thought, or beautify urban landscapes. Street art encompasses a range of styles and techniques, including graffiti, stencilling, wheat-pasting, and installations, characterized by its often unauthorized and spontaneous nature. Murals, by contrast, are

typically large-scale, site-specific works painted or affixed to walls, often created with community consent or through commissioned projects. Both art forms serve as tools for personal expression and public dialogue, bridging the gap between art, audience, and environment (Young, 2014).

2.2.1 Purpose of Street Art

Street art and murals serve multifaceted purposes, blending artistic expression with social commentary. They often act as tools for community engagement, fostering local identity and pride while beautifying urban spaces (Dovey, Wollan, & Woodcock, 2012; Young, 2014). Additionally, street art is a medium for activism and storytelling, providing a platform for marginalized voices to challenge societal norms and address political, cultural, or environmental issues. Murals, in particular, can commemorate historical events, celebrate cultural heritage, or advocate for social causes, creating accessible public dialogue. This art form's accessibility transcends traditional gallery constraints, making art an integral part of everyday urban life (Young, 2014).

2.2.2 Movement of Street Art

The street art movement began in the 1970s as an extension of graffiti culture, fuelled by urbanization and the need for public expression in densely populated cities. Rooted in rebellion and resistance, early street art emerged as a way for marginalized voices to challenge authority and highlight systemic inequalities. Cities like New York and London became hotbeds for this underground art form, with artists like TAKI 183 and Lady Pink using walls, subway cars, and other urban canvases to share messages of identity, protest, and defiance (Ross, 2016). This era was characterized by its raw, unfiltered approach and a strong association with hip-hop culture, which provided a soundtrack to the movement's rise.

By the 1980s and 1990s, street art evolved beyond simple graffiti tags into larger, more complex forms. This period saw the emergence of renowned artists such as Keith Haring and Jean-Michel Basquiat, whose works bridged the gap between street art and gallery exhibitions. Public murals gained increasing recognition for their artistic and cultural value, often addressing pressing social issue and environmental concerns (Young, 2014). This era solidified street art as a legitimate medium for storytelling and cultural dialogue.

From the 2000s to 2020, the street art movement expanded globally, incorporating advanced digital tools and new materials. Artists started collaborating with local communities to create murals reflecting shared histories and aspirations, fostering a sense of place and identity. The rise of social media further propelled street art into the global spotlight, allowing works to reach audiences far beyond their physical locations. Festivals like Up fest in Bristol and POW! WOW! in Hawaii celebrated this democratized art form, bringing together artists from diverse backgrounds (Irvine, 2012). Today, street art serves not only as a medium of creative expression but also as a tool for urban regeneration, cultural preservation, and dialogue on contemporary global challenges.

2.3 Design Component in Augmented Reality Mural

The design components in AR murals include animations that bring parts of the mural to life, such as characters moving or scenes changing, and 3D effects that make it look like objects are popping out of the wall. Visual experience has a major impact on the function of Augmented Reality (AR) component for enhancement the augmented reality experience of existing mural (Billinghurst et al., 2015; Craig, 2013). The framework of visual experience can be utilized as design component such as interface aesthetic, user experience, colour, Intuitive design experience and space.

2.3.1 Interface Aesthetic

Interface aesthetics in augmented reality (AR) murals emphasize visually attractive involves crafting intuitive layouts, seamless transitions, and visual elements that match the mural's theme while remaining user friendly. Important features include vibrant yet harmonious colours, clear text overlays, and interactive icons that provide guidance without being distracting. The interface should blend naturally with the mural's artistic style, ensuring a cohesive integration of digital and physical elements. AR applications murals could culturally inspired patterns and local design elements to resonate with audiences (Norman, 2004; Billinghamurst et al., 2015).

2.3.2 User Experience

User experience (UX) in augmented reality (AR) murals is about creating an interactive, intuitive, and enjoyable way for people to engage with the artwork. A strong UX ensures that users can easily explore AR features like animations, 3D visuals, or informational overlays using familiar devices such as smartphones or tablets. Key aspects include simplicity, so the interface is easy to use, and immersion, where digital elements blend seamlessly with the physical mural (Garrett, 2011; Billinghamurst et al., 2015).

2.3.3 Colour

Colour is a visual property resulting from the interaction of light with objects, perceived by the human eye, and is a key element in design. It is used to communicate meaning, capture attention, and guide focus while evoking specific emotions and reactions. In design, colour enhances visual appeal, creates a sense of hierarchy, and conveys cultural or contextual significance. For instance, warm tones like red and yellow often evoke feelings of energy and excitement, whereas cool tones like blue and green are associated with calmness and stability (Lidwell et al., 2010; Norman, 2004).

2.3.4 Intuitive Design Experience

Intuitive design experience is the practice of creating systems or interfaces that users can easily and naturally understand without requiring extensive instructions or prior experience. It relies on aligning the design with users' mental models, enabling them to interact with the system instinctively and achieve their goals efficiently. An intuitive experience reduces cognitive load, as users can navigate and engage with the interface seamlessly, often relying on familiar patterns, symbols, or interaction (Norman, 2013; Garrett, 2011).

2.3.5 Space

Space in design refers to the area within, around, or between elements in a composition, serving as a foundational element for organizing content and creating visual balance. It can be classified as positive space, which includes the areas occupied by the main elements, and negative space (or white space), which is the empty area that surrounds and separates these elements. Effective use of space enhances readability, guides the viewer's focus. In visual experiences like AR murals (Lidwell et al., 2010).

3 RESEARCH DESIGN

Based on this research design focuses on designing AR components using data analysis on mural artists, AR developers, and selected mural to identify culturally relevant design elements. This data will be analysed using word cloud methods to assess user engagement, interactivity, and aesthetic appeal.

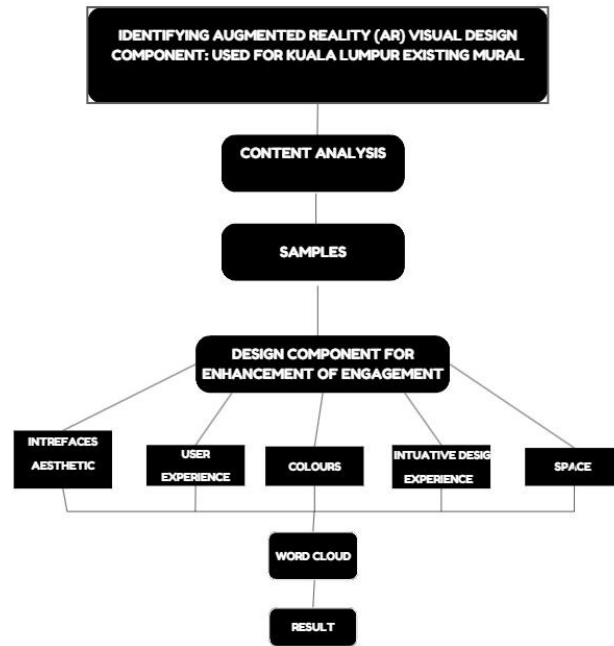


Figure 1 Framework of study






4 SAMPLE

Table 1 Murals in Kuala Lumpur

Title	Mural Artist	Ar Artist	Location
1) Batik Growth	Maisarah	Yeong Ke Xin	Jalan Tun H S Lee
2) Wan Jepak	Wan Jepak	Raito Rahim	Jalan Tun H S Lee
3) The Builder	Cloakwork	Roger Ng Wei Lun	Jalan Sultan
4) Karang Guni	Co2	Aw Boon Xin	Jalan Sultan
5) Jimmy Gummy	Jimmy Gummy	Rexkl	Lorong Panggung
6) Kids Playing Marble	Chan Kok Sing	Seeing Atelier	Jalan Kwai Chai Hong
7) Lady In Red	Norman Khek	Dizzyb	Jalan Kwai Chai Hong
8) Wonder Window	Norman Khek	Raymond Chin	Jalan Petaling
9) Petaling Street	Co2	Arkl Team	Jalan Petaling
10) Chaigoxquiccs	Kenji Chai	Yaya Adnan	Gmbb Chai Hong
8) Wonder Window	Norman Khek	Raymond Chin	Jalan Petaling
9) Petaling Street	Co2	Arkl Team	Jalan Petaling
10)Chaigoxquiccs	Kenji Chai	Yaya Adnan	Gmbb Chai Hong

4.1 Design Component for Enhancement of Engagement

Table 2 Design Component for Enhancement of Engagement

Experiential samples	Interface Aesthetic	User Experience	Colour	Intuitive Design Experience	Space
<p>1) BATIK GROWTH</p> 	<p>Illustration Abstract pattern Dreamy Element</p>	<p>Interactive Art Photography Spot</p>	<p>Cool colour Contra</p>	<p>Experience cultural fusion through interactive immersion.</p>	<p>The swirling branches and circular patterns create a sense of movement and flow</p>
<p>2) WAN JEPAH</p> 	<p>Cartoon Illustration Monochromatic Dynamic shape Human & Floral Element</p>	<p>Interactive Art Photography Spot</p>	<p>Bold colour Pastel shades</p>	<p>AR experience incorporates motion elements in the fauna The flying Wau for an engaging visual effect</p>	<p>Occupies a broader horizontal area and makes use of the existing architectural features, integrating its design</p>
<p>3) THE BUILDER</p> 	<p>Bubble-style graffiti letters Humorous and human element</p>	<p>Interactive Art Photography Spot</p>	<p>Warmth and contrast to the cooler blue tones.</p>	<p>By tapping the character, audiences trigger buildings and a bulldozer to fall from the sky</p>	<p>The central space lettering and character draw immediate attention</p>
<p>4) KARANG GUNI</p> 	<p>Rustic Vibes Realism</p>	<p>Interactive Art Photography Spot Message in mural Storytelling</p>	<p>Earthy Tones Warm Undertones</p>	<p>AR experience playfully celebrating up cycling, reuse, and commitment to sustainability</p>	<p>The mural depicts a bustling scene, symbolizing the lively and dense atmosphere of a traditional marketplace.</p>
<p>5) JIMMY BUNNY</p> 	<p>Cartoonist characters</p>	<p>Interactive Appeal Engaging Simplicity</p>	<p>Bright and Bold</p>	<p>Conveys a message of self-compassion and care in overcoming life's struggles</p>	<p>Space between colour allows main elements pop the to</p>

**6) KIDS
PLAYING
MARBLE**



Realism
Storytelling

Message mural in
Immersive
Environment
Photography
Spot Sound Interact

Earthy
Palette

AR piece stirs nostalgic
memories of our grandparent s,
house with features the
nostalgic tune “Yuet Guong
Guong” (Shiny Moon)

The artwork plays
with depth by
combining real
visual

**7) LADY IN
RED**



Realism
Storytelling
The lantern glow in
the painting could be
enhanced through
AR

Immersive
Storytelling
Dominant
reds
and yellows
Dark
Contrast

AR shedding
light on the life of a prostitute
during a time when society’s
unspoken stories
remained hidden.

The interaction of
the painting with
real- world
elements

**8) WONDER
WINDOW**



Integrated
Architecture
Realism

AR could
animate the child,
making it appear
as if they
are peeking or
Reacting to
passerby
movements.

Light beige
and pastel
tones

AR project aims to showcase
traditional childhood toys
such as congkak, wau bulan,
yoyo, gasing, and jianzi, along
with a Chinese drum toy.

The design
effectively
separates the
mural from the
café below,
creating distinct
layers of visual
focus.

**9) PETALING
STREET**



Traditional
Heritage
Vintage Mural
Storytelling

Complement s
surrounding
elements like red lanterns, blending
art with the
physical
environment.
Monochrom
atic Palette
Warm Tones

Capturing the vibrant
atmosphere of a lively
marketplace

The mural
complements the
street’s aesthetic,
contributing to
the overall
ambiance
without over
whelming the
space

**10) CHAIGOX
QUICCS**



Street
Comic style

Interactive Art
Photography
Spot

Vivid Palette
High
Contrast

This AR animation version of
the mural aims to explore the
layers of the illustrations
being animated to life with the
mix of 2D animations.

Compact but
Impact bold
visuals and
modern street art
styles can
transform urban
spaces into
exciting,
engaging
environment

4.2 Result



Figure 2 Interface Aesthetic

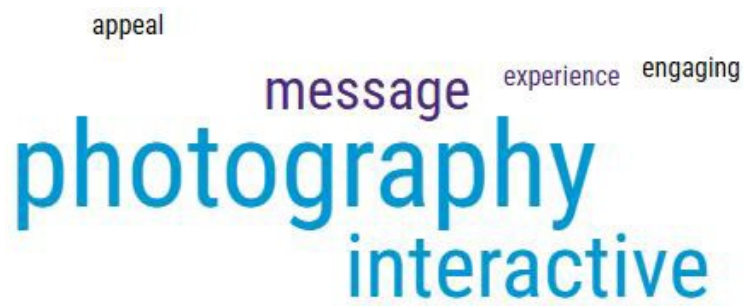


Figure 3 User Experience



Figure 4 Colour



Figure 5 Intuitive Design Experience

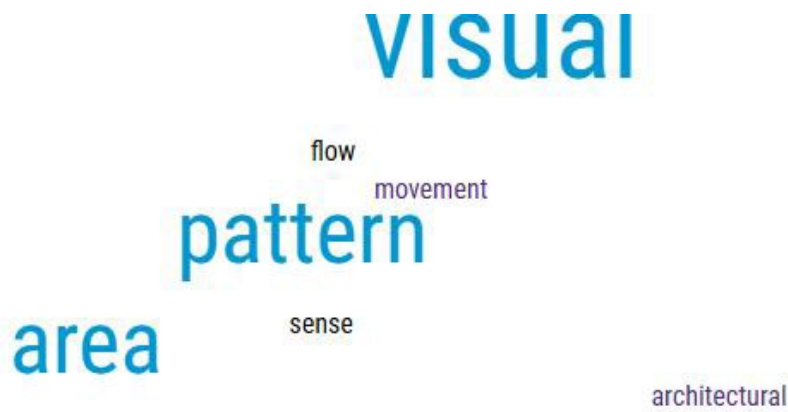


Figure 6 Space

5 DATA ANALYSIS

Table 3 Data Analysis

Interface aesthetic	User Experience	Colour	Intuitive Design Experience	Space
-Storytelling	-Photography	-Contrast	-Experience	-Visual
-Abstract	-Interactive	-Pastel	-Life	-Pattern
-Illustration	-Message	-Warm	-Nostalgic	-Movement
-Dreamy	-Experience	-Bold	-Cultural	-Architectural
-Pattern	-Appeal	-Cool	-Motion	-Flow
-Cartoon	-Engaging	-Shades	-Fusion	-Area

6 FINDINGS

The research findings from the word cloud analysis revealed several key components in an experiential design for each component. For the interface aesthetic, the most frequent components are “Storytelling”, “Abstract”, “Illustration”, “Dreamy”, “Pattern” and “Cartoon”. In user experience, “Photography”, “Interactive”, “Message”, “Experience”, “Appeal” and “Engaging” are the most mentioned. Furthermore, The most frequently mentioned colour such as “Contrast”, “Pastel”, “Warm”, “Bold”, “Cool” and “Shades” as the key component in the colour’s engagement. Moreover, “Experience”, “Life”, “Nostalgic”, “Cultural”, “Motion” and “Fusion” mentioned the most in the intuitive design experience. Finally, in space component it highlighted “Visual”, “Pattern”, “Movement”, “Architectural”, “Flow” and “Area”

The following components supported by the content analysis reveal the significance of each Design component in enhancement in engaging design elements in existing mural.

7 DISCUSSIONS

The results support that the combination of visual with design elements in existing mural can highlight important design elements that can make Augmented Reality (AR) experiences in mural art more engaging and accessible. By implementing the components frequently these elements show how Augmented Reality (AR) can enhance mural art by making it more interactive, visually appealing, and culturally meaningful, providing a foundation for creating immersive urban art experiences.

8 CONCLUSION

In conclusion, according the result and analysis shown, that certain design component used in existing Augmented Reality (AR) murals such as interface aesthetic, user experience, colour, and space can give experiences towards audience on their appreciation about the highlight and importance of creative and visually appealing designs. The research also suggests taking into consideration user experience and intuitive design experience as they play a crucial role in creating an ever-lasting experience. The results of the study offer a clear guide for using Augmented Reality (AR) can enhance Kuala Lumpur murals, making them more interactive, visually exciting, and culturally meaningful for everyone.

ACKNOWLEDGMENT

I would like to take this opportunity to sincerely thank everyone who has supported me throughout this research project. First and foremost, I extend my heartfelt gratitude to my supervisor, Miss Inda Murni binti Hairul Anuar, for her unwavering support, thoughtful guidance, and encouragement at every step of this journey. I am also deeply thankful to Prof. Madya Dr. Sharkawi Che Din for generously sharing his expertise and insights, which were invaluable in shaping this study.

To my family and friends, your constant support, understanding, and encouragement have been my greatest sources of strength. I am truly grateful for your patience and belief in me.

Lastly, I want to thank everyone who contributed to this project in any way. Your efforts, big or small, have made a meaningful difference, and I am sincerely appreciative of all you have done.

FUNDING

This research is self-funded.

AUTHOR CONTRIBUTIONS

All authors played equal contributions towards the production of this paper.

CONFLICT OF INTEREST

There is no conflict of interest.

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