

ALGON-STEAM

e-PROCEEDINGS

BINUS UNIVERSITY

Semarang, Indonesia

01 - 02 September 2023



Organizer



**1ST ASEDAS INTERNATIONAL CONFERENCE
ON SCIENCE, TECHNOLOGY, ENGINEERING,
ART, AND MATHEMATIC IN EDUCATION &
INDUSTRY (A-ICON-STEAM 2023)**

e ISBN 978-967-2762-90-4



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DIGITAL TODAY

**BINUS UNIVERSITY
SEMARANG, INDONESIA**

01 - 02 SEPTEMBER 2023

Published in Malaysia by:

POLITEKNIK MERLIMAU, KEMENTERIAN PENDIDIKAN TINGGI, 77300 MERLIMAU, MELAKA
Laman Web : <https://shorturl.at/EodLL>

e-ISBN : 978-967-2762-90-4

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Published in Malaysia.
Cetakan Pertama, 2024
e-ISBN : 978-967-2762-90-4

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Published in Malaysia by:

POLITEKNIK MERLIMAU, KEMENTERIAN PENDIDIKAN TINGGI, 77300 MERLIMAU, MELAKA
Laman Web : <https://shorturl.at/EodIL>

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PREFACE

Dr. Nelly, S.Kom., M.M., CSCA
Rector of Binus University

Esteemed participants,

Amidst the luminous tapestry of intellect and innovation, it is both an honor and a privilege to extend my heartfelt salutations to the majestic ensemble that is the a-ICON-STEAM conference. Within the venerable halls of Binus University, a cradle of visionary thinking, we convene to unravel the enigmatic realms of science, technology, engineering, art, and mathematics. This convergence, resonating with the resplendent echoes of collaboration between two neighboring nations, Malaysia and Indonesia, stands as a testament to the harmonious symphony that emerges from the meeting of minds. As if choreographed by innovation itself, this symposium unveils a spectacle that goes beyond traditional paradigms, embracing the dawn of new perspectives that paint the grand canvas of human progress.

Over these two days of profound discourse, the corridors of academia shall transcend their boundaries, birthing narratives that are nothing short of transformative. Binus University, a lighthouse of knowledge, radiates its brilliance onto the uncharted shores of thought, guiding us in our quest for innovative thought and boundless creativity. It is within these hallowed grounds that the convergence of science, technology, engineering, art, and mathematics is consecrated, birthing a shared vision that shall orchestrate a future wherein STEAM fields assume their rightful place as the cornerstone of human ingenuity.

Within this symphony of innovation, let it be known that the soul of this conference resonates with the harmonious collaboration between Malaysia and Indonesia, two nations united in their pursuit of excellence. The threads of partnership interwoven with the spirit of collaboration have been enriched by the mesmerizing tapestry of Artificial Intelligence and Humanoid Robotics. As we traverse these uncharted waters, we become architects of the unprecedented, conducting symphonies of brilliance that shall echo through the annals of time, shaping the destiny of generations yet to come.

In the spirit of boundless innovation,

Dr. Nelly, S.Kom., M.M., CSCA
Rector, BINUS UNIVERSITY



PREFACE

Assoc. Prof. Ahamad Tarmizi Azizan
President of ASEDAS International

Esteemed participants,

With a profound sense of exhilaration, I extend an exalted welcome to the grand theater of intellectual exploration that is the a-ICON-STEAM conference. As the President of ASEDAS International, I stand on the precipice of an epochal convergence – a magnificent symphony of minds from every corner of human endeavor, united by an unwavering commitment to chart the uncharted territories of science, technology, engineering, art, and mathematics. This gathering is not merely a conference; it is an altar of enlightenment, where visionaries and luminaries converge to kindle the fires of innovation, igniting the crucible of tomorrow's transformative ideas. Within the tapestry of our shared conversations and dialogues, we sow the seeds of metamorphosis, nurturing solutions to the enigmatic challenges that beset our world.

Yet, as we stand on the cusp of exponential advancement, it is imperative that we peer into the abyss with discerning eyes. ASEDAS International, with its global network and indomitable ethos, not only celebrates the symphony of human ingenuity but also assumes a profound responsibility. In the rapid unfurling of technology, as Artificial Intelligence and Humanoid Robotics permeate our digital world, we must be vigilant custodians of our collective destiny. The alluring crescendo of advancement is not without its shadows – the human risks and perilous precipices that lie along the trajectory of progress. ASEDAS International, guided by its steadfast principles, addresses these concerns with unwavering resolve. It is our moral compass that steers us through the labyrinth of possibilities, ensuring that our ascent is marked by the sanctity of human values.

As we convene in this sacred confluence, let us remember that our collective pursuit is not merely a symphony of brilliance; it is a clarion call to steward our shared future. Through robust collaboration, we shall transform challenges into opportunities, mysteries into revelations. The echoes of this convergence shall resonate not just in the corridors of academia but shall cascade into the far reaches of human experience, informing policy, shaping innovation, and illuminating the path forward.

With an ardor unbound,

Assoc. Prof. Ahamad Tarmizi Azizan
Founder & President
ASIAN Southeast Digital Arts Association (ASEDAS International) 2020/ 2023

**FOREWORD**

**Mr. Danendro Adi, S.Sn., M.Arts,
Dean of the School of Design**

Esteemed Participant,

With a profound sense of achievement and excitement, I warmly welcome you to the groundbreaking A-ICON-STEAM conference. As the custodian of Visual Communication Design at BINUS University Semarang, Indonesia, and the esteemed host of the 4th ASEDAS 2023, I stand amidst a gathering of intellectual luminaries poised for a transformative journey. Over these two days, we'll traverse the ethereal corridors of imagination, nurturing concepts that transcend convention while weaving connections pulsating in harmony with progress.

This conference signifies not just a testament to collaborative spirit and shared commitment to pushing STEAM's boundaries but also declares our dedication to the kaleidoscope of disciplines shaping our future. My heartfelt gratitude to the exceptional individuals converging here, sculpting the trajectory of our future.

In this role as Chair Curatorial/Head Panel Judge, I guide visionary exploration, navigating uncharted waters where Artificial Intelligence and Humanoid Robotics interplay with human creativity. Amid rapid technological strides, we navigate the dance between human ingenuity and the digital realm.

In adjudicating artistic expressions, research papers, and ventures, we discern the balance between the artist's essence and AI's strokes. As Chief Curator/Head of Jury, I navigate this new world with nuanced touch.

Within BINUS University's visionary trajectory, this endeavor is profound. We champion digital direction and technological mastery, ascending academic excellence, and embracing AI's integration within art education and the creative industries.

With unwavering commitment,

**Mr. Danendro Adi, S.Sn., M.Arts,
Dean of the School of Design,
BINUS University, Indonesia**

**FOREWORD****Noor Udin Ung, M.Sn.****Head of Visual Communication Design**

Esteemed Participant,

With a profound sense of achievement and excitement, I warmly welcome you to the groundbreaking A-ICON-STEAM conference. As the custodian of Visual Communication Design at BINUS University Semarang, Indonesia, and the esteemed host of the 4th ASEDAS 2023, I stand amidst a gathering of intellectual luminaries poised for a transformative journey. Over these two days, we'll traverse the ethereal corridors of imagination, nurturing concepts that transcend convention while weaving connections pulsating in harmony with progress.

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With unwavering commitment,

Noor Udin Ung, M.Sn.**Head of Visual Communication Design****BINUS University Semarang, Indonesia****Host of 4th ASEDAS 2023****Chief Curator/Head of Jury Panel**

**PREFACE****Ts. Dr. Maria bt. Mohamad****President of ASEDAS Malaysia**

Esteemed comrades,

With a spirit ablaze and a vision that knows no bounds, I extend a profound and resounding salutation to the assembly of luminaries convened for the prestigious a-ICON-STEAM conference. As President of ASEDAS Malaysia, I stand humbled and invigorated by the privilege of engaging in this transcendental celebration, a veritable symposium that converges the majestic domains of science, technology, engineering, art, and mathematics. Within this crucible of intellectual dynamism, we embark upon an odyssey of unfettered innovation and boundless inspiration, fearlessly casting aside conventional paradigms to forge avant-garde horizons within the realm of digital artistry.

Our shared endeavor, a symphony orchestrated from the harmonious notes of imagination and collaboration, shall reverberate through the hallowed corridors of time itself, infusing the annals of history with the vibrant crescendos of creative revolution. As we breathe life into the very fabric of this convergence, our collective footsteps shall set ablaze a beacon of recognition that pierces through the fog of obscurity, an outstretched hand of inclusivity that bridges even the widest chasms, and a gale of empowerment that transcends the ephemeral boundaries of the artistic realm. In celebrating the convergence of our creative souls, let us not lose sight of the broader tapestry of human progress that weaves us together. It is with great pride that we celebrate the profound synergy between ASEDAS Malaysia and the global network of ASEDAS International, an alliance that binds us with a common purpose – to traverse the frontiers of innovation and illuminate the world with the transformative brilliance of digital artistry.

In keeping with our unwavering dedication to the spirit of exploration, it is also imperative that we remain vigilant and cognizant of the profound implications that accompany the rapid advancement of technology, especially within the realms of Artificial Intelligence and Humanoid Robotics. We stand at a precipice, where the splendors of these advancements have the potential to reshape our very existence. Yet, they also bear the weight of human risk, the dangers that lurk in the shadows of progress. It is our responsibility, as torchbearers of innovation, to navigate these uncharted waters with a sense of caution, ensuring that our strides towards a dazzling digital future are accompanied by robust ethical frameworks and a profound awareness of the human dimensions that define us. In this age of unprecedented digital world advancement, as we gather under the banner of ASEDAS Malaysia, let us not merely revel in the grandeur of our creative exploits but rather, let us embrace the mantle of stewards for a future that is both technologically brilliant and deeply human.

With unwavering dedication to a future that harmonizes innovation and humanity,

Ts. Dr. Maria bt. Mohamad**President****Persatuan Seniman Seni Digital Malaysia (ASEDAS Malaysia) 2022/ 2024**

**PREFACE****Mejar Norizam bin Sekak****Director of PMM (Politechnic Merlimau Melaka)**

Esteemed attendees,

In the radiant tapestry of intellectual exploration, I extend a resounding welcome to the crescendo of brilliance that is the a-ICON-STEAM conference. As the Director of Politechnic Merlimau Melaka (PMM), I find myself standing at the crossroads of ingenuity, bearing witness to an exquisite symphony where extraordinary minds converge to unravel the enigmatic interplay of science, technology, engineering, art, and mathematics. Within the hallowed precincts of our institution, we find ourselves tending to the garden of collaboration, nurturing the very essence of transformative discourse that shall flourish over the forthcoming days. This symposium, a crucible of creativity and innovation, stands as an emblem of unity, where luminaries and learners embrace in harmonious unison, transcending the boundaries of their respective disciplines. It is with unwavering determination that we bring this event to fruition, casting the spark of curiosity upon the kindling of discovery that shall illuminate the corridors of progress.

At this juncture, it is paramount to underscore the profound collaboration that has borne fruit through the unification of ASEDAS Malaysia, ASEDAS International, and BINUS University. This triumvirate of intellectual powerhouses, representing divergent corners of our global community, has converged to sculpt a tapestry of knowledge that transcends geographical confines. The cross-pollination of ideas and perspectives facilitated by this alliance is a testament to the harmonious symphony of global connectivity that resonates within this symposium.

In this epoch of rapid technological advancement, where the brilliance of Artificial Intelligence and Humanoid Robotics are at the vanguard of human achievement, we must not shy away from acknowledging the dual-edged nature of progress. Our collective journey into the digital expanse brings with it a cascade of opportunities and challenges. As we delve deeper into the realms of AI and robotics, the symposium serves as an arena for dialogue, contemplation, and conscious exploration of the potential human risks and perils that underlie these developments.

Amidst this complex symphony of ideas, Politechnic Merlimau Melaka emerges as a beacon of specialization. Our niche forte lies in the intersection of technology and the vibrant tapestry of the tourism industry. With fervor and zeal, we have delved into the intricate nuances of this arena, casting ourselves as pioneers who harness innovation to propel the tourism sector into the digital age.

With heightened anticipation and fervor,

Mejar Norizam bin Sekak**Director****Politechnic Merlimau Melaka (PMM)**



PREFACE

Dr. Rahina Nugrahani, M.Ds

Head of Visual Communication Design

Esteemed participants,

In this grand symphony of intellect and innovation, I extend my heartfelt welcome to the realm of possibilities that is the a-ICON-STEAM conference. As the Head of Visual Communication Design at Universitas Negeri Semarang (UNNES), I stand at the crossroads of artistry and intellect, a witness to the captivating dance of science, technology, engineering, art, and mathematics. Over the course of these two days, within the hallowed halls of UNNES, we embark on an expedition to reshape the very fabric of our knowledge landscape.

Our journey is not undertaken alone, for it bears the indelible mark of powerful collaborations that extend across the global expanse. Through a robust partnership with ASEDAS Malaysia and ASEDAS International, and within the dynamic framework of BINUS University's worldwide networking through ASEDAS International, we have woven a tapestry that unites the artistic heart of Semarang with the world's creative forces.

Yet as we traverse these fertile landscapes of discovery, we must be mindful of the paths we tread. The rapid advancement of technology, particularly Artificial Intelligence and Humanoid Robotics, presents both the promise of progress and the peril of human risk. As the digital world advances, we are called to navigate its uncharted waters with wisdom, aligning ourselves with a direction that safeguards humanity's future.

In consonance with our quest for knowledge and art, this conference stands in conjunction with the 4th Semarang International Illustration (SIIF) 2023, an offering from the Faculty of Language and Arts, UNNES. This symphony of collaboration intertwines academia, art, and innovation, bridging the realms of theory and practice, forging connections that resonate far beyond these halls.

Let this symposium resound not only as a testament to human advancement but as a reminder of our responsibility towards the very essence of humanity. With each brushstroke of innovation and melody of insight, let us harmonize our progress with the symphony of ethics and wisdom.

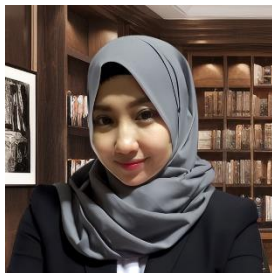
With the resonance of intellect and artistry,

Dr. Rahina Nugrahani, M.Ds

Head of Visual Communication Design

Universitas Negeri Semarang (UNNES)

4th SIIF 2023 / 4th ASEDAS 2024 Coordinator



PREFACE

Ms. Yunisa Andriani Fitri S.Ds., M.Ds..

Secretary General of ASEDAS International

Esteemed participants,

With utmost reverence and unwavering enthusiasm, I extend my heartfelt welcome to the magnanimous stage of intellectual exploration that is the a-ICON-STEAM conference. As the sentinel of The Secretariat, I stand as a sentinel at the crossroads of brilliance, bearing witness to the remarkable convergence that transcends the realms of science, technology, engineering, art, and mathematics. Over the next two captivating days, within the hallowed chambers of shared knowledge, we shall unravel a tapestry of insight and revelation that effortlessly traverses the constraints of geography and discipline. This harmonious convergence, ignited by the incandescent blaze of our collective ambition, resounds as a resounding clarion call, echoing through the annals of time, beckoning forth a new era of metamorphosis and progress.

In this transformative crucible of thought, we stand united not only as agents of innovation but as architects of change. As we traverse the labyrinthine corridors of interdisciplinary discourse, our symphony of shared commitment to human advancement weaves a melody of transformation that resonates beyond the confines of this conference.

We find ourselves standing at a pivotal juncture, where the nexus of art, science, technology, engineering, and mathematics converges in profound harmony. This symposium is a testament to the potent union of ASEDAS Malaysia, ASEDAS International, and the visionary BINUS University, whose collaborative spirits have given birth to this grand intellectual confluence.

Yet, within the corridors of innovation, it is incumbent upon us to peer beyond the luminous horizon and recognize the formidable challenges that stand before us. As we gaze upon the rapid strides in Artificial Intelligence and the realm of Humanoid Robotics, we cannot ignore the allure of progress juxtaposed with the shadows of human risk and danger. Our intellectual odyssey, while guided by boundless curiosity, must also be tempered by the wisdom to navigate the intricate maze of technological advancement. In an era where the digital world burgeons at an unprecedented pace, we, as stewards of the future, find ourselves endowed with the dual responsibility of nurturing the seedlings of innovation while safeguarding the garden of human well-being.

As the torchbearer of The Secretariat, I extend my profound gratitude to every participant, every visionary, and every mind that has converged within this hallowed forum. The symphony of transformation we orchestrate here shall resonate far and wide, serving as a beacon of hope, a catalyst of change, and a testament to the indomitable spirit of human ingenuity.

With unwavering reverence and anticipation,

Ms. Yunisa Andriani Fitri S.Ds., M.Ds..

Secretary General

Head of The Secretariat



PREFACE

Dr. Ariesa Pandawangi, S.Sn.

Chief Curatorial / Chief of Panel Jury

Esteemed visionaries and pioneers of the intellect,

I stand before you with a heart brimming with exhilaration as we embark upon the grand tapestry of the a-ICON-STEAM conference—a beacon of interdisciplinary marvel where the realms of science, technology, engineering, art, and mathematics intertwine in a symphony of innovation and imagination. As the Chief Curatorial and Chief of Panel Jury, I am both humbled and invigorated to preside over this epoch-making convergence. This event is not just a mere assembly of ideas; it is a testament to the powerful collaboration that binds ASEDAS Malaysia, ASEDAS International, and BINUS University, fostering worldwide networking that reverberates through the corridors of human progress.

In an era where the digital world advances at an unprecedented pace, we find ourselves at the crossroads of an exhilarating frontier—the rapid evolution of Artificial Intelligence and Humanoid Robotics. Our direction, though resolute in its pursuit of knowledge, must also heed the cautionary whispers of human risk and the dangerous precipice upon which we tread. As we dive headlong into this new era, the very core of art education and the art industry resonate with the tremors of transformation. My role as the Chief Curatorial and Chief of Panel Jury becomes an ardent endeavor, a challenge akin to navigating the tempestuous seas of uncertainty.

The impact of AI and Humanoid Robotics on art education and the art industry is a subject that defies easy encapsulation. It is a terrain where the familiar and the futuristic converge, where the delicate interplay between human creativity and the computational capabilities of machines becomes a harmonious ballet. The very act of adjudicating artworks, papers, and creations becomes a high-wire act of interpretation—balancing the brilliance of human ingenuity with the kaleidoscopic spectrum of AI-generated brilliance.

Amidst the marvels we will encounter over the next two days, let us not forget the monumental task we undertake—a task to justify the inimitable impact of AI and Humanoid Robotics on the landscape of creativity, a task that demands both meticulous scrutiny and a willingness to embrace the uncharted.

With profound anticipation,

Dr. Ariesa Pandawangi, S.Sn.

Deputy President of ASEDAS International

Chief Curatorial / Chief of Panel Jury



ABOUT THE CONFERENCE & EXHIBITION

Greetings to all, Assalamualaikum warahmatullahi wabarakatuh, Good evening, Om Swastiastu, Namoh Buddhaya, and may peace be upon you all.

Welcome to the 1st ASEDAS International Conference on STEAM 2023 and the 4th International Digital Art Exhibition (ASEDAS 2023). This remarkable event is the result of a strong collaboration between ASIAN Southeast Digital Arts Association (ASEDAS International) and partners, including Binus University, Semarang Campus, and Universitas Negeri Semarang (UNNES) in Indonesia, along with Politeknik Merlimau Melaka (PMM) from Malaysia. ASEDAS International envisions embracing the diversity of digital art expressions and promoting it as a multidisciplinary, innovative, and resilient contemporary art form in the ASEAN region. We have successfully organized previous International Digital Art Exhibitions, attracting artists from over 60 countries worldwide. The 1st A-ICON-STEAM 2023 & 4th ASEDAS 2023 project is a significant milestone, and we are thrilled to have participants from around the world, thanks to the combined efforts of ASEDAS International and Binus University, Semarang Campus. We have brought together two keynote speakers, four invited speakers from academia and industry representing ASEAN Region & Europe, and organized a hybrid event (online & in-person). Additionally, we have formed partnerships with more than 30 strategic partners from various industries, higher institutions, government agencies, and media worldwide. This event has resulted in two excursions, four Memorandum of Understandings (MoUs), and one Artificial Intelligence Declaration on human risk. The conference aims to foster insightful discussions on the convergence of Science, Technology, Engineering, Art, and Mathematics (STEAM) fields in education and industry, contributing to global growth and economic recovery. Furthermore, the conference provides a platform for academics and industry professionals to connect and bridge the gap between theoretical knowledge and practical application through international research. We are proud to have received an overwhelming response, with over 30 accepted papers across three main tracks: Social Science, Emerging Technology, and Innovation. Additionally, select papers from the conference will be published in prestigious journals. The 4th International Digital Art Exhibition (ASEDAS 2023) has attracted participation from 150 countries across six continents, further highlighting the global impact of this event. I express my heartfelt gratitude to all the dedicated committee members, advisors, partners from universities, industries, government agencies, media, and strategic partners for their tireless efforts in making this event a reality. On behalf of ASEDAS International, I extend a warm welcome to all of you attending the 1st ASEDAS International Conference on STEAM 2023 & 4th International Digital Art Exhibition (ASEDAS 2023). I sincerely hope that this event proves to be a fruitful and unforgettable experience for all participants.

Thank you.

Conference & Exhibition Chairperson

Assoc. Prof. Ahamad Tarmizi Azizan

Founder & President

ASIAN Southeast Digital Arts Association (ASEDAS International) 2020/ 2023

KEYNOTE SPEAKER



KEYNOTE SPEKEAR
Dr. Bambang Dwi Wijanarko,
S.Si., M.Kom,
Computer Science, Deputy Director
Binus University@Semarang,
(Indonesia)



KEYNOTE SPEKEAR
YBhg. Datuk Muhammad Nasir Hamzah
Co-Founder / Co-Advisor
Kumpulan Media Karangkraf Sdn. Bhd.
(Malaysia)

INVITED SPEAKER



INVITED SPEKEAR
Prof. Emeritus Dr. Zdzisława
Tolłoczko
Art Historian (Poland)



INVITED SPEKEAR
Mr. Irwan Harnoko
Founder World Graphic Designer
(WGD)
Pradita University
(Indonesia)



INVITED SPEKEAR
Assoc. Prof. Ahamad Tarmizi Azizan
Founder & President
ASIAN Southeast Digital Arts
Association (ASEDAS International)
2020 / 2023



INVITED SPEKEAR
Lt. Kol. Bersekutu (PA)
Ts. Zulhaidi Mohd Jawi @ Said
Director
Vehicle Safety and Biomechanics
Research Center (VSB), MIROS (Malaysia)



Dr. Bambang Dwi Wijanarko, S.Si., M.Kom,
Computer Science, Deputy Director
Binus University@Semarang.
(Indonesia)

Dr. Bambang Dwi Wijanarko, S.Si., M.Kom, Deputy Director of Binus University@Semarang in Indonesia, is a distinguished expert in Computer Science whose exceptional career is marked by visionary leadership, innovation, and a relentless commitment to advancing education and technology. Driven by a transformative vision, he currently spearheads the ambitious project of establishing a Metaverse Center of Excellence (CoE) at BINUS University Semarang, a testament to his forward-thinking and groundbreaking approach.

Dr. Wijanarko's journey is a testament to his unwavering pursuit of excellence. With a solid foundation in Computer Science, he has harnessed his expertise to propel BINUS University@Semarang to the forefront of technological innovation. His leadership has proven instrumental in fostering collaborations with industry leaders and government agencies, creating a dynamic ecosystem that empowers students to engage with cutting-edge technologies.

As an esteemed educator, Dr. Wijanarko has elevated the academic landscape by imparting his profound knowledge and insights to the next generation. His dedication to nurturing young minds and fostering a culture of innovation is evident in his role as Deputy Director. His guidance and mentorship have empowered students to explore the frontiers of Computer Science, inspiring them to push boundaries and drive meaningful change in the digital era.

Dr. Wijanarko's remarkable vision for BINUS University Semarang as a Metaverse Center of Excellence (CoE) underscores his commitment to shaping the future. This groundbreaking initiative exemplifies his ability to anticipate emerging trends and position the university as a global leader in immersive technologies. Under his guidance, BINUS University@Semarang is poised to become a hub of innovation, fostering groundbreaking research, interdisciplinary collaboration, and transformative educational experiences.

In conclusion, Dr. Bambang Dwi Wijanarko, S.Si., M.Kom, is an exceptional leader in the realm of Computer Science, whose visionary leadership and dedication to education are shaping the future of technology and learning. His pioneering efforts to establish a Metaverse Center of Excellence at BINUS University Semarang are a testament to his trailblazing spirit and enduring impact in the field. Dr. Wijanarko's name is synonymous with innovation, excellence, and a boundless commitment to advancing education in the digital age.



YBhg. Datuk Muhammad Nasir Hamzah
Co-Founder / Co-Advisor
Kumpulan Media Karangkraf Sdn. Bhd.
(Malaysia)

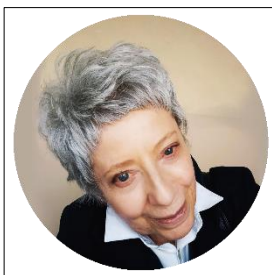
YBhg. Datuk Muhammad Nasir Hamzah, Co-Founder and Co-Advisor of Kumpulan Media Karangkraf Sdn. Bhd. (Malaysia), epitomizes a journey of visionary leadership, transformative innovation, and unwavering commitment. His life's narrative is a testament to breaking boundaries and making a profound impact in the realm of media and entrepreneurship. Born with a vision, he has demonstrated exceptional resilience and ingenuity, shaping the landscape of the media industry.

Datuk Muhammad Nasir's early experiences laid the foundation for his future accomplishments. With determination and foresight, he co-founded Kumpulan Media Karangkraf, leaving an indelible mark on the media landscape in Malaysia. Under his leadership, the company has evolved into a prominent entity, reflecting his profound understanding of media dynamics, innovative strategies, and commitment to excellence.

Datuk Muhammad Nasir's dedication to his vision has led to the establishment of a media powerhouse, setting new standards of quality and diversity. His ability to navigate the ever-changing media landscape, coupled with a keen business acumen, has propelled Kumpulan Media Karangkraf to unparalleled heights. His multifaceted roles as a Co-Founder and Co-Advisor have not only contributed to the company's success but have also inspired a new generation of entrepreneurs.

Beyond his entrepreneurial achievements, Datuk Muhammad Nasir's commitment to corporate social responsibility and community development stands as a hallmark of his leadership. He has championed initiatives that empower communities, foster education, and support socio-economic growth. His strategic vision and philanthropic endeavors showcase a holistic approach to leadership, making a meaningful difference beyond business metrics.

In conclusion, Datuk Muhammad Nasir Hamzah's journey as a Co-Founder and Co-Advisor of Kumpulan Media Karangkraf Sdn. Bhd. reflects a legacy of visionary leadership, innovative entrepreneurship, and a profound commitment to community development. His influence transcends the realm of media, embodying a transformative force that has redefined industry standards and inspired future generations. His name resonates as a symbol of excellence, innovation, and empowerment—a true trailblazer in the world of media and beyond.



**Professor Zdzisława Tolloczko PhD.,S.D.
(Poland)**

She was born 3 November 1943 in Przemyśl (Poland). Her father was an engineer contractor. My died brother was an architect practiced successfully many years in Vienna, Paris, Hamburg, and last but not least in Philadelphia (Penn). Received higher education after five years of study in Krakow. She received a master's degree at the Faculty of Philosophy and History of the Jagiellonian University in Krakow (Cracow) in 1968, that a major in art. History.

The main subject of my interest was gothic art and architecture as well as unbreakable bonds with art. Nature and flora muralis. Simultaneously, my studies were accompanied by research into the art of the Orient and the aesthetics of international ethnological interactions. Then I started in 1969 my professional career at the University of Technology in Krakow (Cracow), the Faculty of Architecture, Institute of History Architecture and Preservation of Monuments. At the Institute here and lectured on art history, aesthetics and culture, taking the position initially: assistant, lecturer, assistant professor, full professor.

In 2011 the President of Republic of Poland honored me with the title of distinguished professor. At the Cracow University of Technology I obtained a doctorate in architecture PhD, and then PhD technical sciences Sc.D. I also graduated from Postgraduate Studies in Monument Conservation and Protection. For almost 45 years She was employed in the Chair of the History of Architecture, Town Planning and Common Art.

During this time, as an academic teacher and tutor, she tried to implement the educational process holistic and international phenomenon of interdisciplinary art creation. As a result of cheap treatment of art. science, it was created under my supervision as a promoter of 8 doctoral dissertation, of which she would highlight those defended to Faculty of Architecture and Urban Planning Latvian Technical University in Riga.

The scientific and research achievements include 13 published books and over 150 articles, studies, dissertation and reviews. As a significant scientific achievement she would consider "Main trends of historicism and eclecticism in the art. of the 19th century" (2011 – 2nd edition) – an academic textbook ; "Architectura perennis. Sketches on the history of non-avant-garde modern architecture of the first half of the 20th century" (1999); "In hortu latericio. Dissertations on the architectural history of the Amsterdam and Hamburg schools" (2000); "The architect's dream or about the history and historicism of 19th and 20th century architecture" (2015 – 2nd edition); "Architectura sine historiae nihil est. From the past Latvian country architecture and town planning" (2013).



Mr. Irwan Harnoko
Founder World Graphic Designer (WGD)
Pradita University
(Indonesia)

Mr. Irwan Harnoko, Founder of World Graphic Designer (WGD) and a distinguished lecturer at Pradita University, Indonesia, epitomizes a dynamic journey marked by innovation, expertise, and an unwavering commitment to the world of design and education. With a passion ignited early on, his story echoes one of resilience and determination. His dedication to learning emerged even during his formative years as he pursued a path distinct from convention.

Rejecting complacency, Mr. Harnoko's dedication led him to a pivotal role as a schoolteacher, where his expertise in Graphic Design and Art flourished. Parallel to his educational endeavors, he delved into artistic pursuits, honing his craft and garnering invaluable experience in the realm of design. Mr. Harnoko's academic odyssey took shape with a fervent pursuit of knowledge. His bachelor's degree in Graphic Design from a prestigious institution set the foundation for his comprehensive understanding of the field. His academic prowess found further expression as he embarked on a master's degree in Design Education, broadening his horizons and cultivating a nuanced approach to pedagogy.

His areas of expertise span a wide spectrum, including Graphic Design, Visual Communication, Art Education, and Design Pedagogy.. A true visionary in the realm of design, Mr. Harnoko's impact extends beyond the classroom. As the Founder of World Graphic Designer (WGD), he has nurtured a platform that bridges design enthusiasts, fostering collaboration, innovation, and dialogue within the global design community. His leadership and creative direction have been instrumental in steering WGD to be a hub of inspiration and creativity.

Mr. Harnoko's legacy reverberates through his dynamic role as a lecturer at Pradita University, where he imparts knowledge, shapes minds, and ignites the passion for design in the next generation. His mentorship and guidance have empowered countless students, preparing them to thrive in the ever-evolving landscape of graphic design.

A trailblazer in every sense, Mr. Irwan Harnoko's journey encapsulates a fusion of artistic ingenuity, educational prowess, and visionary leadership. His dedication to design education, coupled with his role as the Founder of World Graphic Designer, has solidified his position as a prominent figure in the global design arena. As a beacon of inspiration and innovation, Mr. Harnoko's name resonates as a symbol of excellence and forward-thinking within the world of graphic design and beyond.



Assoc. Prof. Ahamad Tarmizi b. Hj Azizan
Founder & President
ASIAN Southeast Digital Art Association
(ASEDAS) International
UMK (Malaysia)

Born on November 4, 1969, in Felda Bersia, Gerik, Perak, Malaysia, Assoc. Prof. Ahamad Tarmizi b. Hj Azizan life story exemplifies resilience, innovation, and an unwavering commitment to advancing knowledge. He portrays a remarkable journey of a visionary polymath who has transcended conventional boundaries to make an enduring impact in the fields of art, technology, and education. Atan AF's early experiences as a police constable underscored his determination and passion for learning. Despite earning a modest salary, he excelled academically, setting the stage for his future achievements. Rejecting a promotion within the police force, he embarked on a transformative path as a schoolteacher specializing in Malay Language and Art.

Concurrently, he pursued his passion for art, engaging in portrait drawing and painting, as well as managing a small restaurant business. His academic journey commenced with a Bachelor's degree in Art Education from Universiti Pendidikan Sultan Idris Shah (UPSI) Tg. Malim, Perak, Malaysia, between 2000 and 2003. He further pursued a Master's degree in Education from the same institution, expanding his horizons through a sabbatical at Universitas Pendidikan Indonesia's Cibiru Campus. Atan AF's expertise spans a wide range of creative and technological domains, including Art Education, Visual Art and Design Theory, Fine Art, Batik Design, Visual Communication Design, Computer Graphics, Digital Art, Artificial Intelligence Generative Art, Sociology and Psychology in Education, Curriculum Development, and Leadership in Higher Education. He is also deeply involved in cultural heritage preservation and policy development. Throughout his career, Atan AF has taken on leadership roles and contributed to policy shaping in the creative and educational sectors. He has served as an International Auditor for Academic Programs at AQAS Germany, held roles in esteemed institutions like MIROS Malaysia, and acted as Dean of the Faculty of Creative Technology & Heritage at UMK. His impact extends to global associations, curriculum development for Malaysian Art Schools, and advisory roles.

As an artist, curator, project manager, and creative director, he has left an indelible mark on the creative landscape. He pioneered the establishment of the Creative Accelerator Center and GIG Center, fostering collaborations with government agencies and private enterprises. His commitment to digital art is evident through his Digital Art gallery and the 1st Digital Art Studio & Gallery on the East Coast Peninsula of Malaysia. His legacy is also showcased through his involvement in numerous exhibitions, research publications, and his role as the Founder and President of ASEAN Southeast Digital Art Association (ASEDAS International). His mentorship of students, engagement with international events, and awards further emphasize his profound influence. In summary, Associate Professor Ahamad Tarmizi Azizan, Atan AF, stands as a visionary pioneer who has seamlessly united art, technology, and education. His tireless dedication, innovative spirit, and commitment to advancing knowledge have left an enduring legacy that continues to shape the creative and educational realms on a global scale. Atan AF's name resonates as a symbol of creativity, innovation, and education—a true trailblazer in the world of digital art and beyond.



Lt. Kol. Bersekutu (PA)
Ts. Zulhaidi Mohd Jawi @ Said
Director
Vehicle Safety and Biomechanics
Research Center (VSB), MIROS (Malaysia)

Lt. Kol. Bersekutu (PA) Ts. Zulhaidi Mohd Jawi @ Said, Director of the Vehicle Safety and Biomechanics Research Center (VSB) at MIROS (Malaysia), embodies a career marked by dedication, expertise, and transformative leadership. His journey is a testament to his unwavering commitment to advancing vehicle safety and biomechanics research, shaping policies, and fostering innovation. Zulhaidi's trajectory began with a deep-seated passion for road safety, which he honed through his military service. Gradually, he emerged as a prominent leader in vehicular safety, leveraging his multidisciplinary knowledge and strategic thinking to influence policies and drive change.

Zulhaidi's holistic approach to road safety led him to the helm of MIROS's Vehicle Safety and Biomechanics Research Center, where he has spearheaded groundbreaking research initiatives that bridge the gap between engineering, technology, and human behavior. His visionary leadership has facilitated collaborations with government bodies, private industries, and international partners, resulting in innovative solutions that have a profound impact on road safety standards. His expertise extends beyond research, encompassing strategic planning, policy formulation, and capacity building. Zulhaidi's significant contributions include his role as a driving force behind the development of evidence-based road safety policies, harnessing data-driven insights to inform decision-making and reduce road accidents.

His commitment to continuous improvement is evident through his involvement in training programs and workshops, empowering professionals to adopt best practices and contribute to the field's advancement. Zulhaidi's dedication to road safety is mirrored in his extensive contributions to publications, conferences, and symposiums. His work not only reflects his expertise but also his commitment to knowledge dissemination and collaboration within the international road safety community.

His pragmatic approach, coupled with his ability to translate complex research into actionable solutions, positions him as a thought leader in the field. In summary, Lt. Kol. Bersekutu (PA) Ts. Zulhaidi Mohd Jawi @ Said's legacy is one of impactful leadership and tireless dedication to enhancing vehicle safety and biomechanics research. His transformative initiatives, strategic vision, and collaborative spirit have left an indelible mark on road safety standards in Malaysia. Zulhaidi's name stands as a symbol of innovation, expertise, and commitment—a true trailblazer in the realm of vehicular safety.

DECLARATION OF SAFETY AND CIVILIZATION IN THE ADVANCEMENT OF AI TECHNOLOGY: FORGING A FUTURE WHERE AI EMPOWERS, PROTECTS, AND UNITES HUMANITY

Objective:

The objective of the Declaration of Safety and Civilization in the Advancement of AI Technology is to establish a framework that ensures the safe and responsible development, deployment, and use of artificial intelligence (AI) technology, while promoting human values, ethics, and societal well-being.

Aims

Promote Human Safety: The declaration aims to establish guidelines and standards that prioritize the safety of individuals and communities in the development and use of AI technology. This includes implementing robust safety measures, risk assessment protocols, and proactive mitigation strategies to prevent AI-related accidents, harm, or unintended consequences.

Uphold Ethical Standards: The declaration seeks to uphold ethical principles and values in the design, development, and deployment of AI systems. It aims to ensure that AI technology respects and protects human rights, privacy, and dignity, and avoids biases, discrimination, or unfair treatment of individuals or marginalized groups.

Foster Transparency and Accountability: The declaration emphasizes the importance of transparency and accountability in AI systems. It aims to promote explainability, auditability, and accountability mechanisms to enable users and stakeholders to understand how AI algorithms make decisions, and to address concerns related to bias, discrimination, or unethical practices.

Encourage Social Impact and Benefit: The declaration aims to harness the potential of AI technology to address societal challenges and promote the well-being of individuals and communities. It encourages the development and deployment of AI systems that contribute to areas such as healthcare, education, climate change mitigation, and social equality, while minimizing negative societal impacts.

Support International Cooperation: The declaration recognizes the global nature of AI development and deployment, and aims to foster international cooperation and collaboration. It encourages the sharing of best practices, knowledge, and expertise among governments, organizations, and stakeholders, to collectively address the challenges and opportunities presented by AI technology.

Ensure Long-term Sustainability: The declaration emphasizes the need for sustainable and responsible development and use of AI technology. It aims to address the long-term implications of AI on employment, socio-economic systems, and the environment, while promoting measures to mitigate potential risks and ensure a just transition for affected individuals and communities.

Justification:

As AI technology continues to advance at an unprecedented pace, it poses both immense opportunities and potential risks to humanity. The objective of this declaration is to proactively address these challenges and foster a harmonious coexistence between humans and AI systems.

By laying down clear guidelines and principles, this declaration aims to safeguard human safety, privacy, and dignity while promoting the positive impact of AI on various aspects of society. It recognizes the need for transparency, accountability, and fairness in AI algorithms and decision-making processes, ensuring that AI

technology is built and utilized in a manner that respects fundamental human rights and values.

Furthermore, this declaration acknowledges the importance of collaboration and cooperation among governments, industries, academia, and civil society to collectively address the ethical, legal, and societal implications of AI. It emphasizes the need for multi-stakeholder engagement, knowledge sharing, and capacity building to promote a comprehensive understanding of AI's potential and its responsible implementation.

Ultimately, the objective and justification of this declaration lie in establishing a global consensus on the safe and ethical development and use of AI technology, thereby fostering a future where AI contributes to human well-being, social progress, and the preservation of our collective values and civilization.

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ACKNOWLEDGMENTS AND APPRECIATION

This proceedings book is dedicated to the keynote speakers, invited speakers, researchers, and participants of A-ICON STEAM 2023 on STEAM Education and Industry, and the 4th ASEDAS, themed "Digital Today." Their contributions and discussions made this publication possible. The theme underscores the importance of developing and strengthening the education and industry sectors in line with the STEAM movement.

International academics have conducted extensive research on these topics, but much of it remains underpublicized and inaccessible. This conference provided a platform for researchers to present their work, exchange information, address research challenges, and foster sustainable collaboration. Over 30 research papers from various institutions, including higher education and research institutions, were submitted and discussed in parallel sessions. We hope this proceeding will serve as a valuable reference for future research in the education sector.

We extend our heartfelt appreciation to the main organizers, whose tireless dedication and meticulous planning ensured the success of A-ICON STEAM 2023 and the 4th ASEDAS, making a significant impact on academia and innovation. We are grateful to our esteemed sponsors for their unwavering support, and to our dedicated collaborating partners, whose synergy elevated the conference. The relentless efforts of our committee members, who ensured the seamless execution of every aspect of the event, deserve immense recognition. We applaud the brilliant participants whose thought-provoking contributions enriched the discourse and opened new intellectual horizons. The artists, through their creative expressions, added an exquisite dimension to the conference's tapestry.

With profound gratitude, we thank everyone who contributed their passion, expertise, and enthusiasm. As we bid farewell, we eagerly anticipate reuniting with you all at the 2nd A-ICON STEAM 2024 and the 5th ASEDAS 2024. Until then, may the spirit of knowledge and collaboration continue to flourish!

Best Regards,

A-ICON STEAM 2023 and 4th ASEDAS Committee

A-ICON-STEAM 2023 SCHEDULE

TIME	Room 1 (Physical) - SOCIAL SCIENCE, EMERGING TECHNOLOGY & INNOVATION	Room 1 (Online) - SOCIAL SCIENCE, EMERGING TECHNOLOGY & INNOVATION	Room 2 (Online) - SOCIAL SCIENCE, EMERGING TECHNOLOGY & INNOVATION
13:00-13:20	AE001 - Internet Videos as a Stimulus for Children with Speech Delay	AE006 - Kajian Keberkesanan Rekabentuk Grafik Kreatif Melalui Penggunaan Perisian Adobe Photoshop Terhadap Subjek Rekabentuk Dalaman untuk Pelajar Program Sijil Rekabentuk Dalaman, Kolej Komuniti Shah Alam	SE001 - The Future of Museum Visits: Enhancing User Experience in Virtual Spaces
13:20-13:40	AE002 - Digitalisasi Pola Batik untuk Menarik Minat Generasi Z	AE007 - Penerimaan Pelajar Terhadap Virtual Tour Guide Kuantan (VTGK) di Kalangan Pelajar DTM30114 Kursus Tourist Guiding Techniques	SE003 - The Importance of Visual Arts in Improving Student Interest in Mathematics Learning
13:40-14:00	AE003 - Exploring the Evolving Landscape of Radio Broadcasting in Malaysia: Trends and Innovations	AE008 - Students' Perception Study Towards Interactive Brochure Fold (iBFOLD) as a Teaching Aid in Digital Publishing Course	SE004 - Enhancing Students' Soft Skills via Project-Based Learning (STEAM) in Art Classroom
14:00-14:20	AE015 - Redesigning Innovative Products Of Up-Cycle-Based Mindi Wood Waste Fashion Bags In Krebet, Bantul-Yogyakarta	AE009 - Smart Light & Shadow Box (SLSB): Keberkesanan Penggunaan Kit Pembelajaran dalam Kursus Asas Rekabentuk	SE005 - Kajian Rintis Tahap Kebolehgunaan Reka Bentuk Antara Muka Pengguna Aplikasi Mudah Alih Flood Rescue
14:20-14:40	AE017 - Pendekatan Kajian Tindakan Melalui Ekspresi Kreatif Budaya Program Kembara Seni IPG Kampus Tun Abdul Razak Kota Samarahan Di ASWARA	AE015 - Redesigning Innovative Products Of Up-Cycle-Based Mindi Wood Waste Fashion Bags In Krebet, Bantul-Yogyakarta	SE006 - Importance of Emerging Technologies towards Human Trafficking in Malaysia
14:40-15:00	AE004 - Jungle Beat – A Breed of Multi Disciplinary Research of Art and Animal Studies	AE011 - Tahap Penggunaan ChatGPT dalam Kalangan Pensyarah	SE007 - Animation Addiction and Its Effects on the Interpersonal Skills of Youth
15:00-15:20	AE005 - Simbolisme Karya Catan Abstrak Ekspresionisme dalam Pendekatan Kebudayaan Kebangsaan	AE012 - A Public Service Announcement (PSA) Video of Dyslexia Awareness Campaign in Malaysia: Case Study Video Medium	SE008 - The Transformation of the Function of the Gan Nuo Mask: Ritual to Performing Art
15:20-15:40	AE010 - Fungsi dan Kesan Pencahayaan pada Fotografi: Pemerhatian Terhadap Tahap Pemahaman Pelajar	AE013 - Keberkesanan Penggunaan Template for Colour Wheel dalam Meningkatkan Kefahaman Pelajar Rekabentuk terhadap Unsur Seni dan Roda Warna	SE009 - Immense Success through Adaptation: The Tragicomedy 'Hi, Mom' from Stage to Screen
15:40-16:00	AE016 - Design Comparison Before And After Conducting Pretotyping: Case Study Mobile Application For Hydroponic Farming	AE014 - The Influence of Attitude, Knowledge and Skills Towards Student's Performance in Electrical Circuit's Course	SE010 - Suicide Intent; Regaining Attention or Reclaiming Decision
16:00-16:20	BR001 - The Digital Photography Revolution and Its Impact on Analog Photography: An Attempt to Revive Analog Photography for Road Safety Intervention Project	SE006 - Importance of Emerging Technologies towards Human Trafficking in Malaysia	SE011 - Solicitation and Reconstruction - Exploration of the Artistic Representation of High Temperature Color Glaze Painting in Jingdezhen

TIME	Room 1 (Physical) - SOCIAL SCIENCE, EMERGING TECHNOLOGY & INNOVATION	Room 1 (Online) - SOCIAL SCIENCE, EMERGING TECHNOLOGY & INNOVATION	Room 2 (Online) - SOCIAL SCIENCE, EMERGING TECHNOLOGY & INNOVATION
16:20-16:40	-	-	SE012 - Exploring Aesthetic Patterns of High Temperature Color-glaze Modern Ceramic in China

THE INFLUENCE OF ATTITUDE, KNOWLEDGE AND SKILLS TOWARDS STUDENT'S PERFORMANCE IN ELECTRICAL CIRCUIT'S COURSE

PENGARUH SIKAP, PENGETAHUAN DAN KEMAHIRAN TERHADAP PENCAPAIAN PELAJAR DALAM KURSUS LITAR ELEKTRIK

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Abstract

Non-cognitive skills are characterized as "patterns of thought, feelings, and behaviors" and include character, motivation, and attitudes. Besides that, non-cognitive factors also have a significant role in students' academic success in addition to cognitive factors. During the pandemic Covid -19, following the fully online learning instructions for the diploma program semester 2, session 2 2021–2022, there is a need to develop alternative methods to carry out practical's work online. The implementation practical lab using simulation also creates different student's perception and anxiety about student's learning outcome in electrical circuit course This research investigates student's perception towards student's performance with three factor such knowledge, skill and attitude. The research using survey method and the questionnaire as a research instrument was used to obtain quantitative data. Through random sampling, the respondents are students enrolled in an electrical circuit course. Multiple regression was utilized to evaluate the data that were gathered using SPSS. The results show factors knowledge, attitude and skills does not contribute to student's performance. For future research, other factor such as teamwork, communication skills, social skills, academic behaviour and learning activities should be investigate in order to see student's achievement especially in lab work activities.

Keywords: Knowledge, attitude, skills and student's performance.

Introduction

In theory, non-cognitive abilities are also important in determining student achievement in a course (Anneke, Adelene, & Karel, 2001). Borghans et al. (2008) said that a non-cognitive skill is characterized as "patterns of thought, feelings, and behaviour's" and include character, motivation, and attitudes. Many people begin actively developing non-cognitive skills while in school and continue to do so as they advance in their careers. Non-cognitive abilities are also known as affective abilities which are seen through learning orientation in many courses of study. Most of the research have revealed that non-cognitive factors also have a significant role in students' academic success in addition to cognitive factors. More broadly, non-cognitive skills influence school performance and reach into adulthood - for better or worse.

Non-cognitive elements have an impact in student's daily environment such as what they hear, see, and experience from their teachers, schools, parents, and society. Everyone can play a significant part in cultivating them, including educators and institutions of higher learning, guardians and parents, coaches and mentors. Educators may enhance student learning and academic achievement while also raising the possibility that they will succeed outside of the classroom by assisting students in the development of non-cognitive abilities, methods, attitudes, and behaviours.

During the pandemic Covid -19, following the fully online learning instructions for the diploma program semester 2, session 2 2021–2022, there is a need to develop alternative methods to carry out practicals online. Therefore, the Multisim simulation software is suggested as an alternative to performing practical work online in electrical circuit 's course. However, implementation in a practical lab using simulation creates anxiety about whether students achieve the learning outcomes. In addition, the teaching and learning process also provides new experiences for students and lecturers. As a result, lecturers have trouble determining how utilizing Multisim Live Simulator has affected student performance.

Therefore, in this study, the researcher tried to examine the student's perception based on factor of Knowledge, Skill, Attitude and relation with student Performance in the Electrical Circuit laboratory activities at Politeknik Ibrahim Sultan. The purpose of this study was to find out the correlation between forecasting variables affected students' performance based on lab work activities.

Literature Review

Knowledge is the result of human sensing, or the result of someone knowing an object through their senses (Muchtamin, 2021). Human senses such as hearing, sight, smell, sensation, and touch are used for sensing. According to Ainon and Abdullah (2003), knowledge is a personal experience that directs us to make the appropriate decisions. Based on cognitive process, experiences, formal and informal education, and knowledge all contributed significantly to a person's development (Kamaruddin, 2010).

Knowledge is a personal experience which guides us to do the right thing (Ainon & Abdullah, 2003). Otherwise, Knowledge also resulted from a cognitive process that involves experiences, formal and informal education as a valuable input to the individual (Kamaruddin, 2010). Skill is basically a person's skill or proficiency in doing a job that can only be obtained from practice, either through practical training or through work experience. Ati Dahniar (2019) said skills or expertise were used knowledge to achieve certain goals. These abilities or knowledge can be begun with specific instruction, but the key to mastering them is to keep practicing and getting experience in the necessary disciplines. However, Yusof et al. (2019) claim that while talents are hard to quantify, they can be seen through an individual's dominance over a task.

A person's attitude essentially determines how he acts and how he behaves. The knowledge and abilities students possess in performing their work tasks are supported by their attitude in order to create good performance (Mary, et al, 2019). High levels of talent and knowledge are useless without decent behavior to back them up. Depending on a person's propensity for a certain thing or condition, attitudes can be expressed in a positive or negative way (Jennifer & Kathy, 2008).

Performance is simply the outcome of a person's work in accordance with the standards set by management for the position. Performance, as defined by The Depdiknas (2003) cited in Muchtamim (2021), is an accomplishment manifested in work ability. Therefore, it may be said that performance and work outcomes are tightly related. Performance in this study refers to how well students performed during laboratory tasks. According to Tunio et al. (2021) academic achievement is the measure of a student's performance if they have achieved a particular goal or result.

According to the study by Omar et al, 2020, the predicting factors such as attitude, knowledge, and teaching skills have a substantial impact on the self-actualization of teachers. While, Chen et al. (2011) said knowledge affects how well students perform throughout learning activities. Students have a favourable attitude regarding adopting software in lab work activities, according to Saidun (2020). In another study, Muchtamim (2021) claims that factors such as knowledge, skill, attitude, and professionalism have an impact on how well bankers, lecturers, teachers, and nurses' function on an individual basis in Jakarta, Tangerang, and Bekasi. Solpuk (2017) states that the outcomes of the random effect model demonstrated that attitude had a moderately impact on academic performance. Hijazi and Naqvi (2006) claim that it is difficult to assess pupils' academic success since it depends on a variety of socioeconomic, psychological, and environmental factors. They needed to change their views toward their academic achievement because their attitudes toward learning had an impact on both how much education they had and how much they wanted to get.

In other side, Merylin. J (2004) find out the student attitude in performing a skill was not associated with academic performance. Mansour et al (2011) convincing that student's performance influence by factor of gender, type of diploma, interest and employment and student's marital status and family have no significant relationship with academic performance. Other study by Afsaneh (2011) find skills of study can play an important role in the improvement of students' academic performance.

Conceptual framework

Conceptual framework is a relationship that is used as a guide in the research process and is a relationship between variables in research components (Ghazali and Sufean, 2016). Therefore, this conceptual framework of the study according to the double relationship $3 IV = 1 DV$. Figure shows the conceptual framework was adapted from Omar (2019) and Saidun et al. (2020) in a research study on software simulation in the teaching and learning process based on student's perceptions. The variables used to indicate student's perceptions are knowledge, skills and

attitude. These variables will relate with students' performance.

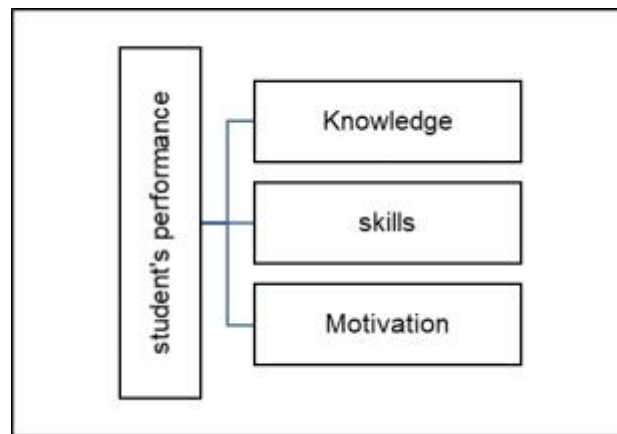


Figure 1 The Conceptual Framework of Research

The multiple relationship of knowledge, attitude and skills that leads to the dependent variable which is student's achievement explains the relationship between three independent variables with one dependent variable of the study. This conceptual framework can explain the appropriate statistical tests to determine the relationship and influence of each proposed study variable through a multiple regression test.

Research Objective

The objectives of this research are:

- i. To investigate correlations between attitude and student's performance.
- ii. To investigate correlations between skills and student's performance.
- iii. To investigate correlation between knowledge and student's performance.
- iv. To investigate the influence of three factors of knowledge, skills, and attitude toward student's performance

Research Hypothesis

The hypothesis studied is to see the influence of items forecasting factor namely attitudes, knowledge and skills towards student performance have an influence on each other. The null hypothesis to be tested is as follows:

H01: There is no significant correlation between student's knowledge, student's attitudes, student's skills towards student's achievement in lab work assessment.

Research methodology

In this investigation, the researcher employs two tools. The questionnaire served as the first instrument, and the secondary data from the students' laboratory assessments served as the second. 200 surveys were distributed both in-person and via WhatsApp group classes. Those, 131 respondents involved in the study.

This survey questionnaire was adapted from Omar (2019) and Saidun et al. (2020) according to the software simulation in the teaching and learning process. The researcher finds out the achievement of student learning outcomes through two sets of practical work, which were implemented using the Multisim Live Simulator software for the Electrical Circuit course. The respondents in this study were students who are taken electrical circuit course in semester 2 session 1 2021 2022.

Research Instruments

The main instrument used by researchers to obtain information and data in this study is a questionnaire. The questionnaire developed for this study is divided into 3 main parts which are parts A, B, and C.

Part A: Respondent Demographics

Part B: Knowledge and attitudes of respondents using engineering simulation software.

Part C: The respondent's skills in practicing using the Multisim Live simulator software for the Electrical Circuit course (DET 20033).

The data obtained through the questionnaire was processed using a spreadsheet generated from Google Form. Data analysis and processing were carried out by classifying the Likert Scale from five points to three points to facilitate the data analysis (Cohen et al,2017).

Pilot Test

A pilot study was carried out by the researcher to determine the students' understanding and reliability of the items in the distributed questionnaire. To test the reliability of the questionnaire items, the researcher used the Cronbach's Alpha Model from SPSS software. The analysis of the study found that the Cronbach's Alpha value was 0.965. This shows that the instrument used has a high reliability value.

Regression analysis

Linear regression analysis is used to predict the relationship between two or more variables. While, multiple regression analyzed two or more Independent variables with one dependent variables. This study was analyzed forecasting factor i.e. attitude, knowledge and skills on student achievement in laboratory Work.

Result and Discussion

Percentage of students' Learning outcomes in lab work

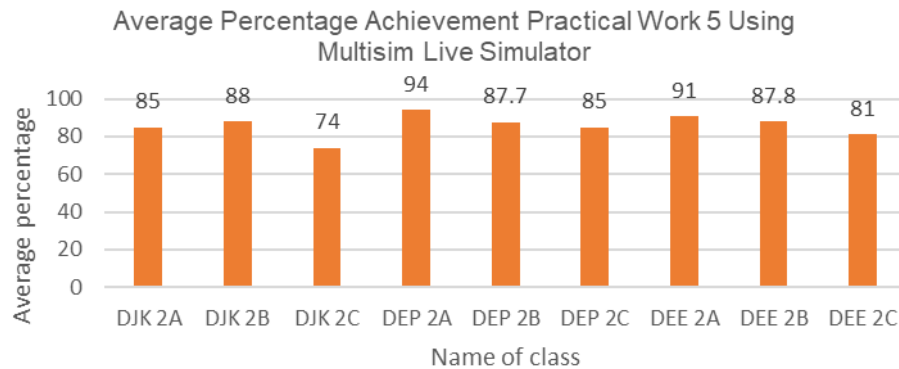


Figure 2. The Percentage of Students in Each Class Who Took Practical Work 5

From Figure 2, each class for the DEE, DJK, and DEP program displays an average percentage value of 82 and above. For the DJK program, the average score for lab 5 is 82, the DEP program shows an average percentage of 89 and the DEE program shows the highest average score percentage of 87.

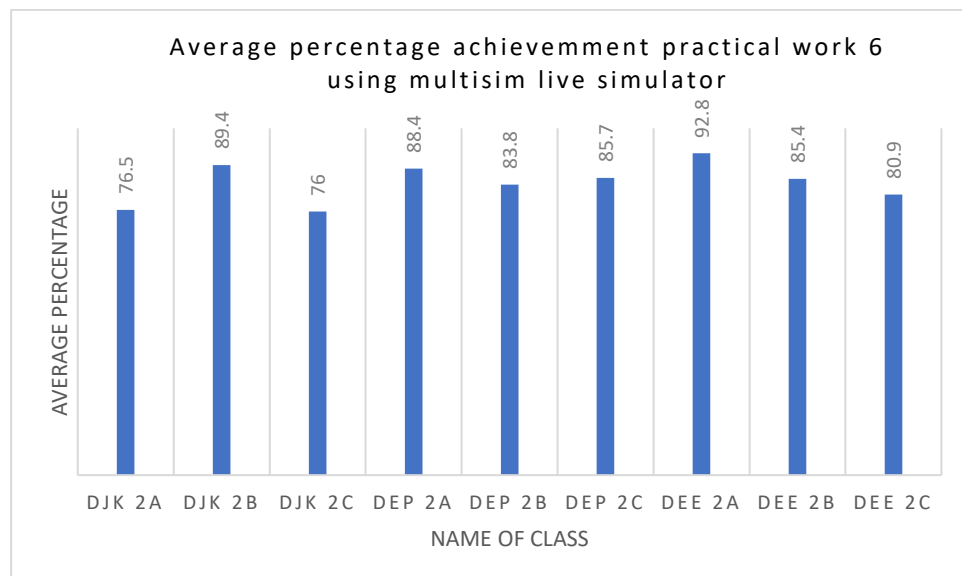


Figure 3. The Percentage of Students in Each Class Who Took Practical Work 6

Figure 3 shows the average percentage of marks for Practical work 6 for each class for the three main program. For the DJK program, the average score for lab 6 is 80.6, the DEP program shows an average percentage of 86 and the DEE program shows the highest average score percentage of 86.4.

Multicollinearity Test

Knowledge, skill, and attitude, are the independent variables used to build the linear regression model, exhibit strong correlations when there is multicollinearity. A construct is considered to have multicollinearity, according to Danang Sunyoto (2008) cited by Muchtamim, 2021, if the Variant Inflation Factor (VIF) 10 and all tolerance of the independent variables is greater than 10%. If these conditions are not met, the variance is deemed to not have multicollinearity. Based on Table 2's findings, it is evident that there is multicollinearity because each independent variable's VIF is greater than 1.0 with a tolerance of less than 10%.

Table 1. Multicollinearity Test

Model		Collinearity Statistics	
		Tolerance	VIF
1	Knowledge	.264	3.783
	Attitude	.277	3.615
	Skill	.561	1.783
Dependent Variable Performance			

Determination Coefficient Test (R^2)

This analysis is used to determine the amount of influence contributed by the independent

Variables (IV) Knowledge, Skill and Attitude, to the dependent variable Students Performance which is expressed as a percentage. In this study the coefficient of determination (R^2) was calculated using the SPSS.

Table 3. R Square

Variable	R^2	Sig
Knowledge	0.006	0.384
skills	0.005	0.440
Attitude	0.004	0.489
Knowledge, Skill, Attitude	0.006	0.838

From the data processing in Table 3, the contribution of influence is obtained and will answer the research question below:

- i. Correlations between Knowledge and student's performance.
 - a. Correlation between Knowledge and student's performance variable having a significance level of 0.384, which is significantly higher than 0.05, and a R square value of 0.006 or 0.6%. This indicates that, with a contribution of influence of 0.6%, the Knowledge factor did not associate with student's performance.
- ii. Correlations between skills and student's performance.
 - a. Correlation between skills and student's performance variable with an R square value of 0.005 or 0.5 % with a significance of 0.440, which is significantly higher than 0.05. As a result, the Skill variable has a contribution of influence of 0.5% and significantly not affect the student's performance.
- iii. Correlation between Attitude and student's performance.
 - a. More than 0.05 is found for the Attitude variable, which has a R square value of 0.004 or 0.4% and a significance level of 0.489. This indicates that the Attitude variable did not contribute on students' performance.
- iv. Correlations between three factors of knowledge, skills, and attitude toward student's performance

Knowledge, Skill, Attitude, variables with an R square value of 0.006 or 59.3% with a significance of 0.838 which

ch is more than 0.05. This means that the Knowledge, Skill, and Attitude did not have a significant effect on individual performance with an influence contribution of 0.6%. That means, student's performance did not totally influence with factors knowledge, skills and attitude.

F Test

The function of F test is to predicts the model fitness of regression or a level of significance. that means to test whether the independent variable simultaneously affects the dependent variable.

Table 4. ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.170	3	3.390	.282	.838 ^b
	Residual	1562.988	130	12.023		
	Total	1573.159	133			

From the results of the data processing in Table 4 above, using a confidence level of 95% and alpha 5%, the results of the model test above show an F value of 0.282 with a significance of 0.838, so H_0 is accepted, meaning that the variables Knowledge, Skill and Attitude simultaneously don't have significant effect to the student's performance.

Conclusion

Based on the objective research questions, it was concluded that simultaneously the knowledge, Skill and attitude variables have not a significant effect on the Student's Performance variable. The achievement of student's mark in Lab Work is not totally affected by three factors. The regression analysis result show that H_0 is accepted which it there is no significant correlation between students' knowledge, student's attitudes, student's skills towards student's performance in lab work assessment. The result of finding, can be used as a guidance for educators in making CQI (Continuous quality Improvement) to improve students' achievement in lab work activity. Overall, the researcher can conclude that probability the other non-cognitive variables that are not studied have a more significant effect on student performance in lab-work activity. For future recommendations, other factor such as teamwork, communication skills, social skills, academic behaviour and learning activities can be investigate in order to see student's achievement especially in practical activities.

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IMPORTANCE OF EMERGING TECHNOLOGIES TOWARDS HUMAN TRAFFICKING IN MALAYSIA

KEPENTINGAN KEMUNCULAN TEKNOLOGI TERHADAP PEMERDANGAN MANUSIA DI MALAYSIA

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Abstract

Importance of Emerging technologies towards human trafficking in Malaysia. With the advancement of technology in recent years, human trafficking has become one of the most significant contributors to global crime. According to the US report, the human trafficking issue in Malaysia is in a critical state, being classified as Tier 3 as the highest tier. Certainly, Malaysia must concentrate on developing and implementing emerging technologies such as artificial intelligence (AI), machine learning and others. There are numerous significant ways in Malaysia to develop technologies to prevent human trafficking. The goal of this study is to discuss the importance of emerging technologies and the development of such technology in Malaysia to prevent human trafficking. Primary and secondary sources are used in this study which includes internet research, journals, and thesis. This study adopts qualitative research the majority of which derives from journals, questionnaire, library, and online sources. This study will thus demonstrate the beneficial effects of new technologies for the problem of human trafficking and its resolution in Malaysia.

Keywords: Emerging Technologies, Artificial Intelligence (AI), Human Trafficking, Crime

Abstrak

Kepentingan teknologi moden ke arah isu perdagangan manusia di Malaysia. Dengan kemajuan teknologi dalam beberapa tahun kebelakangan ini, pemerdagangan manusia telah menjadi salah satu penyumbang utama jenayah global. Menurut satu laporan AS, isu pemerdagangan manusia di Malaysia berada dalam keadaan kritikal, diklasifikasikan sebagai Tahap 3. Seharusnya Malaysia perlu menumpukan perhatian kepada perkembangan dan pelaksanaan teknologi baharu seperti kecerdasan buatan "Artificial Intelligence" (AI), pembelajaran mesin dan lain-lain. Terdapat banyak cara penting di Malaysia untuk mengembangkan teknologi bagi mencegah pemerdagangan manusia. Matlamat kajian ini adalah untuk membincangkan tentang kepentingan teknologi baharu, dan bagaimana mengembangkan teknologi baharu tersebut di Malaysia untuk mencegah pemerdagangan manusia. Sumber primer dan sekunder digunakan dalam kajian ini merangkumi penyelidikan laman sesawang internet, jurnal, dan tesis. Kajian ini menggunakan penyelidikan kualitatif yang sebilangan besar adalah daripada jurnal, soal selidik, perpustakaan, dan sumber dalam talian penyelidikan. Oleh itu, kajian ini akan menunjukkan kesan baik yang dapat diperolehi daripada teknologi baharu bagi masalah pemerdagangan manusia dan penyelesaiannya di Malaysia.

Kata Kunci: Teknologi Baharu, Kecerdasan Buatan (AI), Pemerdagangan Manusia, Jenayah

Introduction

Human trafficking, otherwise called trafficking in persons or contemporary slavery, is a crime where the victims were exploited for forced labor or commercial sexual act. Nevertheless, the United States Department of Justice (DOJ) has already implemented legislation against forced servitude and slavery, namely, the Trafficking Victims Protection Act (TVPA) 2000. This law added new benefits, services and criminal penalties to tackle the issue of human trafficking in a more extensive and efficient manner (US Department Of Justice, December 2015). Human trafficking is a worldwide phenomenon that has been described as among the most profitable organized crime in the world, just behind the crime of narcotics and weapon trafficking. In these regards, women and child are at an increased risk of becoming commodities of global trade in recent years, particularly in sex and labor exploitation.

The crime of human trafficking involves the act of compulsion, exploitation, and damage with other kinds of contemporary slavery; for instance, child labor, sexual slavery, forced labor and forced marriage. The Journal by United Nation Office on Drug and Crime states that the illegal network of human trafficking is made up of international criminal organizations and individual traffickers who operate in small groups or even on their own.

Nonetheless, despite the extensive research in the processes and methods of human trafficking, the lack of official data means that the full extent of these criminal groups involvement in human trafficking activities remain unknown.

Most of the victims of human trafficking were women and children, and law enforcement is the primary source to save these vulnerable groups from human trafficking. The industries that are primarily involved in forced labor in Malaysia are construction, palm oil and agriculture plantation, production factories and sex industries (Mei Mei Chu and Chayut Setboonsarng, July 2 2021). A combination of irregular migration and high demand for low-wage workers in more developed countries creates the potential for labor exploitation in today's world. Among the few reasons why people are trafficked include domestic slavery, forced sex work, forced marriage and other criminal activities such as prostitution

Based on the Suhakam report, Malaysia is one of the popular migration destinations for migrants from other countries mainly due to economic reasons. These groups of people who came from poor and underdeveloped countries are more likely to become the victim of human trafficking, including sexual trafficking (Suhakam Aug 20 2021). In the annual Trafficking in Persons Report by the U.S. Department of State, the authorities rated the effort of the Government of each country in combating human trafficking from Tier 1 to Tier 3 (ChartBin Aug 21 2021). Tier 1 represents those countries whose government has fully met the minimum standards prescribed by the TVP A. meanwhile, Malaysia now remains in Tier 3 and achieve Tier 2 in the annual report, which means that the Government of Malaysia has improved from previously.

The main objectives of this article are firstly, the importance of emerging technologies for human trafficking, and secondly the type of emerging technology can be used to prevent the human trafficking issue in Malaysia.

Emerging Technology

The term “Emerging Technology” is known as new technology for the upcoming generation and modernization. Such term has different type of meanings when used in different contexts, such as in media, business, science or educational fields. The phrase is typically reserved for technologies that are having or are anticipated to have, significant social or economic effects. There are few examples of emerging technology which are evolving and growing rapidly, such as Artificial Intelligence (AI), Automation, Robotization, 3-D Printing, Cryptocurrencies, Drones, Blockchain and many others.

Human trafficking cases has surged everywhere because traffickers have been developing technology in every aspect to increase the activity, by the reason that it can increase their wealth and power. However, human trafficking remains a serious global issue that must be successfully prevented and countered. Fortunately, modern technologies have enormous potential in combating this horrible crime. Thus, Governments should make substantial steps towards eliminating human trafficking by exploiting advances in artificial intelligence, data analytics, blockchain, facial recognition, and big data.

Literature Review

The Trafficking in Persons Report (TIP Report) rates countries based on their efforts in tackling human trafficking issues where it recognized Malaysia's current efforts by investigating its existing frameworks (US Department, 2015). The investigation identified flaws in Malaysia's legislation and enforcement against human trafficking. As a result of the TIP Report, numerous studies, publications, policies, laws, and enforcement methods were developed. The researcher based on the TIP Report as a starting point of reference and discussed parts of the report in depth and detail, identifying the most critically insufficient element in Malaysia's anti-human trafficking apparatus.

According to David Brunnstrom (2014), the demotion to Tier 3 rendered Malaysia vulnerable, which also mean that Malaysia's current effort in tackling human trafficking is comparable to Syria, North Korea, and Yemen, among others, as well as the UN's list of least-developed, war-torn, or dictatorship-ruled countries (David Brunnstrom, June 21 2014). Concurrently, the Government of Malaysia acknowledges that its efforts to combat human trafficking under ATIPSOM 2007 faces numerous obstacles and that the law must be amended further.

According Shelley (2010) there is a need to investigate the fundamental causes of human trafficking issues. Such causes are different from one country to the other, and can be influenced by a variety of reasons such as criminal greed, economic pressure, political instability and constant changes, social and cultural differences between states (Louise Shelley, 2010). These problems have been exacerbated by a lack of job prospects, poverty, regional

economic disparities, corruption, a loss in border control, gender and ethnic discrimination, and violence.

Materials and Method

This article was researched about qualitative methods by observing and research studies through journals, online research and books to study about emerging technology and human trafficking issue around Malaysia. This study has been carried out based on researches from around the world to identify the type of emerging technologies that can help in the prevention of human trafficking cases. Furthermore, this article will discuss how Malaysia can use current technologies to avoid human trafficking throughout Southeast Asia. Focus groups, which are studies of key stakeholders such as NGOs, social professionals, or community members to explore their perspectives, attitudes, and beliefs about human trafficking, were one of the qualitative research methods used. Qualitative data from focus groups can provide a more in-depth insight into community dynamics, cultural variables, and the obstacles associated with combating human trafficking.

Result and Discussion

Revolution of technology has created a new universe in the world, where we can announce part of the basic need of human lifestyle. However, there is positive and negative effect in term technology. Attached with the possibility of human trafficking, and safe usage and privacy are still work in progress. People believe the extent to which this increase in the digital activity created trafficking opportunities during and after the pandemic varied by country - the nature and length of lockdown measures differed across the region, as did identification processes and movement both within and across borders, and this likely contributed to differences in technology and recruitment patterns across different geographical areas.

Human traffickers take advantage of technology and lured the unsuspected community around them with advantages such as good income, luxurious lifestyle, stability of politics and other ways to inspire them and save cost. This will be the false motivation for such naïve individuals to enter the country illegally. and interpreted Malaysia enforcement easily such as police officer and immigration due to the evolution if the modern technology (USAID, April 2023). In addition, technology can help in the recruitment stage of illegal immigrant by making it easier to identify, locate, and contact potential victims. According to the sort of exploitation, different mechanisms are at work.

Besides that, there are many challenges faced by Malaysia government in term of preventing human trafficking issue through technology. Among the challenges as regards to investigation is data encryptions, lack of handling electronic device, lack of technical equipment (Ani Munirah Mohamad, December 2022). Investments in human capital are just as critical as those in software and technology, especially in light of the lack of technological understanding among law enforcement and the need to improve such knowledge. Developed countries such as England, United States and others have emphasized the necessity of giving all enforcement officers additional technical training, including instruction on technology and its operation. Proper training on the collection and processing of technological devices must be given the greatest number of relevant officers and should be included regularly.

Besides that, there are few examples of emerging technology that can be implemented as potential solution to prevent human trafficking issues: -

- i. Dark Web and Encryptions tool tracker: The dark web, a portion of the internet accessible only through particular software, can assist unlawful operations such as human trafficking by offering a platform for anonymous communication and transactions. Encryption technology can also be used to conceal sensitive information relating to human trafficking. However, law enforcement organizations are working to prevent dark web trafficking and create tools to track down and capture criminals engaged.
- ii. Data Analytics and Artificial Intelligence (AI): AI and Data Analytic can be utilised to identify the patterns and trends in human trafficking. AI algorithms can help law enforcement organizations to discover possible trafficking networks, anticipate hotspot, as well as improve detection and prevention efforts by analysing massive amount of data from multiple sources, such as social media, financial transactions, and transportation records.
- iii. Blockchain Technology: By ensuring secure and transparent records, blockchain, a decentralized and immutable ledger, has the potential to help combat human trafficking. It can be used to track supply chains, verify identities, and create a temper-proof database that make it difficult for traffickers to alter or delete data. Blockchain-based system could enable secure data sharing among relevant authorities and organisations improving coordination and information exchange

- iv. **Biometrics Technologies:** These technologies such as facial recognition, fingerprint scanning, and iris scanning can aid in the identifications and rescuing human trafficking victims. Such technologies can help law enforcement agencies under government to verify identities, compare them to the database of missing people or known traffickers, and possibly detect victims in real-time in transportation hubs or border crossings.
- v. **Mobile Applications and Reporting Mechanism:** The creation of mobile applications that enable users to report suspected human trafficking can inspire public involvement in the fight against crime. In addition to utilising technologies like location tracking, image recognition and encrypted communications for effective and trustworthy reporting, these applications can offer a secure and anonymous channel for reporting.

Protecting humans is part of government and community responsibility. Human trafficking is a horrific violation of fundamental rights. Individuals are exploited, often through forced labor, sexual exploitation, or other forms of slavery. Technology can play a vital role to prevent human trafficking issues all over the country.

Suggestions

It is vital for the Government of Malaysia to provide awareness of the importance of technology to the community. This is due to the fact that technology is capable to provide a platform for raising awareness about the dangers and signs of human trafficking. The information can be shared through websites, social media campaigns, and online resources to educate people around the country, potential victims, and at risk communities about the risks and tactics by the traffickers. Besides that, emerging technologies could provide consistent prediction through data analysis. Technology can enable the collection and analysis of massive amounts of data, which can aid in the identification of patterns, trends, and hotspot associated with human trafficking. Law enforcement agencies and organizations can detect and forecast trafficking operations by employing data analytics and AI, allowing for proactive intervention and prevention measures. Furthermore, as technology can help in the recruitment stage by making it easier to identify, locate, and contact the victim, the traffickers frequently use online platforms and social media to recruit victims, advertise their services, and coordinate their actions. Adversely, technology can also be utilized to monitor and analyse online platforms, detect suspect activity, and track traffickers' digital footprints. This data can help law enforcement authorities conduct investigations and dismantle trafficking networks. initial victims. According to the sort of exploitation, different mechanisms are at work.

Conclusion

Illegal traffickers are becoming increasingly dependent on technology, which is a cause for concern. According to the finding of this study, technology was used throughout the entire process of human trafficking, beginning with the recruitment of victims and continuing until the procedure was completed. Even though some may argue that the benefits and advantages of technology have shape human lives to the betterment, others may argue that technology may disrupt the culture and stability ecosystem, as can be seen in the case of human trafficking.

Law enforcement and government agencies must undoubtedly make huge investments in capacity building in areas such as Internet monitoring, cyber patrols, undercover online investigations, social network analysis and the function of automatic tools to analysis evidence. The creation and applications of such tools must adhere to the principles of the rule of law. Malaysia should consider in amending existing legislation to allow for cyber-patrolling and covert online investigation and also consider investing tools to assist investigator in handling and processing large amounts of data such as big data applications.

Besides that, countries, non-governmental organization (NGO), and private companies that provide online and ICT service should launch initiative to raise awareness about technology- related risks, such as how traffickers may exploit technology and how potentially exploitative situation may arise. School and educators should also be included in this effort because children and young adults are at increased risk. NGO and government agencies should collaborate with private companies that provide communication and messaging services to incorporate information or warnings about the safe use of private channels of communications into the systems. Finally, what matters is how humanity will use technology for positive or negative purpose it will reach their mission.

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ANCIENT JAVANESE ART ILLUMINATION AS THE VISUAL INSPIRATION OF BATIK NGAYOGYAKARTA HADININGRAT MOTIVES

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Abstract

Ancient Javanese manuscripts found in the Ngayogyakarta Hadiningrat Palace have artistic illumination that has aesthetic value. Expressed in the form of luxurious coloring around the *Pegon* Javanese text. Not all ancient manuscripts can be accessed by the wider community for reasons of security and documentation. The aims of this study 1) seek to identify artistic illumination in ancient Javanese manuscripts, and 2) preserve the existence of artistic illumination through visual transfer into batik motifs. It was chosen as a batik motif because Yogyakarta is famous for its batik city and it is necessary to preserve it as well as add inspiration in creating Yogyakarta-style batik motifs. This study uses a qualitative method. The data used are *Serat Jaya lengkara*, *Serat Arjuna Sosrobahu*. The selection of this data is based on the results of field observations obtained by the research team. This research resulted in a visual transfer into the form of Ngayogyakarta Batik with the Batik Harjuna Sosrobahu Sakti and Motif Batik Peksi Kusumo.

Keywords: Ancient manuscript, Batik, Keraton Hadiningrat, Yogyakarta, Visual transformation

Abstrak

Naskah Jawa Kuno yang terdapat di Keraton Ngayogyakarta Hadiningrat, memiliki iluminasi seni yang memiliki nilai estetika. Diekspresikan dalam wujud pewarnaan yang mewah mengelilingi teks jawa pegon. Naskah ini, tidak semua dapat diakses oleh masyarakat luas, dengan alasan untuk keamanan dan pendokumentasian. Tujuan penelitian ini 1) berupaya untuk mengidentifikasi iluminasi seni dalam naskah jawa kuno, 2) melestarikan keberadaan iluminasi seni tersebut melalui alih visual ke dalam motif batik. Dipilih menjadi motif batik karena Yogyakarta terkenal akan kota batiknya dan perlu untuk melestarikannya sekaligus menambahkan inspirasi dalam penciptaan motif batik khas Yogyakarta. Penelitian ini menggunakan metode kualitatif. Data yang dipergunakan adalah *Serat Jaya lengkara*, *Serat Harjuna Sosrobahu*. Pemilihan data ini berdasarkan hasil observasi lapangan yang didapatkan oleh tim peneliti. Penelitian ini menghasilkan alih visual ke dalam bentuk Batik Ngayogyakarta dengan Motif Batik Harjuna Sosrobahu Sakti dan Motif Batik Peksi Kusumo.

Kata kunci: Alih visual, Batik, Keraton Hadiningrat, Naskah kuno, Yogyakarta

Introduction

The Ngayogyakarta Hadiningrat Palace, better known as the Yogyakarta Palace, is the official palace of the Ngayogyakarta Hadiningrat Sultanate which is now located in Yogyakarta City, Yogyakarta Special Region, Indonesia (Abrori et al., 2017; As'ad, 2022). The sultanate has been part of the Republic of Indonesia since 1950, but this palace building complex still functions as the residence of the sultan and the royal household who still carry out the sultanate tradition to this day. The Palace is one of the famous tourist destinations in Yogyakarta. The palace complex is a museum that houses various collections belonging to the sultanate, including various gifts from European kings, replicas of palace heirlooms, and gamelan. This palace is one of the best examples of Javanese palace architecture, having luxurious halls and spacious courts and pavilions (Atmojo, 2004).

Inside the Palace are stored many old manuscripts that have not been revealed to the public. This is because it was alleged or suspected that during the colonial period, thousands of historical records owned by Indonesia were confiscated by Europe, including 7,000 ancient manuscripts belonging to the Yogyakarta Palace (Darmarastri et al., 2021; Syarif & Kurniawati, 2018). For ten years, Sri Sultan Hamengku Buwono X struggled to bring the manuscript home. Coinciding with the 30th anniversary of the Sultan's reign since March 7, 1989, at least 75

manuscripts have been returned by the British Library to the Yogyakarta Palace. This number is far from what it should be. Even so, the Palace happily welcomed the return of the dozens of manuscripts. This research is an opportunity to be able to dig up information about these old manuscripts.

A similar study has been accomplished by the authors, which investigates the illumination of historical manuscripts as a source of inspiration for the creation of art, namely batik motifs. The study was conducted qualitatively, including data from interviews with courtiers, batik workers, head librarians, and ancient manuscript experts from the Hadiningrat Palace, and it used a descriptive-narrative technique to understand the significance of illumination in ancient Javanese manuscripts. The results of this study are batik motifs inspired by ancient manuscript illumination which are then transformed into copyrighted batik works. It is hoped that the results of this study can enrich batik motifs in Indonesia (Pandanwangi et al., 2023). In addition, another research on implementing illumination done by Syarif and Kurniawati in 2018 which redefine the function of implementing illumination in Javanese script, especially those copied or written in the palace environment (scriptorium palace).

Because the problem in this study emphasizes the disclosure of the illumination function, the appropriate research strategy is qualitative research. The research objective is focused on Javanese manuscripts resulting from the palace scriptorium in the collection of the Yogyakarta Sonobudoyo Museum. Data were collected by observation techniques, document studies, and in-depth interviews. The analysis was carried out using functionalism theory. The results are illumination on the Javanese scriptorium palace script, made to full-fill personal functions, such as a beauty medium expressing of the creator, and social functions, which include spiritual functions, which will increase the spiritual value of scripts, educative functions, intensify attractiveness of studying scripts, communicating the message in the text through illumination, and the political function is to confirm the position of the king, as well as the physical function is to beautify the physical appearance of the manuscript (Syarif & Kurniawati, 2018).

Based on the descriptions of the two studies, a research gap was found which will be the focus of this research. This research focuses more on two ancient manuscripts that are rarely disclosed by other researchers and discusses the meaning of batik motifs inspired by two ancient manuscript illuminations. Therefore, this research is important to do. The more that is revealed in this ancient manuscript, the higher the element of adequacy that can be fulfilled in its documentation. The two studies above focus on artistic illumination contained in ancient texts. Ariesa et al. in 2023 focused on the creation of batik motifs, while the researcher Syarif in 2018 focused on the function of artistic illumination, but both have similarities in the use of methods, namely the qualitative descriptive method.

According to the description of earlier research, the purpose of this research is to locate, identify, and revive batik motifs that were originally found in manuscripts. These concepts will then be reflected in batik artwork for the production of new motifs in the form of digitization. The *Serat Jaya Lenggara* and *Serat Harjuna Sosrobahu*. data were utilized. This data was chosen because it is accessible and has strong data support from transliteration and translation into Indonesian. As a result, there are more chances to transform designs into batik motifs. Therefore, research questions are formed below, namely: (1) What are the batik motifs originating from the illumination of ancient Javanese manuscripts that are revealed in batik artwork in the form of digitization?; (2) What are the steps to identify batik motifs originating from ancient Javanese manuscripts that are revealed in batik artwork in the form of digitization?; and (3) How to revitalize the illumination motif originating from ancient Javanese manuscripts into batik artwork?

Materials and Methods

The study areas of this research are two ancient manuscripts in the form of *Serat Jaya Lenggara* and *Serat Harjuna Sosrobahu*. What is studied is the visual contained in ancient manuscript illuminations, then identified and visualized into batik motifs. To achieve the research objectives, a qualitative descriptive method was used. Qualitative methods are appropriate for research related to culture (Creswell, 2014; Creswell & Plano Clark, 2018). The complexity of culture cannot be described in terms of mathematical calculations and numbers, culture is also essential because it is closely related to the activities and creation of reason, art, beliefs, and customs (Decker et al., 2019; Pandanwangi et al., 2023). The data used comes from images derived from illumination contained in ancient manuscripts in the form of *serat*. Qualitative research involves direct field observation activities, as well as expert interviews as resource persons to strengthen the results of research discussions. The stages in this research are:

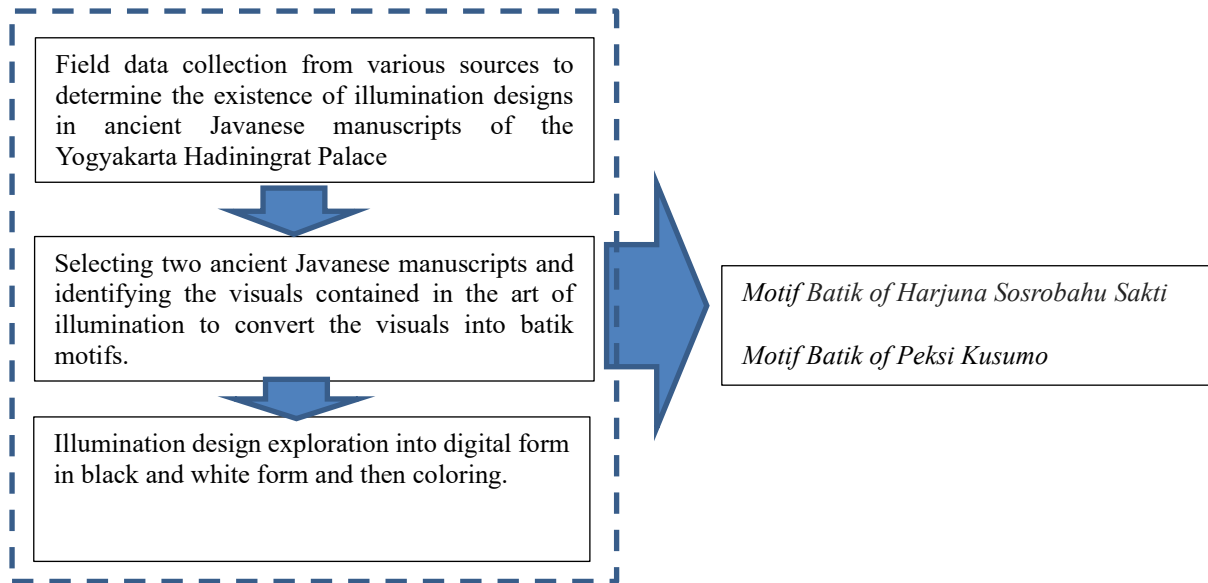


Figure 1. The flow of research stages

Source: 2023 Research Team

Result and Discussion

Illumination is the art of beautifying manuscripts or books with ornaments or decorations in the form of paintings, letters, or geometric shapes, especially on the edges of the pages using gold or other colors (Masturoh, 2014; Ratna Saktimulya, 2016; Syarif & Kurniawati, 2018). Ratna further stated that illumination is a form of art found in written manuscripts, but is not a development of the written arts, because simple writings on non-ornamented pages cannot be called illumination. The term illumination was originally used in pure gilding on some pages to make the text more attractive and to beautify the manuscript. This activity continues to grow so that the illumination is more inclined and focuses on the pictures in the manuscript, which are generally found on the front and back pages, which serve to decorate the manuscript (Ratna Saktimulya, 2016).

Illumination art is found in ancient manuscripts containing chronicles, fibers, and so on (Syarif, 2017). For example, *serat* contains *suluk* which interprets every journey of human life as well as manners and human behavior to be virtuous and understand *unggah ungguh* (attitude) towards their environment (Pandanwangi et al., 2023; Purnomo et al., 2021). This also refers to the results of an interview with the statement of an ancient manuscript expert from KHP Widya Budaya Karaton Ngayogyakarta Hadiningrat, KRT Rintaiswara. KRT Rintaiswara through an interview on 17 September 2022 said that both *serat* and *babad* always contain messages from God or religious teachings. *Serat* are literary works that contain teachings from ancestors for goodness. The examples of illumination from ancient manuscripts which are the focus of this visual transfer are the illumination from *Serat Jaya Lengkar Wulang MSS Jav 24*, and *Serat Harjuna Sosrobahu*.

Illustrations that are often found in ancient texts that have tangible and intangible wealth. Tangible value can be seen directly in the beauty of forms or decorative elements which usually come from nature, such as flora, fauna, and architectural forms (Darmayanti et al., 2023; Iswanto, 2020; Syarif & Kurniawati, 2018). It is not only decorative which adorns the manuscript and becomes a beautiful frame of the narrative in it, but also as identity and meaning which is the intangible value of illumination. The meaning is hidden because it is conveyed through symbols (Ratna Saktimulya, 2016; Sulaiman & Bastian, 2019). This statement was reinforced by an explanation from KRT Rintaiswara during an interview and discussion at the Ngayogyakarta Hadiningrat Palace library in September 2022, that the element of illumination can provide identity when the manuscript was made through the elements in the illumination, especially on the initial page which is called *wedana* and on the page end of a script.

The beauty and richness of the values of ancient manuscripts and their various illuminations provide inspiration in making batik motifs with Yogyakarta characteristics. Batik motifs are equipped with meaningful descriptions and names that are the main attraction (Pramono et al., 2019). Below is a visual transfer from art illumination to batik motifs. The first is *Serat Harjuna Sosrobahu*.



Figure 2. Serat Harjuna Sosrobahu

Source: Ngayogyakarta Palace Library

The illumination of the ancient manuscript art above is visualized into a batik motif which can be seen in Figure 2. The main motif is taken from the form of the main motif in the illumination of the ancient manuscript art which is located above and below, left and right on the ancient manuscript page which is flanked by artistic illumination. The arrangement of objects is made towards the horizontal and is made repeated. The background motif is a background filled with star like shape (*isen*-batik consisting of eight small line – form a circle). This star like shape fills the batik background which is combined with the *dots* motif that has been modified. The selection of motifs on the background of the cloth is to highlight the main motif so that small motifs are selected as the background of this batik fabric.



Figure 3. Motif Batik Harjuna Sosrobahu Sakti

Source: Research Team

The *Harjuna Sosrobahu Sakti* Batik motif was initiated from the narration of *Serat Harjuna Sosrobahu* which tells the story of a king named Kanjeng Sultan Mangkubuwana Senapati ing Ngalaga Durahmani Sayidin Panatagamaku who died and was succeeded by his son, Dipaningrat Nyakrakusuma Caliph the Great. In short, this fiber talks about the condition of the country under the reign of the King, bringing prosperous conditions, formidable defense forces, and complete weapons. The written message stated that his will appoint his son as a successor when it was time for him to die.

The *Harjuna Sosrobahu Sakti* Batik motif is designed from the top of the *serat* illumination depicting a dragon-like shapes opposing each other. With a series of feathers resembling a fowl's tail in the middle, and an arrangement like wings on the left and right. Selected this section. because it has an important role in the illumination page it appears three times on the left and three times on the right page. So, from this section, it is made into a source of motif ideas to become batik motif designs. In general, the depiction of dragons is closely related to messages that tell about the state, while a pair of wings often tells about kings and their families. Therefore, the depiction of wings or also called *sawat* is classified as a sacred motif.

In the *serat* story, it is written about the king's supernatural powers in leading the country to bring glorious conditions, this is what is stated in the batik motif, which tells of magic or in other words because of his great treatment, the country progressed under his leadership. Then the arrangement of motifs is made by placing the main image in a mirror opposite each other so that an image resembling many hands appears. This is in line with the expression which symbolizes the hand as an action, arranged repeatedly to emphasize that his actions and the level of his supernatural powers brought the country to a very prosperous position. And this also makes the hope that someday this batik user will get a role model who encourages him in his actions to increase all good, especially for the country. The second is *Serat Jaya Lengkar Wulang*.

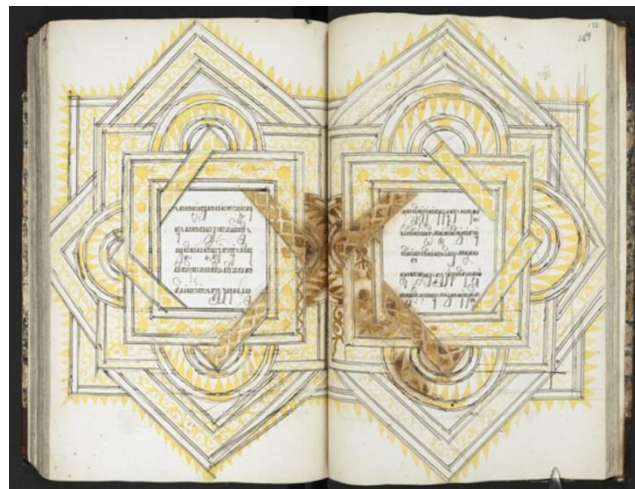


Figure 4. *Serat Jaya Lengkar Wulang* – MSS Jav 24, Page 171v-172r.

Source: British Library

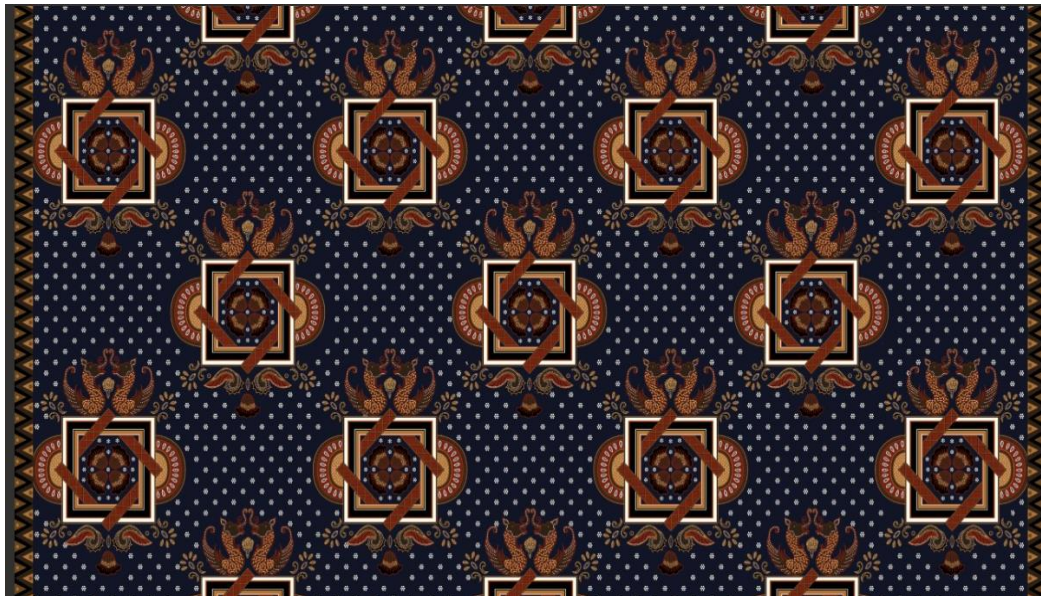


Figure 5. Batik Peksi Kusumo Motif

The *Peksi Kusumo Batik* motif was initiated from the narrative contained in the *Jaya Lengka Wulang serat* which is found on page 172V, namely *Wruh ing umat mufakat amrih rahayu. Wadwa kayungyun kang gêng a[172r]lit sêsmi teng kang maha luhur. kênnyatahan trusing ilmi. Kawarnaa solahing wong*. The meaning is understanding consensus so that people are safe. The warriors were captivated by the magnitude of the sign of the Highest. The fact that knowledge flows is reflected in human behavior. It means that no matter how smart people are, they must have humble behavior because there are still those who have the "sign" of the Highest. The transformation of batik motifs is done by visualizing the artistic illumination found in the *Jaya lengka Wulang* fiber. The main object of the batik motif comes from the illumination that surrounds the text on this fiber, namely geometric shapes that are connected, while the supporting motif comes from *Serat Jaya Lengka* page 182 v, which is a flower that stretches above the pexis. The two sections of this artistic illumination become part of the main motif which is composed on the geometric plane. The meaning of this motif refers to mysticism to be a human being who remains humble even though he already has high knowledge.

Conclusion

This study shows that motifs originate from the *Serat Jaya Lengka* and *Serat Harjuna Sosrobahu* manuscripts that become a typical Javanese batik motif in the form of digitization. The motifs taken from *Serat Jaya Lengka* are motifs from pages 171v-172v illumination in the form of geometric shapes that are interrelated with simple but complementary details. This simple motif can provide creative inspiration and produce a typical Javanese batik motif called *Peksi Kusumo* which is different from the original motif. The motif taken from *Serat Harjuna Sosrobahu* is the tail of a bird and a dragon which is then processed into a batik motif called *Harjuna Sosrobahu Sakti*. The two batik motifs have of course been adapted to the standards of Javanese Yogyakarta batik, namely by adding characteristics in the form of *isen-isen* and distinctive colors as identity. The steps for identifying batik motifs inspired by ancient Javanese texts are based on the meaning of the narratives in the illuminations, and the rules about Yogyakarta batik from experts. The step to revitalizing ancient manuscript illumination motifs is by "bringing" them out of closed books which are quite limited in access to media that are more likely to be seen by the wider community, namely batik motifs.

Manuscripts containing Illumination images to decorate manuscripts with various design styles, which are located at the *Hadiningrat* Palace in Yogyakarta, are a source of ideas that can be explored for visual conversion into batik motifs. Illumination is a form of decoration or ornament that specifically decorates ancient texts. Illumination images in the ancient Javanese manuscripts have their charm and uniqueness which are characterized by Javanese art that deserve to be preserved. But unfortunately, until now there has not been much research on this illumination using an artistic point of view conducted by researchers in the arts, because of the potential for development in the art of illumination, it is necessary to revitalize it, one of which is using visual transfer. Through this visual transfer, there are many possibilities for exploring the development of batik motifs. It is hoped that the batik

produced from ideas originating in ancient manuscripts can enrich the Yogyakarta batik treasury, as well as spread the valuable values contained in the contents of the manuscripts. This transliteration of the text in ancient Javanese is a kind of innovative bridge of understanding. An effort to turn literacy into a form of use object has many benefits in its implementation; for consumers, they will be more familiar with the noble values of their nation's culture, while for producers, it can bring economic value to batik makers, especially in Yogyakarta.

Acknowledgment

The authors thank the Ministry of Education, Culture, Research, and Technology with the research master contract no. 156/E5/PG.02.00.PT./2022 dated 10 May 2022 with a derivative contract LL Dikti IV No. 097/SP2H/RT-MONO/LL4/2022, LPPM Maranatha derivative contract 192.A-C/LPPM/UKM/VI/2022. The research team would like to thank all the institutions funding this research.

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VIDEO AS THERAPY FOR CHILDREN WITH SPEECH DELAYS IN INDONESIA

PEMANFAATAN VIDEO SEBAGAI TERAPI UNTUK ANAK DENGAN KETERLAMBATAN BICARA DI INDONESIA

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Abstract

The Covid-19 pandemic is said to be one of the factors exacerbating cases of speech delay in children in Indonesia. Most likely the cause of the increase in cases of speech delay during the pandemic is children who are more often at home and interact less with their peers. In addition, gadgets are also considered to be one of the main causes. At a seminar, 'Challenges of Behavioral Addiction in Adolescents' held by the West Java Provincial Government, many parents expressed their ignorance about child development delays and what to do when children experience developmental delays. At present it is difficult for parents to separate gadgets from their children, so parents should accompany their children when using them and according to the age of their children to the use of devices. This research will conduct interviews with child psychologists to find out what kind of videos do not cause speech delays in children. Observations in children's speech therapy sessions are also carried out to provide a basis for designing video content. The results of this research are in the form of video samples, each element of which was created based on the results of interviews and observations.

Keywords: gadgets, speech delay, video, stimulus

Abstrak

Pandemi Covid-19 disebut menjadi salah satu faktor yang memperparah kasus keterlambatan bicara pada anak di Indonesia. Kemungkinan besar penyebab meningkatnya kasus speech delay di masa pandemi ini adalah anak-anak yang lebih sering berada di rumah dan kurang berinteraksi dengan teman sebayanya. Selain itu, gawai juga dinilai menjadi salah satu penyebab utamanya. Dalam sebuah seminar, banyak orang tua yang mengungkapkan ketidaktahuannya tentang keterlambatan perkembangan anak dan apa yang harus dilakukan ketika anak mengalami keterlambatan perkembangan. Saat ini orang tua sulit untuk memisahkan gadget dengan anaknya, oleh karena itu sebaiknya orang tua mendampingi anaknya pada saat menggunakannya dan sesuai dengan usia anak dalam penggunaan gawai tersebut. Penelitian ini akan melakukan wawancara dengan psikolog anak untuk mengetahui jenis video apa yang tidak menyebabkan keterlambatan bicara pada anak. Observasi pada sesi terapi wicara anak juga dilakukan untuk memberikan dasar dalam merancang konten video. Hasil penelitian ini berupa sampel video yang setiap elemennya dibuat berdasarkan hasil wawancara dan observasi.

Kata kunci: gawai, keterlambatan bicara, video, stimulus

Introduction

Cases of speech delay in Indonesia have increased during the Covid-19 pandemic. Reporting from the May 2022 edition of the Jawapos news article, pediatrician Dr. Dian Pratamastuti, Sp. A admitted that speech delay cases have increased from year to year. She also mentioned that this case reached its peak during the pandemic. "Indeed, from previous years it has always increased. But during this pandemic the increase was even more significant," (Pradewo, 2022) Lack of time to play outside with peers and excessive use of gadgets are the main causes of increasing cases of speech delay during the pandemic. Children who don't play outside and have to be at home will quickly get bored and gadgets are an alternative entertainment for them. Many parents use gadgets as a tool so that their children are not fussy. Through this, it can be seen that parents do not know the bad effects of gadgets. Many parents express that they have no knowledge about delays in their child's growth and development and what to do if their child experiences delay in growth and development. (Wamad, 2022)

Based on data from the 2021 Indonesian Internet Survey from the Association of Indonesian Internet Service Providers or APJII, the number of internet users in Indonesia is currently 77.02 percent of the total 275.3 million Indonesian population. This shows that there are around 210,026,769 people in Indonesia who are internet users.

Unfortunately, of these, not all are adults, among these users there are many young people who are already internet users. Good for learning, skating in cyberspace and for playing games. A survey was conducted on 1084 children aged 4 years, found a significant increase in screen exposure for school (72%) and for leisure (49.7%) during the pandemic. (Romina Moavero a b, 2023) Seeing this phenomenon, Professor of Developmental Psychology, Faculty of Psychology, UI, Adriana Soekandar Ginanjar, advised parents, "Accompany them when using devices and also ask what applications are being opened by children. Also introduce educational applications and they can become a means of increasing children's knowledge," he also advised parents to adjust the age of their children to the use of gadgets, also asking parents to take part in activities with their children. According to him, family is the root of every child to get a strong and healthy soul (Rauf, 2023).

Important infant stages in language development are crying (birth), cooing (1-2 months of age), babbling (6 months of age), transition from a universal linguist to a specific language listener (6 to 12 months), using language (8-12 months), word comprehension (8 to 12 months), first word pronunciation (13 months), vocabulary explosion (18 months), rapid development of word comprehension (18 to 24 months) and second utterances word (18 to 24 months) (Kurniati, 2017). Based on this explanation, the child should be able to start saying words at the age of 13 months, if at this age the child is still unable to pronounce words, then media is needed that can stimulate his language development. Video is an audible learning material (audio visual) that can be used to convey messages/subject matter. It is said to be heard because the elements of hearing (audio) and visual/video elements (visibility) can be presented simultaneously (Ayip, 2003).

It was stated in a journal, the existing forms of handling speech delay in children such as flashcards and stories with dolls only focus on visuals. Handling like this also requires a therapist to do it. However, it is also stated that the form of multimedia does not fulfill all sensory, namely video, audio and touch (Manik Mahachandra, 2022). This multimedia is often consumed by children in the form of videos during their screen time. Therefore, further research is needed regarding the media presented to children during their screen time.

Considering the source of these problems and considering the difficulty of eliminating screen time with children in this digital era, this research has the following problem formulation:

- i. What kind of video content that can involve parents in their children's screen time?
- ii. What kinds of video visuals that help to stimulate children's speech development?

Materials and Methods

The results of this study are expected to be effective and right on target, so the problem will be narrowed to the main target audience, namely children (age will be adjusted according to the results of psychologist interviews), as well as to secondary targets, namely parents. This output design will be strengthened by interviews with children psychologist and observation at children growth and development clinic. The interview and observation results will be analyzed and used as the basis of video design.

Result and Discussion

The method used for this research is interview. An interview is a communication between two or more parties that can be done face-to-face where one party acts as the interviewer and the other party acts as the interviewee with a specific purpose, for example to collect information or collect data. (Fadhallah, 2021) The interview was conducted at a child development clinic in the South Tangerang area with a child psychologist and speech therapist. The following table will explain some of the questions asked during the interview with psychologist, Amanda A. Kinasih, M. Psi., and the answers.

Table 1 Question and Answer

No.	Question	Answer
1.	What causes speech delay in children?	Various, but since the pandemic, the majority is due to parents giving their children screen time.
2.	At what age is a child said to have speech delay?	If the age of 18 months has not said the first word then it is said to be too late, then it is said to be speech delay until the age of 4 years. Above 4 years means there are certain disorders.
3.	What kind of stimulus can hone children's speech development?	2-way interaction. It is better if the child's main caregiver often has 2-way communication.
4.	Are internet videos can help to develop children's speech development?	The causes of speech delays in children vary. So videos like this will give different results to each

5.	Are internet videos about learn to speak good for children with speech delays?	child. Some were able to speak, some were only helped, or some had no effect at all.
6.	What age children can be given this educational video?	It's ok with the assistance of an adult by his side so that there is still 2-way communication.
7.	Are such videos needed by parents?	Screen time of any kind is not recommended for children under 1 years. And children can be said to be speech delayed aged 18 months and over. So it is best given to children aged around 2 years and over.
8.	How long does a 2–4-year-old focus time?	Yes, many parents don't know how to stimulate their children to be able to speak. Child's focus time is the child's age multiplied by 3. For children aged 2 years, the maximum focus is 6 minutes.

Based on the results of the interviews, the point that can be drawn is that the videos made will give different results to each child, the videos must still involve adults to accompany them. Next, the list below will discuss the points taken from the observations of children's speech therapy sessions.

- i. Say the word slowly and clearly.
- ii. Repeat the pronunciation.
- iii. Make eye contact with the child. Get closer to the child.
- iv. Ask questions or invites so that there is 2-way communication.
- v. Pay attention to body gestures so that children can understand.

A child development specialist with a master's degree in Early Childhood Curriculum and Instruction, has done extensive research on the children show, Cocomelon. She has found that Cocomelon videos are so hyperstimulating for young children. In an article in the New York Post, it was explained that cocomelon might be hyperstimulating because the scene changes too quickly. (Goulis, 2023) To avoid overstimulating and for effectiveness, all elements that make up the video must be made based on the results of interview analysis, observation and literature study. Table 4 explains the reasons for each forming element in the video.

Table 2 Element

No.	Element	Explanation
1.	Duration 4-6 minutes	According to health data published by the Brain Balance Center, it is stated that the ideal concentration range for children is two to three minutes times their age. (Fadli, 2023) Same as the results of interviews with psychologists, the child's focus time is the child's age multiplied by 3.
2.	Color Red as main color	Red: dynamic, passionate, stimulating, active, strong, warm, aggressive. (Triana, 2022)
3.	Zoom in	The results of therapeutic observations: to build a child's focus.
4.	Text	Based on interview results: There must be a guide for parents or companions accompanying children to watch.

The following is a video where each element is made based on the results of literature studies, interviews, observations, and comparative studies.



Figure 1. Video Screenshots

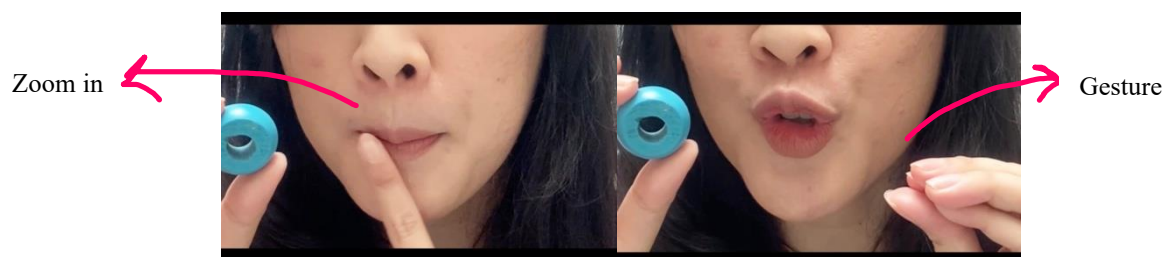


Figure 2. Video Screenshots



Figure 3. Video Screenshots

This video uses only a few colors and red as the main color. The graphics used are simple so that children can focus on the main message, namely how to speak. The speaker here also speaks slowly and clearly and also do a repeat. Zoom in is aimed at the part of the speaker's lips so that the child can follow the movement of the lips, equipped with gestures to clarify how to speak. The duration of this video is according to the concentration level of children aged 1-4 years, which is 6 minutes.

Conclusion

The conclusions of this study are divided into 2 parts, the visual concept that should underlie the design of learning-to-speak videos for children and whether internet videos can really help children's speech development. These two things will be explained in point to make them easier to understand.

- i. This video should be 4-6 minutes long according to the duration of the focus of children aged 1-4 years. The colours used are bright colours, and red as the main colour because red is stimulating. Zooming in on the lips is highly recommended to draw the child's focus to the movement of the lips. Speak slowly, clearly and repeatedly so that the child remembers and can follow. Use body gestures that invite to create interaction. Complete with text for accompanying guidance when children watch.

- ii. The effectiveness of this video still needs to be further investigated on respondents with children aged 1-4 years with speech delays. The results of each child will be different because according to child psychologists, the causes of speech delay in children are different. Researchers hope that this video can help develop children's speech and can be a source of information for parents about how to stimulate children's speech development.

Acknowledgement

Thank you to the child development clinic in South Tangerang, Mutiara Edu Sensory for agreeing to become a partner in this research. Thank you Mrs. Amanda A. Kinasih, M. Psi., for taken her time for an interview. The researchers also thank UPJ and ASEDAS for providing the opportunity for this research to be presented at international conferences.

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SUICIDE INTENT: REGAINING ATTENTION OR RECLAIMING DECISION

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Abstract

Posit the various variables in one structured model may claim a better vision of suicide intent, especially in psychological model theory or behavior theory. The suicide intent research became the main clarification, of how human processing thought claims their intention either to gain the attention or being portrayed as a decision to release the satisfaction. Hence purpose of this study is to explore and support the model fit in explaining the possible way of suicide intent perceptions regarding two derived variables. This study will adopt the theory of planned behavior as the basis. This pilot test future findings will involve partial least square structural equation modeling (PLS-SEM) to analyze future data. Through this concept paper, these two attended issues (attention and decision) of suicide intent will discuss a significant literature finding on suicide intent behavior. Implications in the context of suicide behavior and recommendations to increase the attention on this suicide intent area are discussed more through Mapping using Bibliometric Analysis in the next working paper. Through the feasibility study from the same niche of research in a previous paper published on Widad FAROKAM & Widad Psychetra Door in the context of Malaysian users, this concept paper expected to execute one of the comprehensive structured model determinants in decreasing the suicide intent through users' trait and digitalize.

Keywords: theory of planned behavior, suicide intent, behavior, psychology

Introduction

A study from the same niche of research in a previous paper published on Widad FAROKAM expected to execute the initiation idea of a structured model in decreasing the suicide intent through users' nature factors either gaining the attention or just merely a declaration of decision. This study is motivated by the urge to understand the role of attention-seeking among suicide intenders. The attention possesses differences based on the bonding through parents, peers, or lovers. The attention needed will be declared on how the suicide intent probability occurs. Widad FAROKAM algorithms exercise the user experience that people feel when they follow the flow of activities given through virtual instruction. This kind of attention expects users' psychological phase where one experiences attention enjoyment during the completion of a task with the partners. The recommended tools as PICO 4 will direct the virtual activities smoothly (Pelet et al 2017).

The attention level also will be inclined by being fully absorbed in such virtual activities. Hence suicide intenders will lose their self-consciousness by full concentration. In this state, one affective response to this Widad FAROKAM system characterized by the interaction bonded by the involvement of partners in such activity is deepened without having to make much effort. This enjoyable experience allows an individual to exercise a sense of control over their intended action (Coppersmith et al., 2023). The completion task will pose as a two-way communication which serves as attention directed and leads to a pleasant experience for users. This interaction would provide a flow experience which can lead to a reclaiming decision (Bloch-Elkouby et al., 2023).

The decision perceived ease of use from this Widad FAROKAM will lead to reclaimed the intended suicide among users and will lead the declined numbers of suicide intent reported in the future. AI era in this century became the main diffuser for the virtual reality tools like PICO 4 and the target market for this Widad FAROKM would have no problem to reach the younger suicide intent especially for young adolescent in society (Saharuddin, 2020; Soh et al., 2018). The society of today is increasingly connected and digitalized, with algorithms and computers facilitating daily. Additionally, ICTs have improved access to information and knowledge in terms of scale, scope,

and speed (Herzog et al., 2023; Pelet et al., 2017).

People today seek out direct connections, demand greater social contacts, and expect rapid responses. People access to information as they form their traits in the light of flexible communities (Anastasiadis et al., 2018). Psychologists believe that a trait is influenced by biological factors, which explain PEN model of personality based on three universal traits (Extroversion vs. Introversion), (Neurotism vs. Emotional Stability) and (Psychotism vs. Socialization). Suicide intent mostly covers introvert and extrovert. An extravert is commonly described as an outgoing expressive person, yet based on PEN model its description is more complex. Sociability, impulsivity, frivolity, general activity, and overt sexuality are all components of extraversion. Some of the differences in personality theory may be caused by the complexity of each higher-order factor (Ibrahim et al., 2021; Harun 2018). The intention to suicide may result from others through certain traits observed and being learned. Before taking any actions to regulate or induce the suicide intent it is important to discuss scientifically what factors drive respondents to be aware of their signs of suicidal behavior.

This study, classified as a pilot study, aims to investigate whether a deficit variable, such as attention, may cause users of Widad FAROKAM, who are within the target group, to reconsider their choices. The theory of planned behavior model (TPB) has been selected as the basic theoretical model in the current research. TPB, introduced by Ajzen in 1991, is an impactful theory to explain an individual's behavior (Ajzen, 1991; Wang et al., 2016; Yadav and Pathak, 2016). Given the specific research context and background, other variables have been integrated within the TPB to better explain individual behavior in our previous paper published in the Journal of Science and Management Research by Widad Education Research Centre. The findings from previous research show people's concern about suicide behavior factors such as traits and other three determinants (which were discussed in another working publication) have been considered and added into TPB to develop a comprehensive theoretical model to understand people's suicide behavior.

Literature review

Theory of planned behavior (TPB)

TPB theory emphasized three main determinants in arguing the intention and future behavior of human. These certain determinants exhibit their measurable and perceived characteristics which are attitudes, subjective norms (SN) and perceived behavioral control (PBC) (Ajzen, 1985; Ajzen & Driver, 1991, 1992). Suiciding is a behavior which correspond to the inner thought, conflict and occupying area knowledge as maximizes as people can. Internal factor and external factor which represents the perceived behavioral control (PBC), attitude and social norm (SN) in TPB shown the intention connecting the possible factors that will lead to suiciding behavior (Rustagi et al., 2023; Ismail et al., 2022; Ibrahim et al., 2021). This study aims to expand the idea of proofing the selective factors which possibility decreasing the behavior of suiciding.

Many studies had been done in psychological field and TPB is considered as one of the most robust in explaining the intention of individual behavior. In the current research context, peoples with positive attitudes towards suicide, perceive those friends and relative around them expect them to decrease the behavior A higher subjective norm may indicate a higher likelihood of engaging in such activity. Perceived behavioral control refers to "the controllability of conducting a certain behavior"(Apipuchayakul & Vassanadumrongdee, 2020; Nuwan Gunarathne et al., 2020). This study is motivated by the urge to understand the role of attention seeking among suicide intenders. The attention deficit variable added to this TPB model in order to understanding more about suicide intent behavior. The following figure 1 present the research model adapted in this study.

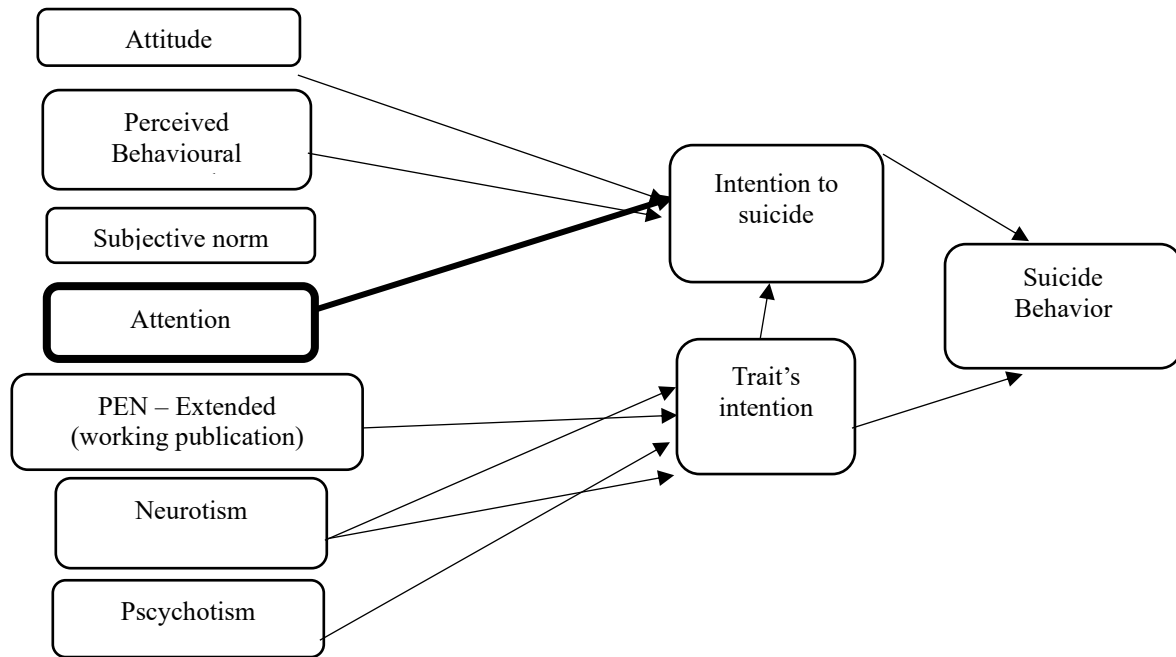


Figure 1. Research model

Methodology

Population in this future study will be considered as users' intention towards the virtual system of Widad FAROKAM decision. This suicide intent research basically will go through the sample of users who is willing to complete the task given through Widad FAROKAM and recap their perception after completing the task given through the virtual reality system. Its digitalized and the sample will be collected through quota sampling technique. The sample was divided into five clusters in Malaysia which are northern, east coast, central, southern, and east Malaysia. The sample will be selected in each of five clusters about 20% and among users' ranging from 10 to 50 years old. The researchers will circulate the questionnaire based on the quota. The measurement scales of this study were adapted from various validated items in prior studies (Stoll et al., 2020; Soh et al., 2018). All items in this study were rated on a seven-point Likert scale ranging from "strongly disagree" to "strongly agree."

Future Data Analysis

The data analysis will be based on the two stage PLS-SEM using SmartPLS 3. The first stage evaluates the measurement model by investigating the reliability and discriminant validity of constructs. The second level is to assess the structural model by testing the proposed hypotheses through variables' path coefficient and statistical significance. The PLS-SEM approach is really useful to employ in this study as its ability to work with complex models with many indicator variables and exogenous and endogenous constructs, non-normal data distributions (Hair et al., 2014). Besides, the PLS -SEM can assist the researcher who conducts exploratory research in developing theory, with its ability in estimating the model that commonly displays a high degree of statistical power compared to the CB-SEM method (Hair et al., 2011; Henseler et al., 2015; Law & Fong, 2020). Thus, PLS-SEM can determine the most successful variable in understanding user suicide intent in this study. The measurement model is the first stage of using the PLS-SEM that specifies the construct's internal consistency reliability, convergent validity, and discriminant validity. The reliability of the constructs will be measured through Cronbach's alpha and composite reliability. A considerable threshold for the reliability should be more than 0.60 for exploratory research (Hair et al., 2019).

This study will be used the bootstrapping method (5000 resample) to test the model with different research hypotheses. To assess the structural model, the path coefficient of exogenous to endogenous variables, the t-values, and squared multiple correlation (R^2) values of explained variance on the endogenous variable were evaluated. The path coefficient value is ranging from -1 to +1, which path coefficient estimated close to +1 shows a strong positive relationship while -1 shows strong negative relationship with annotation of path coefficients (β).

Conclusion

This study determined the factors that influence users' suicide intention. According to the previous findings. This research has a wide range of explanations on how certain factors can accommodate the intention to suicide among

Malaysians especially on attention deficit variable. In daily life communication in the same community may contribute to the intention. Thus, the mutual aspect to be considered is being introduced the advantages of Widad FAROKAM virtual reality system through tools like PICO 4. The best approach to attract users is by intervening in their basic psychological needs (as shown in the Maslow hierarchy). In conclusion, this study future findings are identified among the crucial determinants of suicide behavior.

Acknowledgement

Author(s) would like to emphasize this concept paper under Project secure SB003/Bachelor of Psychology/H311-05/04(2023FAKM)_Ibrahim, M. F., (2023) Re aft; file WUC/ESB003/2023(6)/H314-08

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A STUDY OF STUDENTS' PERCEPTION TOWARDS INTERACTIVE BROCHURE FOLD (IBFOLD) AS A TEACHING AID IN DIGITAL PUBLISHING COURSE

PERSEPSI PELAJAR TERHADAP INTERAKTIF LIPATAN BROSUR (IBFOLD) SEBAGAI BAHAN BANTU MENGAJAR DALAM KURSUS PENERBITAN DIGITAL)

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Abstract

The use of technology in education has become a major driving force in transforming higher education towards the digital era. eLearning is one of the creative practical teaching and learning approaches using technology that positively impacts student cognitive development and achievement. Due to the lack of student engagement and understanding of the brochure fold, this study aims to investigate students' perception of learning using the interactive brochure fold (iBFOLD) as an innovative teaching aid. This to helps increase students' concentration, interest, and knowledge in Digital Publishing courses. This is a quantitative research using five likert-scale questionnaires instrument. The survey was done with 30 students of Graphic Design Program in Politeknik Ibrahim Sultan who were selected through purposive sampling technique. Data was collected and analyzed using descriptive analysis. In conclusion, iBFOLD is an effective teaching learning aid for brochure folding in Digital Publishing courses while diversifying the teaching method.

Keywords: Students Perception, e-Learning, Teaching Aid, Brochure Fold

Abstrak

Penggunaan teknologi dalam pendidikan telah menjadi penggerak utama dalam mentransformasi pendidikan tinggi ke arah era pembelajaran digital yang lebih efektif. e-Pembelajaran adalah salah satu pendekatan pengajaran dan pembelajaran secara praktikal kreatif yang menggunakan teknologi di mana memberi kesan positif kepada perkembangan kognitif dan pencapaian pembelajaran pelajar. Oleh kerana kurangnya penglibatan dan pemahaman pelajar terhadap lipatan brosur, kajian ini bertujuan untuk mengkaji persepsi pelajar terhadap penggunaan Interactive Brochure Fold (Ibfold) sebagai bahan bantu mengajar berbentuk interaktif. Ianya digunakan untuk membantu meningkatkan konsentrasi, minat dan pengetahuan pelajar dalam kursus Penerbitan Digital. Kajian ini berbentuk kuantitatif menggunakan instrumen soal selidik skala likert lima mata. Kajian melibatkan 30 orang pelajar program Diploma Rekabentuk Grafik di Politeknik Ibrahim Sultan yang dipilih secara teknik persampelan bertujuan. Data dikumpul dan dianalisis menggunakan analisis deskriptif. Kesimpulannya, iBFOLD merupakan alat bantu mengajar yang berkesan untuk meningkatkan pengetahuan jenis-jenis lipatan brosur dalam kursus Penerbitan Digital dengan menggunakan kaedah pengajaran secara interaktif.

Kata kunci: Persepsi Pelajar, e-Pembelajaran, Bahan Bantu Mengajar, Lipatan Brosur

Introduction

E-Learning is a creative teaching and learning approach using emerging technologies, has been shown to have a positive impact on student cognitive development and performance (Yun Li et al., 2022) [1]. It not only fosters and stimulates students' creativity and receptiveness to information during the teaching and learning process but also address the primary goal of capturing students' attention on openness on receiving information and enhancing their knowledge. This is particularly crucial as classroom challenges arise due to the students' limited engagement and understanding of brochure folding, which can impede their assignment completion. This is because, there are problems in class where students show lack of engagement and understanding of brochure fold making it difficult for students to complete assignments. So, Ismail et al, (2019) highlighted the effectiveness of digital teaching aids used to explain complex lessons and attracting students' attention in class [2]. Moreover, the significance of teaching aids able to resolve issues on existing problems during the teaching and learning process.

Then, Interactive Brochure Fold (iBFOLD) were integrated into the Learning Management System as a comprehensive teaching aid that aligns with the 21st century approach. This concept is parallel with 4K1N educational act

ivities that emphasizing communication, collaboration, creativity, critical thinking, and the development of personality values (Sinar Harian, 2018) [3]. According to Krismadinata et al, (2018) [4], the use of technology as a teaching aids is essential in contemporary independent learning process, nowadays. Therefore, iBFOLD empowers students to engage independently as self-directed learning without the help of lecturers. Consequently, the 21st century education landscape demands students who are smart, active, and competent to deal with problems not only intelligently, but systematically, innovatively, and creatively. Moreover, e-Learning as a teaching aid has proven to be impactful, engaging, attractive and easy to understand in the learning process (Suppiah Nachiappan, 2017) [5].

So, iBFOLD learning contents were focus on the brochure folding topic that plays a pivotal role in attaining Course Learning Outcome 2 (CLO2) in the Digital Publishing course offered as part of the Graphic Design Diploma program at Politeknik Ibrahim Sultan. The topic is taught within 3-hour synchronous class session, requiring students to simultaneously recall and master the nine distinct folding style theory. Proficiency in brochure folding is imperative with 20% of the course assignments. However, learning challenges arise due to the time constraints during teaching and learning sessions, which make it difficult for students to comprehend all nine folding techniques. Student easily get confuse and not actively engage in class. When it involves with time constraints, unintentionally it elevates stress levels and impede students' creative potential (Miraka & Tritsaroli, 2019). [6]

Although the study on e-Learning as a teaching aid has demonstrated to be practical and effective, several issues related to the use of teaching aids have been identified. Self-directed learning often referred as SDL, is a critical component of modern education especially linked with e-Learning methodologies. A key advantage of Self-Directed Learning as highlighted by LaTour and Noel in 2021 [7], is that it grants students the autonomy to decide when and how frequently that access their learning materials. Furthermore, LMS or Learning Management System, has become the primary online technology that significantly influences the patterns of learning and teaching in higher education institutions (Gill et al, 2020) [8]. So, in order to develop the most effective digital teaching aid for students, it is essential to investigate students' perceptions of interactive learning and brochure folding contents when using iBFOLD that implement SDL and by using LMS as a learning platform.

Materials and Methods

Methodology

The research methodology employed in this study is a quantitative. The study comprises population of this study are 30 second-semester Graphic Design students who are enrolled in the Digital Publishing course at Politeknik Ibrahim Sultan. Samples were selected using purposive sampling technique. The purposive sampling method is used because it helps researchers to understand the actual problem. The research design adopted is a quasi-experimental approach, specifically a one-group post-test-only, which concentrates on a single group of participants and involves a single assessment conducted after the implementation of the iBFOLD intervention at week six to nine of the semester. Unlike designs with multiple treatment or intervention groups, this particular design examines the effect only after the intervention. Since there is no pre-test or control group in this design, researchers rely on data after the intervention, without a comparison group or pre-intervention measurements. Statistical techniques are often employed to analyse the data and control for potential confounding variables.

Research Procedure

This study involves four phases of the research procedure: analysis, design and development, implementation, and assessment. The first phase comprises an analysis process which involves problems identified in classroom. The second phase encompasses the design and development process that includes the design on research instruments and the development of Interactive Brochure Fold (iBFOLD). The development process of iBFOLD involves the planning of e-Learning hierarchy, interface design using Adobe Illustrator, identified learning content of brochure folding and final composition using iSpring. The scorm file were embedded in the LMS for learning purposes. However, it is important to mention that the Learning Management System used is an existing system called CIDOS and does not involve the development of a new one.

Next, the third phase is the implementation of the study which is conducted both synchronous and asynchronous self-directed learning for a duration of four weeks for Digital Publishing students. The implementation procedure is in Table 1 below.

Table 1. The implementation procedure

Week Of Semester	Description
6	Brochure folding theory Practical in class Self-learning for revision
7	Practical in class Self-learning for revision
8	Practical in class Self-learning for revision
9	Practical in class Self-learning for revision Self-check Distribute post-test questionnaire

Based in the Table 1, post-test questionnaire was distributed at week ninth of the academic semester consisting of perception items. During the intervention at week six of semester, 30 students were provided access to iBFOLD, an interactive learning tool as teaching aid through the Learning Management System (LMS) during teaching and learning session in class. This allowed them to engage with iBFOLD as part of digital e-learning experience. While the lecturer conducted their teaching, students also were encouraged to use iBFOLD to enhance their understanding of the brochure folding topics. Furthermore, after the classroom sessions, the participants were given the opportunity for self-directed learning for four weeks as short-term study interval by following the Study Learning Time (SLT) in Digital Publishing course. They could use iBFOLD as a resource to independently study and prepare assignments, offering them a flexible and personalized approach to their learning process.

Lastly, fourth phase is the assessment phase of this study. It involves the data analysis process to study the research objectives. The online questionnaire was distributed at week nine of the semester and the data will be analysed using Statistical Package for Social Science (SPSS). The study aimed to assess how the use of iBFOLD in both synchronous and asynchronous self-directed learning settings would impact the students' perceptions.

Research Instrument

The research instrument used in this study is a survey, conducted through of five Likert-scale questionnaires. The questionnaire regarding students' perception was adapted from previous research conducted by Che Ibrahim et al, (2021) [9]. This questionnaire consists of two main sections, labelled as Section A and Section B. Section A primarily focuses on collecting respondents' demography information. While, Section B comprises ten items questions that focus on students' perception regarding the effectiveness of e-Learning using iBFOLD as a teaching and learning aid within the context of 21st century learning. The questionnaire was distributed to 30 semester two students in Graphic Design program who were enrolled in the Digital Publishing course at week nine of the semester, utilizing Google Forms. A total of 30 questionnaires were completed, returned, and subsequently analysed for the study. Then, respondent's data was analyzed using SPSS to find the frequency and level of the perceptions.

Items in the instruments measured by using scale (1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly Agree. Interpretation mean score was based on Bahaman and Turiman (1993) [7] as in table 2 below.

Table 2. Mean Score Interpretation Scale

Low	Medium	High
1 – 2.33	2.34 – 3.66	3.67 - 5

iBFOLD as e-Learning Teaching Aid

Figure 1 shows the interface and function of iBFOLD. This e-Learning used as a digital teaching aid during synchronous class and asynchronous as self-directed learning.

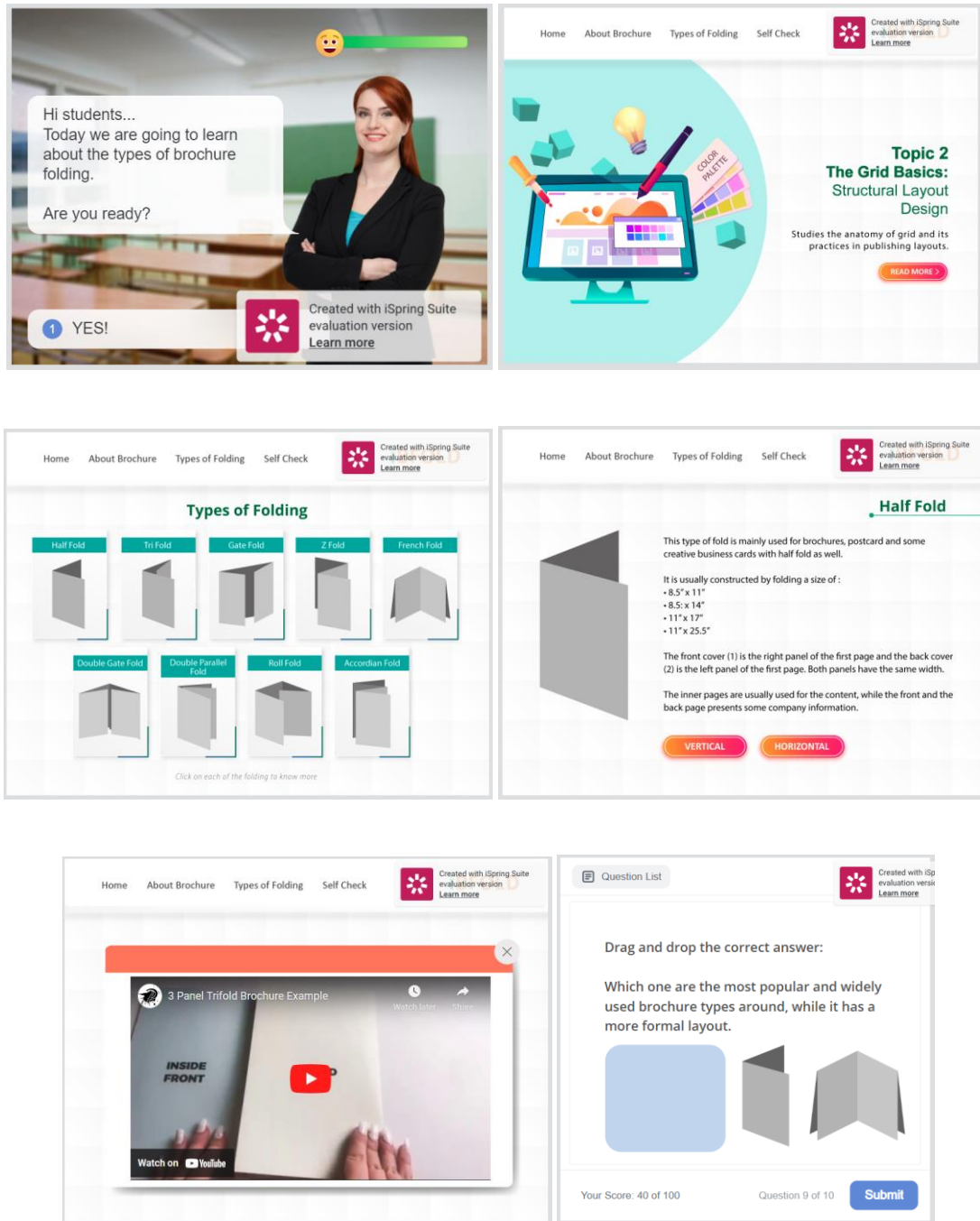


Figure 1. Interface and function of iBFOLD

The learning process commences with an introductory dialogue between students and the virtual teacher, serving as an initial knowledge assessment before delving into the course content. On the homepage, students can access information related to brochures, various folding techniques, topic details, and Course Learning Outcome (CLO) information. Additionally, a self-check section is provided. To master the technique of brochure folding and its function, students are required to complete the learning. Lastly, students must complete ten self-check questions, aims to gauging their comprehension of the topic. Figure 2 below shows the interactive flowchart of iBFOLD content structure.

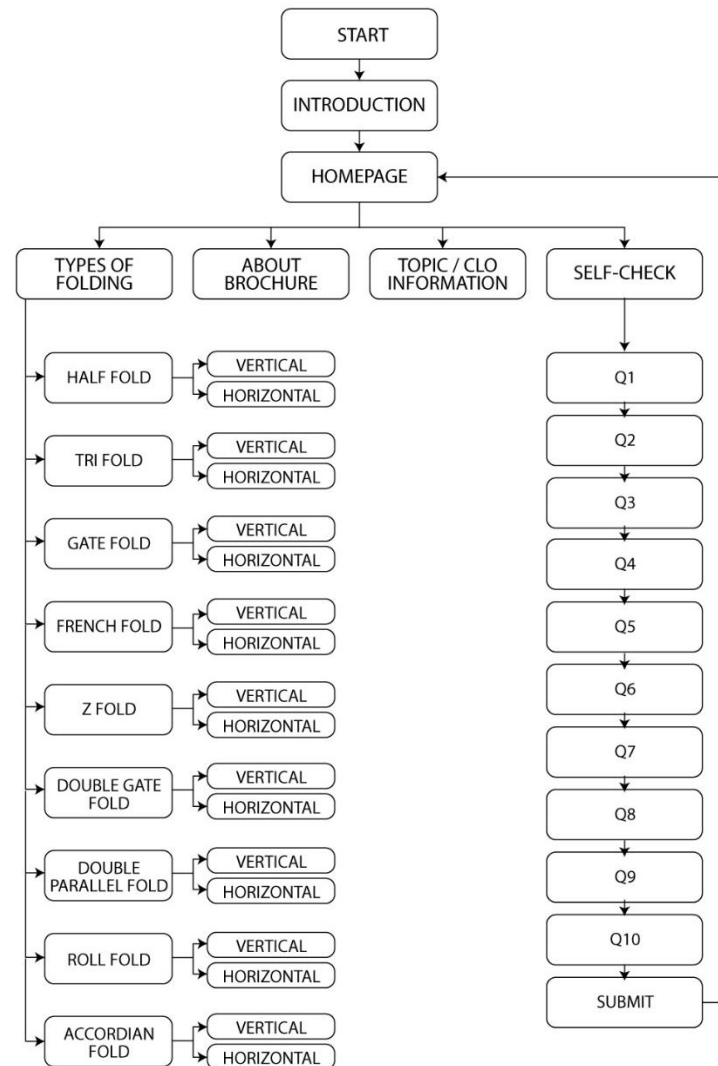


Figure 2. The Interactive Flowchart of iBFOLD Content Structure

Result and Discussion

Based on the questionnaire, there are two sections to be analysed. Section A consist of three demographic items and section B consist of 10 perception items towards iBFOLD as a teaching aid in the Digital Publishing course. 30 respondents were answering the online questionnaire given by the researcher. Below are the findings of the analysis:

The Study of Demographic

Based the total 30 respondents, there were 30% male students and 70% female students involved in the study. A detailed distribution of respondent gender is as shown in Table 3 below:

Table 3. Gender		
Gender	Frequency (f)	Percent (%)
Male	9	30
Female	21	70
Total	30	100

Based on the age of the respondents, the study includes students in the age range of 18 to 24 years old, constituting 100% of the students involved in the study. A detailed distribution by age group is as shown in Table 4 below:

Table 4. Age

Age	Frequency (f)	Percent (%)
18 to 24 years old	30	100
25 to 30 years old	0	0
Total	30	100

Based on the race study, the data reveals that 90% of the respondents were Malay, 7% were Indian, and 3% belonged to other races. A detailed distribution by race group is as shown in Table 5 below:

Table 5. Race

Race	Frequency (f)	Percent (%)
Malay	27	90
Chinese	0	0
Indian	2	7
Others	1	3
Total	30	100

The Study of Perception

There are two issues that was stated in the questionnaire which is respondent interest and level of understanding while learning using iBFOLD. Both elements are related to the respondent's perception towards the effectiveness of using iBFOLD in class.

Table 6 below shows the frequency of students' perception towards the effectiveness of interactive learning using iBFOLD as teaching aid in the class. Overall, students' perception shows high interest and understanding of brochure folding which is between $M=4.63$ to 3.77 . The highest mean score is for "I pay more attention when lecturers use iBFOLD interactive learning as teaching aid in the class" item. While the lowest mean score is "I am able to re-explain the learning, topic based on the use of iBFOLD used by the lecturer" item.

Table 6. Students perception towards interactive learning using iBFOLD as teaching aid

Items	F (%)					Mean Score	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree		
1. I pay more attention when lecturers use iBFOLD interactive learning as teaching aid in the class	0	0	0	11 (36.7%)	19 (63.3%)	4.63	High
2. I don't get bored when lecturers use iBFOLD interactive learning materials in the class.	0	0	0	12 (40%)	18 (60%)	4.60	High
3. I don't feel sleepy when lecturers use iBFOLD interactive learning materials in the class.	0	0	6 (20%)	9 (30%)	15 (50%)	4.30	High
4. The use of iBFOLD interactive learning materials increased my interest in the class.	0	0	0	18 (60%)	12 (40%)	4.40	High
5. I am more interested in learning the Digital Publishing course when using iBFOLD's interactive learning materials.	0	0	0	17 (56.7%)	13 (43.3%)	4.43	High
6. I am able to re-explain the learning topic based on the use of iBFOLD used by the lecturer.	0	0	12 (40%)	13 (43.3%)	5 (16.7%)	3.77	High
7. The understanding gained as a result of learning using interactive learning allows me to easily do	0	0	3 (10%)	18 (60%)	9 (30%)	4.20	High

	activities and answer the exercises given.							
8.	I better understand the type and function of brochure design when lecturers use iBFOLD as learning material.	0	0	0	16 (53.3%)	14 (46.7%)	4.47	High
9.	It is easier for me to understand how to fold brochures based on interactive learning than descriptive explanations or based on text descriptions alone.	0	0	2 (6.7%)	15 (50%)	13 (43.3%)	4.37	High
10.	It is easier for me to master and practice the topics in iBFOLD learned in the class.	0	0	5 (16.7%)	12 (40%)	13 (43.3%)	4.27	High

Table 6 above shows the attention given when lecturer use iBFOLD as interactive teaching aid is high. This is because, 63.3% strongly agreed with the statement, followed by 36.7% agreed with the statement. In terms of the boredom when lecturer use iBFOLD in class shows 60% agreed with the statement “I don't get bored when lecturers use iBFOLD interactive learning materials in the class”. While 40% agreed with the statement. Next, 50% students strongly agree and 30% agree with the statement they do not feel sleepy in the class. Thus, there are 6 students (20%) who feel neutral with the statement. This clearly shows that 80% students strongly agree and agree that they do not feel sleepy when lecturers use iBFOLD interactive learning materials in the class. Regarding the use of iBFOLD can increased students' interest in the class, it shows that 40% students strongly agree that using iBFOLD can increased their interest in the class. 60% students also agreed with the statement. When students' interests are high in learning iBFOLD, automatically, they also interested in learning Digital Publishing course. This statement shows 43.3% students strongly agree and 56.7% students agreed with the statement. After the class, 60% students strongly agree and agree that they are able to re-explain the learning topic when using iBFOLD.

Thus, there are 40% students neutral with the statement. In term of the students' understanding, it shows that 60% students strongly agree that their understanding is increased after using iBFOLD and allowing them to easily complete the activities and exercises. 60% students agree with the statement, while only 10% students feel neutral. The statement of “I better understand the type and function of brochure design when lecturers use iBFOLD as learning material” show 46.7% strongly agree and 53.3% agree. Brochure design in mostly related to brochure fold. 93.3% students strongly agree and agreed that they easy to understand how to 9 types of brochure folding using interactive learning than descriptive or text explanations. The brochures folding is presented in video format in iBFOLD for easy understanding. Only two (6.7%) students were neutral with the statement. So, after students experienced using iBFOLD, 43.3% strongly agree and 40% agree that learn using iBFOLD make them easy to master and practice the brochure folding topics in class. There are 16.7% students feel neutral with the statement.

Conclusion

This research shows that students have high interest and understanding of brochure folding topics when using iBFOLD as teaching aid. Graphic Design students were enrolled in Digital Publishing courses in semester 3 during their Diploma program. Other than synchronous class, students also use Learning Management System (LMS) for self-directed learning. The iBFOLD also allow students to recap and complete the exercises outside classroom by using LMS as a learning platform. LMS is a web-based system that allow interaction between lecturer and students thru synchronous and asynchronous learning (Grace Onodipe et al, 2020) [10]. Then, interactive learning method were used in developed iBFOLD as teaching aid. Using this method in teaching and learning were factors that attract students to study this course with interest. It's given flexibility learning to students when used technology as teaching aid in class. Lecturers can conduct synchronous class by fully utilise interactive learning contents in LMS (Robiatul A'dawiah Jamaluddin et al., 2023) [11]. Interactive learning can enhance learning environment and convey knowledge effectively. Other than that, the study of Abdurrahman (2020) [12] clearly shows that the use of digital interactive learning also can promote active learning, increase student's attention and motivation in class. Thus, the mean score for student's perception in using iFOLD were high. It is proven that students from this survey have proven that the use of iBFOLD as teaching aid in class were efficient, effective and student-friendly has attracted students to study the brochure folding in Digital Publishing course.

Summary, it shows that students' perceptions on interactive learning interest and level of understanding to the learning contents when using iBFOLD is high. It is important because brochure folding is one of the crucial topics that students need to master before complete the course assignment. Where else, future research should be done

on digital interactive learning with widen respondents in Malaysia to know the effectiveness and competent of this teaching aid.

Acknowledgement

Thank you to all students who involves in this research and the Digital Publishing course coordinator.

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A MATH-ART SYMPHONY: COMBINING MATH AND ART FOR ENRICHED LEARNING AND EXPLORATION

SIMFONI MATEMATIKA-SENI: MENGGABUNGKAN MATEMATIKA DAN SENI UNTUK PEMBELAJARAN DAN EKSPLORASI YANG DIPERKAYA

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Abstract

Most students now regard mathematics as a challenging subject. This is supported by studies revealing a lower level of student interest in mathematics when compared to other courses. Mathematics is usually seen as a terrifying subject. Furthermore, student participation in mathematics is generally minimal. One of the reasons behind this is because mathematical topics are typically presented abstractly, making it difficult for students to grasp them. One approach that might be employed is to incorporate visual art with the learning of mathematics. This paper will address the influence of visual arts in increasing students' interest in mathematics. Several research have shown that incorporating visual art into mathematics learning has a good influence. One of the results shows that integrating art as a learning-teaching approach contributes to motivation, stimulates positive feelings and increases curiosity. Another result also shows that engaging in art is positively correlated with achievements in mathematical tasks. There are also results that shown active engagement in creating original artwork contribute to achievement even more than the more passive selection and analysis of existing artwork.

Keywords: mathematics learning, visual art, learning methods

Abstrak

Integrasi matematika dan seni memiliki potensi untuk memberikan perubahan dalam pembelajaran dan eksplorasi. Artikel ini membahas hubungan simbiosis antara matematika dan seni, khususnya seni rupa. Lebih lagi, hal yang disoroti adalah manfaat seni rupa dalam meningkatkan ketertarikan siswa dalam pembelajaran matematika. Dengan memvisualisasikan konsep matematika melalui senirupa, siswa dapat mengembangkan pemahaman yang lebih dalam tentang prinsip matematika dan meningkatkan kemampuan kognitif mereka. Artikel ini menggali berbagai cara matematika dan seni rupa diintegrasikan, termasuk representasi visual, seni algoritmik, dan penggunaan simetri dan pola. Selain itu, ini mengeksplorasi dampak integrasi matematika-seni pada keterampilan berpikir kritis siswa, kemampuan memecahkan masalah, dan apresiasi estetika. Hasil penelitian ini menekankan pentingnya menggabungkan matematika-seni dalam kurikulum pendidikan untuk mendorong pembelajaran yang diperkaya dan mendorong eksplorasi siswa.

Kata kunci: pembelajaran matematika, seni rupa, metode pembelajaran

Introduction

The traditional method of teaching mathematics focuses primarily on procedural comprehension and algorithm mastery. This strategy frequently fails to capture the attention and interest of students. This results in minimal student involvement or activity in class and a lack of interest in certain areas. Based on these phenomena, educators and scholar have been seeking approaches to making mathematics more comprehensible and relevant to students' lives (Benson-O'connor et al., 2019; Hirsch et al., 2018; Stein et al., 2008; Thanheiser & Sugimoto, 2020) . Students' lack of enthusiasm and activity in mathematics sessions has become a serious difficulty in modern teaching. Many students consider mathematics to be unimportant in their daily lives, which leads to a lack of enthusiasm to study mathematics ((Aguilar, 2021; Goodykoontz, 2008; Ukobizaba et al., 2021)). Furthermore, the perceived difficulty and abstract nature of mathematics can contribute to a negative mindset in which children

believe they are "not good at math" and may develop math anxiety. These factors contribute to low student interest, which diminishes students' motivation to investigate and persevere in their mathematical study.

Many studies have been conducted in order to find the best way to increase students' interest in learning mathematics. (Nurhayani et al., 2020), Said that Therefore it can be concluded that the Guided Discovery learning model can be applied to optimize students' interest in mathematics learning especially by paying attention to the results of reflections from their study. (Nwaocha Vivian Ogochukwu, 2010) focusing the fact that alarming statistics in mathematics education in Nigeria indicated that very few or almost none of the students in high school fancy taking up a course in mathematics in the University. Although educators have made some efforts towards improving these trends, students' disinterest in continuing mathematics study beyond secondary school level is still a tremendous problem. The result is multimedia presentations can improve students' understanding, enthusiasm, class attendance and satisfaction. (Vergara et al., 2019), the Concrete-Pictorial-Abstract approach can be used as an alternative to improve students' mathematics interest. (Abu & Kribushi, 2022), he technological tool positively affected two important motivational constructs that influence general motivation for mathematics studies. (Vergara et al., 2019), he proposed methodology enhanced the students' motivation and was helpful for developing mathematical content in a more pleasant way than in a conventional class based on a master class and problem-solving class. (Attard & Holmes, 2020).

The goal of this study is to shine light on the relevance of incorporating visual arts into mathematics teaching in order to alleviate student disinterest and disengagement. Visual arts offer a unique opportunity to bridge the gap between abstract mathematical principles and actual, tangible representations that pupils can relate to. Educators can tap into students' creativity and imagination by introducing visual arts into mathematics instruction, making mathematics more approachable, relatable, and fun. Visual arts integration can assist students in visualizing mathematical topics, exploring multiple representations, and engaging in hands-on activities that encourage deeper comprehension.

The purpose of this research is to investigate the possible benefits of incorporating visual arts into mathematics instruction, such as greater student motivation, improved conceptual comprehension, and problem-solving skills. It will also go through numerous tactics and approaches that educators can use to effectively integrate visual arts into their maths curriculum. This article aims to motivate educators, curriculum designers, and policymakers to understand the transformative potential of visual arts in enhancing student engagement and accomplishment in mathematics by highlighting effective approaches and providing evidence-based insights. The ultimate goal is to foster students' curiosity, creativity, and mathematical literacy by creating a more engaging and inclusive mathematics learning environment.

Materials and Methods

This study used a qualitative research strategy that included a literature evaluation and analysis of current studies, as well as case studies and examples of visual arts integration in mathematics instruction. The goal was to collect evidence and insights into the role of visual arts in increasing student engagement in mathematics learning. The steps taken include the following:

1. Literature Review: To investigate existing research, theories, and best practices linked to the integration of visual arts in mathematics instruction, a comprehensive study of relevant literature was done. Scholarly articles and publications were gathered through databases, academic journals, and credible sources.
2. Selection Criteria: The studies and papers were chosen based on their topical relevance, study methodology quality, and contribution to the knowledge of the value of visual arts in boosting student engagement in mathematics learning. To assure up-to-date information, the emphasis was on recent publications (within the previous decade).
3. Data Collection: A systematic approach was used to acquire pertinent information from chosen papers and articles for data collecting. The impact of visual arts on student interest in mathematics learning was recognized and recorded as key themes and findings.
4. Case Studies and Exemplars: To provide practical examples and insights into the benefits and tactics of integration, case studies and exemplars of effective implementation of visual arts in mathematics instruction were investigated. These case studies were chosen for their instructional relevance, efficacy, and variety.
5. Analysis: The material acquired, including findings from the literature research and case studies, was examined qualitatively. To find recurring patterns, themes, and linkages in the data, thematic analysis was used. The study sought to provide a thorough understanding of the role of visual arts in increasing student engagement in mathematics instruction.
6. Ethical Considerations: During the research procedure, ethical considerations were taken into account. To respect the original writers and sources of information, proper reference and referencing were used. When referring to specific case studies or instances, confidentiality and data protection were respected.

7. Limitations: It is critical to recognize the study's limitations. Because the study was based on existing literature and case studies, the conclusions are limited to the extent of those sources. Furthermore, the findings may be limited to the contexts and demographics represented in the selected studies.
8. Replicability and Future Research: Detailed descriptions of the selected studies and sources were supplied to assure replicability and to encourage additional research. There were also suggestions for future research paths and areas for inquiry in the subject of visual arts integration in mathematics instruction.

Using the resources and methods described above, this study attempted to collect and analyze important information and evidence on the role of visual arts in boosting student engagement in mathematics learning. The research findings and insights add to the existing body of knowledge and serve as a foundation for future research in the discipline.

Result and Discussion

Theoretical Framework

The theoretical framework establishes a conceptual foundation for comprehending the significance of visual arts in increasing student engagement in mathematics learning. It is influenced by two major theoretical perspectives: constructivism and multiple intelligences.

1. Constructivism.

Constructivism is a popular educational paradigm that proposes that students actively construct knowledge and meaning via their experiences. Constructivism emphasizes the necessity of immersing students in hands-on, experiential learning activities in the context of mathematics education. Students can build problem-solving skills and establish their own knowledge of mathematical subjects by actively participating in the learning process. The constructivist approach complements the integration of visual arts. Students can explore mathematical topics in a creative and personal way by participating in artistic activities. They can use visual arts tools and techniques to depict, manipulate, and portray mathematical ideas, encouraging a greater knowledge of mathematical relationships and systems. Visual arts engage students in active learning by helping them to make connections between mathematical concepts and real-world contexts.

2. Multiple Intelligences:

Howard Gardner's idea of multiple intelligences proposes that people have distinct sorts of intelligences or cognitive talents. Gardner distinguished eight intelligences, one of which is visual-spatial intelligence. The ability to perceive, analyze, and produce visual images and patterns is referred to as visual-spatial intelligence. Visual arts integration engages students' visual-spatial intelligence while also allowing them to express and deepen their mathematical skills. Educators can adapt to the abilities of kids with visual-spatial intelligence by introducing visual arts activities into mathematics curriculum. This method encourages students to think visually, to produce visual representations of mathematical concepts, and to explore mathematical ideas using artistic mediums.

The combination of constructivism and multiple intelligences gives a strong theoretical framework for comprehending the significance of visual arts in increasing student engagement in mathematics study. Teachers may build a learning environment that promotes active participation, conceptual understanding, and the development of multiple intelligences by including visual arts. This method provides a comprehensive and inclusive approach to mathematics teaching, responding to students' different learning needs and preferences.

Art in Math

(Tramonti & Paneva-Marinova, 2019) raised issue that About 79% of students define mathematics as a big obstacle for their learning process. The difficulties often revealed are related to its being considered more abstract than the others. They described that actually, about 83% of students work using visual memory. This means that if we can imagine a history lesson as a film or a cartoon, it is quite impossible to do the same with a mathematics lesson. For instance, a lesson on inequalities or on functions hardly can activate the visual memory as a literature subject does. At most, it can stimulate the photographic memory which is only 7% of the visual one (Tramonti & Paneva-Marinova, 2019). One of the things they did in answering these problems was conveying the concept of symmetry through art. As an example, illustrated in the following figure.



Figure 1. Visualisation example of symmetry (Tramonti & Paneva-Marinova, 2019)

(Nutov, 2021) investigated the process of integrating visual arts into the mathematics curriculum, particularly focusing on pre-service teachers (PSTs). The study aimed to explore the potential benefits of incorporating art to illustrate mathematical concepts or principles and its impact on PST achievement in mathematical tasks. The formulated hypotheses were twofold:

1. Engagement in art illustrating mathematical concepts or principles would be positively linked to PST achievement in mathematical tasks.
2. Active creation of visual art would be associated with higher mathematical achievements compared to choosing and analyzing existing artwork.

These hypotheses were addressed by designing and conducting an online asynchronous course titled "When Mathematics Meets Art." This course was held at a teacher training college in northern Israel during the fall of 2017. While various creative activities fall under the term "art," the course specifically focused on visual art representations, such as pictures, collages, drawings, and photographs. The 14-week semester-long course was facilitated through the Moodle platform. The course's objectives were twofold:

1. to equip PSTs with an integrative learning experience to make mathematical content more accessible to a wider range of students;
2. to expose them to contemporary mathematical concepts like fractals to enhance their existing mathematical knowledge.

Six topics were delved into by the course: tessellations; zero and infinity concerning the area and perimeter of fractals (abbreviated as zero-infinity); spatial vision (in the context of impossible shapes); the golden ratio; dimension, encompassing fractal dimension; and self-similarity in Euclidean shapes and fractals. The selection of these topics adhered to three criteria: inclusion in the elementary school curriculum (zero, infinity, area, perimeter, spatial vision); concepts mentioned in the curriculum but not studied in depth (dimension and tessellations, particularly plane transformations); and concepts not covered in the curriculum but closely tied to both mathematics and art (the golden ratio, self-similarity, and fractals).

Table 1. Study on combining Art in Mathematics learning

Topics	Results	Authors
Mathematics Education, Western and Eastern Teaching Approaches Combined With Arts	Secondary school pupils were engaged and motivated in mathematics—a subject that is sometimes seen as boring and difficult to understand—by combining art and technology.	(Tramonti, 2021)
Two complementary ways of linking math and art	Formal mathematical arguments are unappealing until they are accompanied by an intuitive visualization model.	(Séquin, 2020)

Math And Art Convergence For Education	Formal mathematical arguments lack appeal unless they are supported by a clear visual aid.	(Tramonti et al., 2017)
Maths, art and technology: A combination for an effective study	European students often lack both mathematical and key basic competencies in science and technology.	(Tramonti & Paneva-Marinova, 2019b)
Mathematics and outdoor photography experience – exploration of an approach to mathematical education, based on the theory of Dewey’s aesthetics	Students' opinions of using photography to teach mathematics were positively impacted by its use in outside settings.	(Meier et al., 2018)
The effect of using visual graphics via interactive multimedia on learning of mathematics (Straight Line) at secondary school	The impact of interactive multimedia and visual graphics on secondary school mathematics instruction (Straight Line).	(Meier, 2021)
Visualization in teaching and learning mathematics in elementary, secondary and higher education	The educational program uses technologies like HTML, Java, and GeoGebra to teach contemporary visualization skills.	(Malešević et al., 2015)
Art-Integration through Making Dioramas of Women Mathematicians’ Lives Enhances Creativity and Motivation	Making dioramas representing the lives of women mathematicians is a creative and motivating way to integrate art. The studio-based, arts-integrated approach of this project encouraged creative output and the corresponding internal drive.	(Rule et al., 2016)

In addition to the research paper described above, there are also several books that discuss the use of art in learning mathematics (Gibson & Ewing, 2021; Kalajdzievski, 2021; Mitchell et al., 2018; Tsokos & Wooten, 2016). To see how much the attachment between Mathematics and Visual Art is, in this paper a number of studies are mapped which are used as references in the form of word mapping using the VOS Viewer as shown in Figure 2.



Figure 2. Mapping The Linkage of Research Title Words between Mathematics and Art using VOS Viewer.

Figure 2 shows that "math", "geometry", has a lot to do with "combination", "artwork", and "art perception". In addition, there is also research with the title "addition", "achievement" and "exploration". This shows that the combination of mathematics and visual art can increase student achievement and exploration in learning mathematics. Benefits of Integrating Visual Arts in Mathematics Education:

1. Increased Student Motivation and Engagement:

It has been demonstrated that incorporating visual arts into mathematics education improves student motivation and engagement. Visual representations, such as diagrams, graphs, and models, help students understand and relate to mathematical topics. Educators can tap into students' innate curiosity and creativity

by introducing visual arts, promoting a sense of enthusiasm and interest in mathematics study.

2. Enhanced Conceptual Understanding:

Students can study and comprehend abstract mathematical concepts through the use of visual arts, which provide a concrete and visible medium. Students can gain a better understanding of mathematical relationships, patterns, and structures by generating visual representations. Visualizations assist students in grasping difficult ideas, visualizing processes, and connecting disparate mathematical concepts.

3. Improved Problem-Solving Skills:

Visual arts integration fosters creative problem-solving and critical thinking abilities, both of which are required in mathematics. Students can use artistic activities to explore and solve mathematical issues in novel ways, increasing flexibility in thinking and mathematical reasoning. Visual arts allow pupils to look at problems from many angles, to think outside the box, and to come up with original solutions.

4. Increased Spatial and Geometric Reasoning:

Integration of visual arts improves pupils' spatial and geometric reasoning abilities. Spatial visualization abilities are developed by creating and interpreting visual representations such as geometric shapes, patterns, and spatial configurations. These abilities are essential in geometry and other areas of mathematics where spatial relationships and transformations must be understood.

5. Encouragement of Creative Expression:

Visual arts integration provides a platform for students to express their creativity and unique perspectives. By incorporating artistic elements into mathematics learning, educators create an environment that values creative expression. This encourages students to explore and communicate their mathematical ideas through visual means, fostering a deeper sense of ownership and personal connection to the subject.

6. Bridging the Gap Between Mathematics and the Arts:

Integrating visual arts in mathematics education bridges the gap between traditionally perceived separate disciplines. It highlights the inherent connections and overlaps between mathematics and the arts, promoting interdisciplinary learning. This integration encourages students to see the beauty, creativity, and aesthetic aspects of mathematics, breaking down barriers and fostering a more holistic understanding of both subjects.

7. Increased Retention and Transfer of Knowledge:

The incorporation of visual arts aids in the retention and transfer of mathematical information. Visual representations serve as meaningful and concrete anchors for comprehending and remembering mathematical concepts. When mathematical knowledge is coupled with visual representations and aesthetic experiences, students are more likely to retain and apply it.

8. Promoting Inclusivity and Multiple Intelligences:

Incorporating visual arts into mathematics instruction accommodates to a variety of learning methods and intelligences. Visual arts engage students' visual-spatial intelligence, helping them to capitalize on their strengths in comprehending and communicating mathematical topics. Educators may build an inclusive learning environment that acknowledges and promotes different learning preferences and talents by embracing visual arts.

Incorporating visual arts into mathematics education improves students in a variety of ways, including increased motivation, improved conceptual comprehension, improved problem-solving skills, and promoting creativity and inclusivity. Educators may develop engaging and meaningful learning experiences that encourage student interest and accomplishment in mathematics by embracing these benefits.

Strategies for Integrating Visual Arts in Mathematics Instruction:

1. **Visual Representations and Manipulatives:** To illustrate mathematical concepts, use visual representations such as diagrams, graphs, charts, and models. Visual aids help pupils understand abstract concepts by making them more concrete. Hands-on activities with manipulatives such as geometric shapes, pattern blocks, or fraction tiles engage students in active learning and improve their grasp of mathematical topics.
2. **Artistic Problem Solving:** Encourage kids to tackle mathematics issues in creative ways. Ask pupils to make artwork that depicts a mathematical subject or problem, for example. This technique encourages creative thinking, relates mathematics to real-world circumstances, and allows students to express their learning creatively.
3. **Data Visualization:** Integrate data visualization techniques in mathematics instruction. Students can create graphs, infographics, or other visual representations to analyze and interpret data sets. This strategy helps students make connections between mathematics and real-world applications, develop critical data literacy skills, and communicate mathematical insights effectively.
4. **Visual Storytelling:** In order to engage pupils in mathematics, use visual storytelling strategies. Students can make visual narratives or comic books depicting mathematical principles or problem-solving procedures. This style encourages pupils to think creatively, improves communication skills, and approaches mathematics from a narrative standpoint.
5. **Art and Geometry Connections:** Use visual storytelling tactics to engage students in maths. Visual narratives or comic books depicting mathematical principles or problem-solving techniques can be created by students. This technique encourages students to think creatively, enhances communication skills, and approaches mathematics via a narrative lens.
6. **Integration of Technology:** Make use of digital tools and software to enable students to construct and manipulate visual representations of mathematical concepts. Through the use of visual arts, interactive graphing software, animation tools, and virtual reality applications can improve students' engagement, discovery, and understanding of mathematical subjects.
7. **Collaborative Art Projects:** Use digital tools and software to let students create and manipulate visual representations of mathematical topics. Students' involvement, discovery, and knowledge of mathematical subjects can be improved by using visual arts, interactive graphing software, animation tools, and virtual reality applications.
8. **Museum and Gallery Visits:** Plan field visits to art museums or galleries that feature mathematical art or exhibits with mathematical themes. Students can obtain inspiration and understanding of the artistic and mathematical concepts at work by exploring the interaction of mathematics and visual arts in a real-world situation.
9. **Reflection and Discussion:** Encourage students to reflect on their experiences with visual arts integration and to participate in group discussions. Encourage students to express their thoughts, connections, and insights about the mathematical topics learned through visual arts. This method improves metacognition, communication skills, and intellectual understanding.
10. **Professional Development and Collaboration:** Provide chances for educators to receive professional development in order to improve their knowledge and skills in integrating visual arts into mathematics instruction. Collaboration between math and art teachers, as well as other stakeholders, can foster interdisciplinary approaches and exchange best practices for effective integration.

Using these tactics, educators can create a rich and engaging learning environment that effectively blends visual arts and mathematics. These approaches not only improve students' grasp and enthusiasm in mathematics, but they also encourage creativity, critical thinking, and overall growth.

Case Studies and Exemplars:

Several case studies and exemplars that demonstrate successful implementation and positive outcomes have arisen to demonstrate the benefit of integrating visual arts in mathematics teaching. These examples provide practical ideas and real-world applications for incorporating visual arts into mathematics training. Here are some specific case studies and examples:

1. **Case Study: "Mathematical Origami":** Several case studies and examples of effective implementation and positive effects have emerged to highlight the value of incorporating visual arts into mathematics teaching. These examples illustrate practical ideas and real-world uses for bringing visual arts into mathematical education. Here are some specific instances and case studies:
2. **Exemplar: "Data Visualization Art":** In this example, students present and understand data using visual arts techniques. They design visually appealing and instructive data representations, such as infographics or charts, in order to effectively represent and communicate mathematical information. Students gain critical thinking abilities, data literacy, and the capacity to express complicated data in a visually compelling manner

- by combining mathematical analysis and aesthetic design principles.
3. Case Study: "Geometric Street Art": This case study looks at how geometry and street art can be combined. Students work together to design and build large-scale murals or installations with geometric patterns, shapes, and transformations. Students increase their understanding of geometric ideas, spatial reasoning, and the aesthetic components of art via this project. The case study demonstrates how incorporating visual arts fosters creativity, teamwork, and the application of mathematical principles in a real-world setting.
 4. Exemplar: "Mathematical Photography": In this example, students explore and capture mathematical principles in their environment using photography as a medium. Students identify and shoot geometric structures, patterns, and symmetries in their surroundings while incorporating mathematical ideas into their compositions. Students develop a strong observation of mathematical structures in everyday life because of this practice, boosting their visual-spatial intelligence and cultivating an appreciation for the mathematical beauty in their surroundings.
 5. Case Study: "Mathematical Fashion Design": Students in this case study combine mathematics and fashion design by designing outfits that include mathematical principles. Geometric ideas such as symmetry, tessellations, and proportions are used by students to create distinctive clothing pieces. Students use mathematical reasoning and creativity in this project, while also learning more about geometric ideas and their practical applications in design.

These case studies and examples show how visual arts can be integrated into mathematics training in a variety of methods, emphasizing the positive influence on students' engagement, conceptual comprehension, and creativity. They provide educators with practical examples from which to draw inspiration when planning and implementing visual arts integration in their own classrooms.

Conclusion

The incorporation of visual arts into mathematics instruction has various advantages and has the potential to increase student interest and involvement in the subject. We investigated the role of visual arts in increasing student interest in mathematics learning using the theoretical frameworks of constructivism, multiple intelligences, creativity, authentic learning experiences, and interdisciplinary connections. The incorporation of visual arts into mathematics training offers students with meaningful and genuine learning experiences by connecting abstract mathematical concepts to real visual representations. Educators may tap into students' creativity, imagination, and natural curiosity by introducing visual arts, promoting a sense of excitement and relevance in mathematics. Students' conceptual understanding, problem-solving skills, spatial and geometric reasoning, and creative expression improve when they use visual representations, manipulatives, data visualization, and artistic problem-solving strategies. In addition, incorporating visual arts bridges the gap between mathematics and the arts, encouraging interdisciplinary linkages and a comprehensive view of the universe. It encourages students to investigate the connections between subjects and to appreciate the beauty, inventiveness, and aesthetic elements of mathematics. Visual arts integration caters to varied learning styles and multiple intelligences by developing creativity and giving chances for artistic expression, ensuring inclusion and engaging all children in mathematics learning.

Time restrictions, curriculum alignment, resource availability, teacher training, assessment methodologies, inclusion, and collaboration are some of the obstacles and issues that come with including visual arts in mathematics education. To address these issues, careful planning, professional development, and a dedication to providing an inclusive and supportive learning environment are required. To summarize, including visual arts into mathematics instruction is a powerful technique for increasing student interest, motivation, and knowledge of mathematics. Educators may create dynamic and engaging learning experiences that develop creativity, critical thinking, and a lifetime respect for mathematics by utilizing the benefits of visual arts. Accepting visual arts integration allows children to understand the links between mathematics and the world around them, cultivating their curiosity and equipping them to become active and confident learners in mathematics and beyond.

Acknowledgement

The authors would like to thank Universitas Padjadjaran for giving the support via Hibah Riset Unpad Riset Artikel Review No.1549/UN6.3.1/PT.00/2023, 27th march 2023, and also the referees for suggestions, useful remarks.

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ENHANCING STUDENTS SOFT SKILLS VIA PROJECT-BASED LEARNING (STEAM) IN ART CLASSROOM.

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Abstract

The current body of literature indicates that teachers are found to be deficient in choosing the most effective approach (teaching strategies, tools, relevant learning contents, and required skills) to improve students' soft skills in the art classroom. To overcome this issue, project-based learning (PBL) that integrates STEAM components has high potential. Thus, this study is aimed at improving students' soft skills through PBL that integrates the collaborative structure of LeapEd and STEAM education. This study applies a descriptive case study that includes data collection from interviews, observations, and document analysis. Academic experts, art teachers, and students are involved as participants in this study. The triangulated data analysis shows the potential and effectiveness of integrating a PBL-STEAM approach for improving students' soft skills during the learning process in the classroom. Also, this approach, along with the implementation of LeapEd's collaborative structure, which is tailored to the art curriculum content, has benefited the teachers in delivering effective teaching and thus improving students' soft skills in the art classroom. In short, other than its effectiveness, this approach is proven to be pivotal to the school ecosystem in enhancing soft skills, which contribute to the excellent outcomes and potential of art students. This, in turn, will help improve the quality of the education system, especially in art education in primary schools.

Keywords: project-based learning, art education, STEAM, art classroom

Introduction

Implementing a thorough transformation by generating a clear vision and ambitions for a more educated nation is one of the goals of the Malaysian Education Blueprint (MOE, 2018). The ministry is of the opinion that teaching students the five components of the 21st century (5Cs) will ensure that the next generation is motivated and prepared to compete on a global scale. Therefore, rather than only generating technicians or intellectuals, education stakeholders should put more of an emphasis on fostering people's creative talents. As a result, schools should be transformed to accommodate the STEAM principle by introducing the practise into the current teaching and learning process involving the arts classroom. To achieve the curriculum's goals, art teachers learn to create lesson plans for their classes that teach students critical abilities, methodologies, and language. The most fundamental question in art education is, arguably, how to put together art projects. What do we educate when we teach art? Is our teaching technique in line with our objectives? Will students comprehend the material and what it has to offer? In this paper, emerging topics and lessons, well-planned pedagogy design, and a blended STEAM curriculum were highlighted. As a result, the PBL analytic technique in the art classroom integrating LeapEd structure and STEAM projects is observed and discussed in this study. Along with the PBL fundamentals and curricular components, the three primary phases of PBL implementation in creating STEAM projects were also emphasised. The PBL procedures were thoroughly explained, with art education pedagogical designs serving as illustrations.

Background Study

Application, invention, and ingenuity are required for new education. STEAM is one of the initiatives to encourage student creativity that involves the critical processes of creativity and invention. STEAM connects proven STEM aspects with art practises, elements, design concepts, and assessment (Bertrand 2020; Bertrand 2019). These STEAM elements include an integrated approach to learning that necessitates a deliberate link between standards, evaluations, and lesson design. STEAM's fundamental standard encourages inquiry, cooperation, and a project-based learning method, which has incorporated the authenticity of art curriculum (Chen, 2019; Kang, 2019). A comprehensive approach, autonomy, ownership, collaboration, and emergence are required for a successful PBL environment in art education (Ahmad Ghanem & Sayed, 2019; Muhali, 2019). As a result, PBL can assist students in honing their reasoning abilities with the goals of meeting the demands of 21st-century learning as well as in understanding the learning process in the art classroom. In addition to the phases and features of PBL, there is an element that teachers can adopt by utilising the collaborative technique known as the "LeapEd structure". This structure includes frameworks involving guidelines, instructional strategies, and methods that are appropriate for

the situation and supplement the art pedagogical practises involving STEAM projects (LeapEd Services, 2021). PBL projects provide a complex entry question that stimulates students to conduct additional research, organise timeframes, set benchmarks, and reflect on the final outcome. It is vital to comprehend curricular information through a multidiscipline STEAM project (Aksela & Haatainen, 2019). Teachers must have appropriate tools to assist students during the PBL process, support students with time management, and ultimately assess their projects once completed. This would foster the development of a successful and effective PBL method in the art classroom, enabling diversity in learning and supporting multidisciplinary lifetime learning among students at school, equipping them with necessary skills that are beneficial to them.

This STEAM component uses a PBL pedagogical design with an integrated approach that combines traditional teaching, assessment, and lessons. According to academic experts, PBL pedagogy design and STEAM curriculum design, which are both extensively employed by educators in 21st century education, have a clear relationship (Silk, 2021; Chen, 2019; Liao 2019). The figure below explains the six STEAM components used in the classroom and how they relate to projects in the PBL classroom.

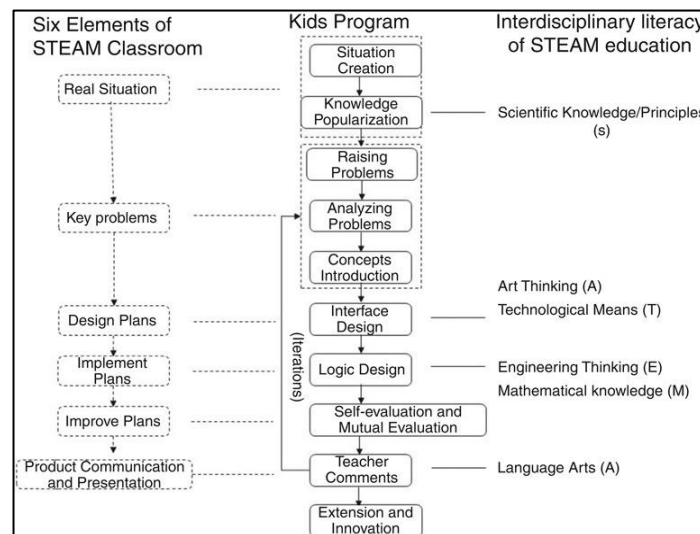


Figure 1. Six Elements of STEAM Classroom.

Problem of the Study

Soft skill development necessitates a focus on 21st century talents such as communication, cooperation, critical thinking, and creativity. The education ministry has also underlined the significance of soft skills in learning, which include six major attributes: knowledge, ethics and spirituality, leadership abilities, national identity, language competence, and thinking skills. (MOE, 2018). Therefore, teachers should be able to provide learning opportunities that allow familiarization and development of these skills. This means that the learning process should be transdisciplinary, experiential, and perspiratory to all students. With such learning settings, students will be able to integrate and apply what they have learned, evaluate their learning, and be productive and competitive in generating ideas (Thi & Thi, 2020). In achieving this, PBL is found to be potential over the traditional teaching approach as its core domains (the planning, the evaluation process, and the final product) are supporting the development of soft skills (Aksela & Hataainen, 2019). However, the teachers should be proficient in conducting this approach as it requires a shift from teacher as knowledge provider to facilitator of learning. Proper and structured training is therefore required to achieve this.

On the other hand, concerns about teachers confusion or hesitancy in selecting the best approach in teaching arts have been raised in the literature (Grossman et al., 2021). This is rooted in poor skills in: a) identifying appropriate teaching strategies; b) selecting a suitable project; c) selecting relevant measurement tools; d) assessing rubrics; e) developing appropriate learning content to suit the objective and main purpose of the lesson; and e) managing projects over an extended period of time (Hawari & Noor, 2019). This has resulted in resistance to implementing PBL in this subject.

Even though many studies suggest the PBL approach is one solution to the issues stated (Ab Rahman, 2020), it offers the advantage of helping teachers implement excellent pedagogical practises, which makes learning more interesting and relevant for students. This strategy needs to be put into practise, but there are a few concerns that

need to be overcome before it can be said that it will be properly adopted and will benefit every student at the school. As a result, this study will explore how the PBL methodology and the LeapEd structure have the potential to enhance instructional practises. In order to produce the essential academic content, the PBL design technique will emphasise the artistic process of developing STEAM projects, encourage suitable challenge discovery, and emphasise learning content to address the issue at hand (Hawari & Noor, 2020). As students finish their STEAM projects using PBL and LeapEd ideas in learning, the study will also discuss the teachers' usage of appropriate scaffolds or guidelines to support students in becoming independent, accountable, and engaged learners.

Methodology

The case study looks at two art teachers who utilised the Project-Based Learning (PBL) method in a multidisciplinary art classroom involving STEAM art projects. The adaptations of the PBL pedagogical design concept suggested by a number of experts in PBL and 21st century learning concepts, including experts in arts education, subject integration, and curriculum content, were used to collect the descriptive data (Bertrand & Namukasa, 2022; Zakaria & Daud, 2021; Thi & Thi, 2020). The STEAM project research took about three to six months. This study, which included a class of Year 4 and 5 students, was carried out at a chosen primary school in Kuala Lumpur. The study enlisted the participation of 30 students of eight groups in total. For each stage of the research, semi-structured interviews were done to gather information from each sample of teachers and each group of students. Using the right tools, the scripts were transcribed in order to identify the proper theme and pattern that highlighted the soft skills based on the fundamental ideas of PBL approach. Different observation forms by Douglas et al. (2019) are used to record all of the important data when observing the teachers and the students in the classroom. The observation sessions also utilised an array of authentic PBL instruments that modified and personalised to fulfil the study objectives, which included Stanley (2018)'s evaluation tools and rubrics. Thematic analysis was used to establish the theme and pattern of how well students are improving their soft skills based on their involvement in PBL learning throughout the project development utilising observed triangulated data. All data were discussed in order to highlighted all the soft skills improvements hence improve the credibility and trustworthiness of the research as a whole.

Findings

The triangulation data analysis demonstrates the feasibility and usefulness of incorporating a PBL-STEAM method for strengthening students' soft skills during the classroom learning process. As a result, researchers were able to assess students' performance in a variety of phases and areas, including the learning process, problem solving, STEAM creativity, the final product, and their personality or soft skills during project creation. Data collection was divided into several key points (based on concepts, phases, and processes in the PBL approach), which include the three domains of project planning, the evaluation process, and the final product.

The Planning

The foundation of the LeapEd method is built upon four primary basic values known as the acronym 'ROPE,' which stand for Respect, Ownership, Positive Interdependence, and Equal Participation. In summary, ROPE attempts to strengthen students' soft skills by allowing them to collaborate to achieve an agreement and enabling the processing of ideas to take place while learning. According to Johnson, Johnson, and Srinivas (2014), the LeapEd cooperative method structure includes four management strategies: teaching, practise, planning, and facilitation. As shown in Table 1 below, this management technique may be executed using eight teaching and learning strategies that involve 14 cooperative skills strategies to enhance students' soft skills.

Table 1. LeapEd Cooperative Method Structures.

ROPE Skills Strategy	Implementation Method							
	Create Idea	Opinion	Previous Learning	Question	Thinking Process	Share Discussion	Agreement	Feedback Reflection
Share-N-Turn	√	√	√		√	√		
One-Two_Group		√					√	
Look-Think-Comment			√	√	√			√
Share-Your-View		√	√		√			√
North-South		√	√		√			√

News-N-Views	√	√	√	√	√	√
Mine-N-Combine	√	√		√	√	√
Find-A-Treasure	√	√	√	√	√	√
Team-Card-Challenge			√	√	√	√
Roam-or-Remain		√	√	√		
Token-Talk-Time	√	√	√	√	√	
Idea-Rush	√	√	√	√	√	
On-A-Mission			√	√		√
Question-N-Coach			√	√		√

The comprehensive lesson preparation for the project focuses on the idea, stages, components, and PBL process in the classroom. To make it easier for students to execute the teaching technique, it was thoroughly explained step by step. The PBL approach that are transferred into their teaching and learning are as follows:

- Step 1: Start with an essential question that is open-ended, versatile, and calls for several responses. The inquiry exposed students to real-world issues and led to thorough research that was effective and authentic. The questions are pertinent to the students' surroundings and lives, which is the most crucial factor.
- Step 2: Choosing the proper subject matter and including the students in the project plan's development Activities support actual issues or questions and foster diversity. They are chosen depending on the curriculum.
- Step 3: Establishing a timetable and schedule for the students Lessons must be more adaptable and open to modifications. The appropriate time to wrap up their analysis, conclusions, and evaluation must be emphasised. Without placing too many restrictions on them, teachers provide recommendations to aid students in staying on track.
- Step 4: Tracking students' development, facilitating the procedure, and promoting teamwork Teachers have a key role in assessing students' progress by utilising project and team rubrics together with the available resources, tools, and guidelines.
- Step 5: Assessing development and providing comments to pupils on their understanding of the material and areas for improvement. Additionally, assessments assist teachers in creating more effective lesson plans. Students are also permitted to evaluate themselves using specific evaluation tools.
- Step 6: Making everyday reflection a part of the educational process The teacher welcomes personal observations such as journaling, group reflection, and debate. Students' ability to express their emotions and experiences reflects the development, modifications, idea-sharing, and assessment processes of their projects.

An example of a project plan is illustrated in Table 2 below for teachers and students to use as a template for preparing their PBL STEAM projects. This project overview form which is modified from Douglas et.al (2019) included thorough project details, acted as a benchmark to monitor the lesson development, and additionally served as a piece of supporting material for assessment to track the soft skills development of the students.

Table 2. Example of STEAM Project Overview

PROJECT PLAN			
Project Overview (<i>Essential</i>)			
Project Title	<i>IET Faraday Challenge – Spaceship Project</i>		
Driving Question	<i>Spaceship and Outer Space</i>	General	<i>Spaceship Model</i>
Grade	<i>K-4 to K-5</i>	Product	
Level			
Subject			
Time Frame	<i>3 Months</i>	Individual	<i>A Team Leader</i>
		Groups	<i>5 persons in a group.</i>
Project Summary	<i>Building space rocket model through various STEAM activities based on real-world challenges and everyday problems.</i>		
Collaboration	<i>The Institution of Engineering Technology (IET), Institute of Faraday, Petronas, KPM.</i>		
<i>Learning Goals (Planning)</i>			
Standard	<i>Curriculum Content</i>	Literacy	<i>STEAM Language</i>
Curricular		Skills	
Big Ideas	<i>Rocket Science</i>	Criteria	<i>Student build space rocket based on</i>
	<i>(Curricular Competencies)</i>	Standard	<i>the set challenge.</i>
Keyword(s)	<i>Spaceship, Rocket, Faraday</i>	Rubric(s)	<i>LeapEd, PBL</i>
<i>Learning Design (Schedule)</i>			
Curriculum			
Connection	<i>21st Century of Learning, Information Technology, Creative Thinking, STEAM, PBL</i>		
(EMK)			
Knowledge	<i>On-A-Mission, Share-N-Turn, Look-Think-Comment, Find-A-Treasure</i>		
Softskills			
Public			
Audience(s)	<i>Stakeholder, Community of Interest</i>		
Scenario	<i>Based on theme and topic.</i>		
Challenge	<i>Challenges that can be associated to the theme of the project.</i>		
<i>Learning Tools (Monitor)</i>			
	<i>Objective :</i>		
Various Method	<i>The objective of the project.</i>		
Representation			
Expression	<i>Step 1</i>		
Engagement	<i>Step 2</i>		
Finalize	<i>Step 3</i>		
	<i>Conclusion</i>		
<i>Exhibit Product (Assess)</i>			
	<i>Instrument(s)</i>		
Assessment	<i>Mark</i>		
	<i>Score</i>		
<i>Reflection (Evaluate)</i>			
Reflection			
Individual	<i>Feedback from</i>		
Group	<i>Students?</i>		
Essential Skills	<i>Teachers?</i>		
Stakeholders	<i>Community?</i>		

The Evaluation Process

The evaluation process in PBL included an assessment procedure that gathered data from studies that illustrated an array of STEAM project-making skills. To illustrate the value and potential of the PBL STEAM approach to enhancing students' soft skills, the following three aspects were highlighted;

- i. Aspects of Representation involving linguistic strategies, special needs, return expectations, and existing knowledge,

- ii. Aspects of Expression: Expression involving students acquiring various knowledge, application of Knowledge through the Scaffolding method,
- iii. Aspects of Engagement involve students' experiences of learning interests and the project exploration process.

Based on the three previously described parts, the following table 3 shows study data that described the importance of soft skills learned by students during the development of the PBL STEAM project. The collected data shown the PBL approach highlighted eight essential elements of PBL and all the soft skills involved in each aspects of representation, expression and engagement in the project.

Table 3. Study data describing the importance of soft skills via STEAM PBL

PBL Elements	Representation	Expression	Engagement
Key Knowledge	Critical Thinking	Creativity & Innovation	Cooperative & Constructivism
Challenging Question or Problem	Driving Question and Inquiry Analysis	Project Implementation	Complying with Agreement
Sustained Inquiry	Building Knowledge, Understanding, and Skills Gathering and Evaluating Information	Defining Creativity Challenges	Assisting Group Members
Authenticity	Develop and Review Ideas	Build Knowledge Identifying Information Sources	Organise Task and Implementation
Student's Voice and Choice	Utilise Criteria Evidence	Develop and Research Ideas and Products	Respect each other.
Reflection	Justification, Considerations, Alternatives and Implications	Generate and Select Ideas	Responsible to the group member.
Evaluation	Product presentation and Problem Solution	Answer Driving Question	Work as a Team
Product	Real World Problem Solving	Product Presentation	Produce quality and creative product.
		Audience Presentation	

The Final Product

The list below includes some PBL STEAM projects done by students at the chosen school. Each of these projects is carried out in accordance with the PBL STEAM learning structure. Each project is thoroughly analysed in order to learn about the students' soft skills and then documented for reflective purpose.

- 4th International Chem-Car Competition
- IET Faraday Challenge (FARADAY) – Spaceship Project
- Maker-Talent Conference and Exhibition (MTDC-UiTM-MTC)
- MTCE Bootcamp – Robotics and Drones Competition
- NUSOC – International Solar Car Creation
- DRABOT - Malaysian Embedded Systems Programming
- KLESF Robotic International Challenge
- Digital STEM Exhibition
- Young Doctor Innovation by Ministry of Health
- NUS Computing - Sumobots Petrosains

Evaluating the group's products and performance is one component of demonstrating the efficacy of this PBL approach. 'Originality', 'Value', and 'Style' are the three key characteristics for product evaluation (Buck Institute, 2015) that teachers are instructed to consider when evaluating a student's work. These characteristics demonstrate the students' capacity to create products while utilising soft skills, which are essential while working on STEAM school projects and are highlighted in Table 5 below.

Table 4. Key Characteristics of products' evaluation.

Elements	Description
Originality	A product's uniqueness is determined by its models, ideas, adherence to instructions and rules, use of unconventional materials, and reliance on knowledge that already exists.
Value	The product is viewed as useful, functional, and capable of addressing the demands of an issue that was discovered early on in the planning process or tackling a specific problem.
Style	The product produced should have aesthetic value and an attractive style.

As for the final task, each student must deliver a presentation of their project once the work has been properly finished. The presentation consists of two types of presentations: (1) presentations that involve the appreciation process after each project is finished, in which students describe the process and display their work directly on a small-scale presentation; and (2) a presentation following the project that includes several completed activities and will be implemented on a large-scale exhibition. Students in the group explain the whole process, from gathering materials and brainstorming ideas to showcasing the finished product, during the presentation. Finally, teachers assess the final outputs using the proper tools throughout the PBL process based on the targeted exit objectives and curricular material. Table 4 below highlights the primary soft skills discovered in students throughout their PBL presentation through numerous skills and evaluations.

Table 5. The highlight of students' primary skills of presentation.

Theme	Description
Ideas dan Information	Students present information, findings, arguments and supporting evidence clearly, concisely, and logically through clear and distinct perspectives.
Arrangement	Pupils organize ideas neatly and orderly and manage time well.
Eye Contact & Body Language	Convincing body movements and making eye contact with the audience.
Voice	Students have good language skills and have clear and correct articulation.
Presentation Aids	Students have the skills to use the presentation aids well.
Responses to Audiens	Students are able to answer audience questions using good language, providing clear and complete answers.
Group Participation	Every question posed could be answered by any group member, demonstrating a thorough mastery of the subject.
Final Product	Product created based on the three characteristic of product evaluations.

Discussions

The PBL STEAM approach focuses on enhancing student achievement through multidisciplinary and STEAM projects that help students enhance their soft skills. This approach, integrated with LeapEd's collaborative structure and STEAM education, has aided teachers in providing efficient lessons and thereby boosting students' soft skills in the art classroom. This strategy is divided into three stages, which are as follows: 1) The preparation 2) The Evaluation Procedure, and (3) The End Product

"The planning" is the cornerstone of the approach, which included instructions for teachers and students on how to start the project. The LeapEd cooperative method structure, which focuses the four management techniques of teaching, practice, planning, and facilitation and which may be used during the planning session, was also included into this phase. Utilising PBL approach means freedom to choose any topic, develop questions or solution, and create the project in varieties ways (Silk 2021; Liao 2019; Ahmad Ghanem, 2019).

Teachers used the eight teaching skills, which incorporated 14 cooperative skills, in the lesson to bolster the instructional approach and utilised the main key components of the cooperative structure, including respect, ownership, constructive interdependence, and equal participation for all students. This PBL component of

planning emphasises students' abilities to design 'self-directed learning' and encourages them to construct a personalised or 'trademarked' art learning practise (Ab Rahman, 2020; Aksela & Haatainen, 2019)

The PBL approach's step-by-step guidelines also improve students' knowledge, critical thinking, and communication abilities. From the analysis, students were able to explore their curiosity, use problem-solving techniques, manage ideas, and develop their creativity as they responded to the PBL's essential questions. In addition, students effectively managed their time while using their problem-solving, teamwork, and leadership abilities. Finally, students were able to analyse their team's performance and reflect on it, which improved their performance. According to Grossman et al. (2021), the ability of the students to digest the curriculum's knowledge and incorporate it into the project using the PBL approach design is one of the most crucial parts of PBL. Students may also develop early plans, list pertinent materials, and choose evaluation tools to support their assignments in the classroom (Grossman et al., 2021).

Next, the project overview form summarised project details, functioned as a benchmark to evaluate lesson growth, and also served as a piece of supporting material for assessment and a tool to track students' soft skill development. The form is useful as a guide as the PBL approach emphasises the use of suitable instruments, which require teachers and students to customise the content based on previously determined or planned exit outcomes (Aksela & Haatainen, 2019).

The second phase, namely the evaluation process, highlights three main aspects of the PBL: representation, expression, and engagement. Table 3 presents research data that shows the value of soft skills developed by students throughout the construction of the PBL STEAM project based on the three previously outlined sections. The data collected revealed that the PBL method emphasised eight fundamental parts of PBL as well as all the soft skills needed in each area of representation, expression, and project participation. The PBL approach not only enables teachers to analyse the entire lesson in depth but also allows students to participate in evaluating the progression of projects, hence improving their soft skills (Zakaria & Daud, 2021; Talib, 2019; Rusdin, 2019).

Lastly, the third phase of the PBL approach is the final product. Based on the PBL STEAM learning framework, this phase highlights the other three aspects, which are finalisation, assessment, and reflection. One aspect of proving the effectiveness of this PBL technique is evaluating the group's output and performance. The three primary qualities for product evaluation that instructors are encouraged to take into account when grading a student's work are "originality," "value," and "style." (Buck, 2015). These qualities indicate students' soft skills, which were vital when working on STEAM school projects, and are listed in Tables 4 and 5, which demonstrate the key capabilities during the learning process while exhibiting their products. Academics have emphasised the importance of students adopting PBL concepts and contributing to successful learning when producing projects in the classroom (Bertrand & Namukasa, 2022; Henriksen & Mehta, 2019). As a result, students must be able to evaluate the project from start to finish, beginning with the planning, development process, and lastly, the final outcome.

Conclusion

The objective of this research is to enhance students' soft skills using PBL, which incorporates LeapEd's collaborative framework and STEAM instruction. Additionally, the use of LeapEd's collaborative structure—which is customised to the content of the art curriculum—has aided teachers in providing efficient learning and enhancing students' soft skills in the art classroom. According to the findings of the study, the effectiveness and potential of the PBL Leap approach for students by developing soft skills contribute to exceptional outcomes and the potential of art students. The triangulated data analysis demonstrates the viability and efficacy of incorporating a PBL-STEAM method for enhancing students' soft skills throughout the rigorous instructional process. The three main PBL phases included the eight elements of PBL, which highlighted all six essential aspects of creating a project. All of these elements were seen to have a positive impact on the students' personality development, skills, and knowledge. The strategy can enhance pedagogy, shape students' personalities, and encourage the production of high-quality art works, thus raising the calibre of teachers. The PBL method, as believed by a majority of educators, fosters effective learning, which encourages students to participate more actively in class and be more creative in their learning, both of which help students develop their soft skills. However, several considerations must be made in order to guarantee that this approach is well implemented and beneficial to students, teachers, and schools. In conclusion, this strategy has been shown to be crucial to the school's ecology in strengthening soft skills, which contribute to the good outcomes and potential of art students, aside from its efficacy within the educational field.

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TRANSFORMATION OF GAN NUO MASK FUNCTIONS: RITUALS TO PERFORMING ARTS

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Abstract:

This paper describes the function of Gan Nuo masks in traditional rituals and performing arts based on the timeline, combing the Gan Nuo masks from the Shang, Zhou and Han Dynasties to the Tang, Song and Yuan periods until the development of today's society, the reasons for the transformation of the mask function. Nuo is an ancient activity of witchcraft, and it passed down from ancient times to the present day in order to drive away epidemics and ghosts, pray to the gods for blessings to preserve life as the main purpose of the primitive religious and cultural behaviour. Gan Nuo is part of China Nuo, masks are important features of Nuo. The researcher has systematically analyzed the research object by reviewing literature, pictures, videos and other materials, and constructed an analytical model integrating the three perspectives of the mask, the wearer and the audience. Inspired by Charles Sanders Peirce, the function of the Gan Nuo mask in ritual and in performance is analysed from a semiotic perspective. The results of the study show that the function of Gan Nuo masks from rituals to performing arts is due to the transfer of faith to popular culture. Gan Nuo mask in the eyes of modern people is a kind of art, its traditional inheritance model can no longer be adopted by The Times, the Nuo mask into the performing arts, not only helps the Chinese traditional culture better show in the eyes of the contemporary people, so that Gan Nuo mask is more modernized. At the same time, it has theoretical research value for the inheritance of regional culture and traditional art characteristics.

Keywords: Gan Nuo, mask, ritual, performing arts

Introduction

Masks are a particular cultural phenomenon in the world. Each ancient tribe, nation and country has its own history of masked cultural development. Chinese masks first appeared in the ritual of Nuo, an ancient Chinese religious ritual to drive away ghosts and epidemics. The General Theory of Chinese Nuo Culture writes: "Nuo is a fusion of multiple religious cultures, folk cultures, and artistic cultures, and is a ponderous and mysterious cultural complex that spans time and space, society, ethnicity, and borders. It is a favourite among traditional cultures in the long history" (Qu & Qian, 2003).

In the history of Nuo culture, masks occupy a very prominent place. At the same time, Nuo masks dominated the early mask culture. What distinguishes Nuo masks from ordinary masks is that they contain a strong sense of witchcraft, and primitive religious overtones, and have the function of driving away ghosts and epidemics and avoiding disasters and evil spirits (Qu & Qian, 2003). Gan Nuo is a part of Chinese Nuo. Gan is short for Jiangxi and is in the southeast of China. Gan Nuo culture is not only older than the surrounding provinces, more original cultural values, but Jiangxi is also one of the important exporters of Nuo culture, some of the famous Nuo dances, Nuo opera and Gan Nuo have a certain "kinship" relationship. Gan Nuo masks, with their many varieties and "bull horns, fangs, fire eyebrows, four eyes of gold" characteristics, and become a large family of Chinese Nuo masks in the exuberant family (Cai et al., 2007, p.71).

At the same time, the deep history of Gan Nuo masks contains profound historical and artistic values. The traditional mode of inheritance of Gan Nuo masks "in line with the old" has not been adopted by the times, so explore the transformation of the function of Gan Nuo masks, to discover their value of Gan Nuo masks. The use of Nuo masks on the contemporary stage has not only enriched the style of theatre, making it more realistic, bringing infinite inspiration to contemporary performing arts creators, and better presenting traditional intangible cultural heritage in the eyes of contemporary people.

Materials and Methods

This study adopted the research method of qualitative research. The researcher chose Gan Nuo mask as the object of study. First of all, this study mainly collects data through the literature, which leads to a descriptive analysis of the past research on Gan Nuo masks. Afterwards, the research methodology includes a qualitative analysis through field research, including visiting museums, watching Gan Nuo performance works, interviewing performers and

mask makers, taking relevant photos and watching relevant video materials.

The function of Gan Nuo masks in ritual

In China, out of reverence for totems and gods, the ancients had to pray for them to exert supernatural power and overcome natural or man-made disasters to protect their own survival and reproduction, and the masks were able to play a role in transcending the red earth, transcending the ego of communicating with the gods, worshipping ancestors, driving away ghosts and expelling epidemics, and the activities performed became rituals (Liu, 2013). Gan Nuo has preserved the original ancient Nuo rituals in a more complete way. Gan Nuo has always maintained the tradition of using masks as the core of all activities, and Nuo masks are not just figurative codes or disguises in an artistic sense in Nuo activities, but remain more the soul of these activities, which still enjoy people's reverence.

1. Representation

A Gan Nuo mask is a "god", a "ghost", or a real-life respectable "person", and the many masks make up a mysterious and complex world of gods and spirits. The many masks form a mysterious and diverse world of spirits. Gan Nuo masks are symbols and carriers of the gods and spirits and are sacred, but the masks when sealed in the box do not have a unique spirit, and only when the mask is worn on the face of the dancer will it have the role of the gods. Then, once the Nuo mask is brought to the face of the Nuo jumper, it cuts off the connection between the Nuo jumper and the outside world, and the Nuo jumper himself is very likely to have the illusion of entering the world of the gods in the chaos, thus thinking that he can represent the gods to issue a decree; at the same time, the crowd watching from the sidelines cannot see the original mask of the Nuo jumper, but only see the mask constantly shaking in front of their eyes, and it is also very easy to produce the deity represented by the mask and the Nuo jumper (Cai et al, 2007,p.97). In other words, when the mask is put on, the mask takes on the identity it represents, or becomes the spirit it represents. The Gan Nuo mask is sublimated into a deity when worn, the dancer thinks he or she is a representative of the deity, and the audience treats him or her as a deity in the atmosphere. It can be seen that the Nuo mask is an important magic tool in the hands of the shaman in the Nuo ritual, usually indispensable in the Nuo ritual to harness the objective world with a strange effect of the tool, is a symbol and carrier of God, is a bridge between the two worlds of man and God, is the soul of the gods and ghosts to reside in, plays a very important role in the overall ritual.

2. Transformation of the spirit

The mask is largely seen as one with the spirit of the entity it represents, and in some cultures is a sacred object, the true home of the spirit, which exerts its power over the wearer, who may be possessed by the spirit of the mask, but, crucially, does not necessarily become that spirit (Rose, 1998). The ancient Chinese had the idea of the separation of form and spirit, believing that the human head was the death of the soul, and reshaped the human face with exaggerated metamorphosis, transforming the human into a god, into a visual reproduction of all the spiritual forces of good and evil in the universe, giving life to objects of clay, trees and machines (Liu, 2013,p.31).

The masked spirit possession ritual is presented as an example in Shaoqiao village, Wanzai County, Jiangxi Province. The ritual follows the following procedures: recruiting soldiers, consecration, storing the treasure, storing the five treasures, storing the medicine treasure, and Dianguang. Every few years the gods of Nuo must be replaced and replenished, which is called "advocating for soldiers". The "consecration" is equivalent to the ritual possession of the soul for the Nuo deity's mask, while the "Dianguang" refers to the ritual possession of the soul for other ordinary masks (Hirota, 2005).

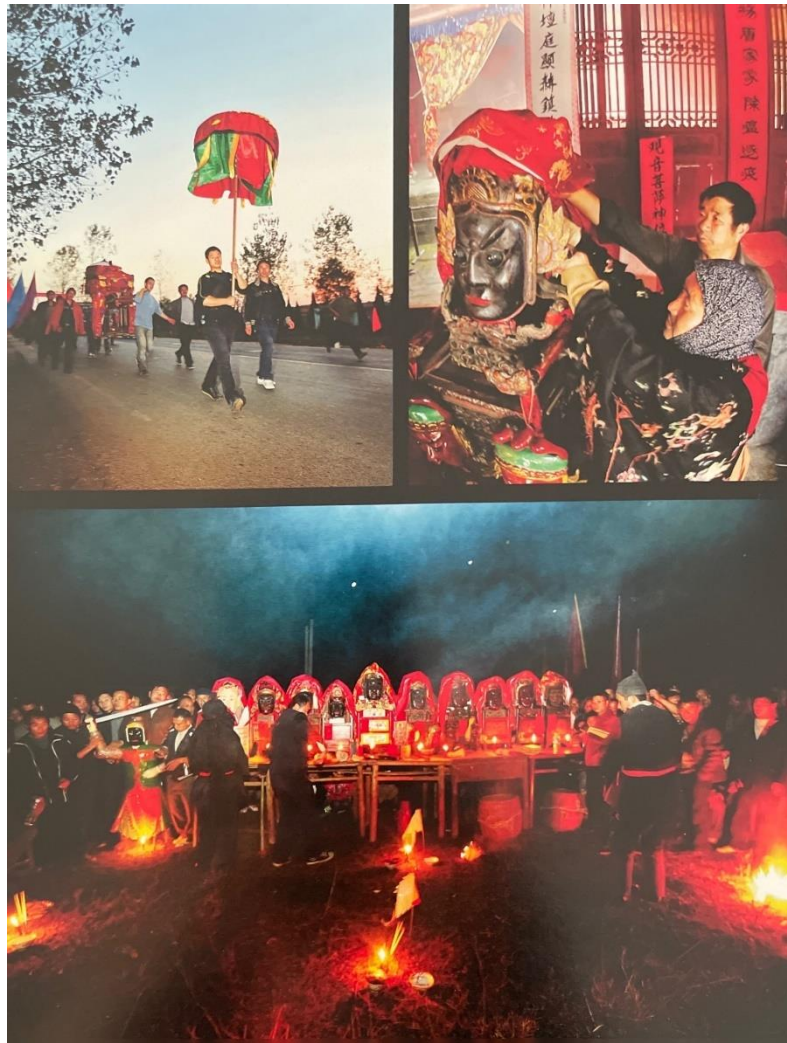


Figure 1. Recruiting Soldiers (Ding, 2012, p.37)



Figure 2. Consecration (Ding, 2012, p.40)



Figure 3. Dianguang (Ding, 2012, p.41)

Only when this is done, the mask becomes a symbol of the gods, and when the person wears the mask, the wearer has become the embodiment of the gods, appearing before the people to pray for blessings, eliminate calamities and solve problems. This makes the mysterious and exalted deity a tangible reality.

The sacredness of the mask...derives from...the fact that the divinity considered to be present in the mask and through it, to be acting." The wearer is "depersonalized to the advantage of the mask he animates. for there to be a mask, man must erase himself cease to be himself, and shed his individuality (Furlonger, 1998).

According to the narrative of the Shaqiao village Nuo team's heritage, the Gan Nuo mask does not directly change the wearer, but the wearer wears the mask as if he or she will be exposed to some kind of transmission of power that makes him or her also believe that he or she has become the incarnation of a deity. It is perhaps this power that allows the wearer to undergo isolation, purification, transformation, and thus spiritual transformation. The mask changes the wearer's appearance, and the body is changed by his consciousness. In these cases, the mask has a dual function, hiding the identity of the wearer on the one hand and activating the character on the other, the activated mask reveals supernatural powers. Through this process, the wearer is perceived to be in direct contact with the spiritual power of the mask, which makes him susceptible to this spiritual power. The mask changes the wearer's appearance, and the body is altered by its consciousness. This alteration not only represents the spirit of the mask but also allows the personality of the wearer himself to be hidden. In some cases, this unification of body and mask may lead the wearer to believe and rely psychologically on the character he portrays, his own identity being subsumed into that of the supernatural figure he portrays, and when he removes the mask, he may think that he has just been dreaming or out of his mind. For his personality and behaviour change, incorporating the spirit he has created and become.

Belief

In the process of Nuo believers wearing masks to perform or perform Nuo rituals, to make themselves or others believe in the spirituality of their prayers, it is inevitable to create a psychological distance between the two in time and space, thus giving rise to the meaning of ancestral return, Nuo masks in many cases act as the role of human gods and religious beliefs. It functions as a channel for the transformation of yin and yang; in material terms, it melts the object of people's beliefs; in graphic terms, it unites the allegorical meaning of people's worship; and in image terms, it fully embodies the symbols of the gods that people think they are. The eternal, solemn and sublime meaning of the many images of deities that have been handed down will be unconsciously revealed in the creation of Nuo masks (Huang, 2019).

The first is totemism. Totemism is the earliest form of human ancestor worship. There are four main aspects of totems on Gan Nuo masks: first, animal totems. There are folk customs and legends of worship of animals such as luan and phoenix, immortal cranes, snakes, tigers, dragons and mice, which are widely passed down. For example, the snake was transformed into an immortal nun to bring rain to the earth, and the rat was worshipped as the god of wealth. Secondly, botanical totems. For example, the worship of the camphor tree by setting up an altar and temple under the tree to worship the god. Thirdly, the worship of natural objects. For example, the worship of boulders, spiritual springs (holy water, immortal sources, dragon wells) and mountains. Fourthly, legends about animals, plants and other natural objects spirits and ghosts and gods.

Next is the witch culture. Witch culture was born from the mother of Nuo culture in the totemic era. In the late totemic period, the purely intuitive and superficial contact of the Nuo mask-wearing ritual no longer met the deeper needs of people in the religious psyche, leading to the emergence of witches as a more perceptive form of faith. As an intermediary between man and the gods, the witch is able to speak to the gods on behalf of the people and to pronounce or soothe beings on behalf of the gods (Cai et al., 2007, p.140). The Gan Nuo mask slowly expanded its function under the influence of witch, creating more roles for the gods and developing towards a performance function to entertain the gods and people. Of course, there is still a long-standing, extensive and blurred 'border' between the witch and Nuo, with both witch, who never gives up his mask, and Nuo, who also uses witchcraft.

Finally, there is a combination with Taoism. The combination of Gan Nuo and Taoism lies in the worship of Taoist gods, the use of certain Taoist spells and rituals, and the same costumes and Taoism. Taoism, a large number of absorptions originated in a primitive society in the early part of the available witch culture, the successful construction of a patriarch, ethics, classics, charms, spells, rituals, cultivation and secular applications of the complete system, enhancing the status of the human subject in religious activities, thus achieving a leap from the primitive belief in nature worship to man-made religion (Cai et al., 2007, p.132). Nuo and Taoism combined to reflect the fundamental function of wish-fulfilment: Nuo altar that life's misfortunes, illnesses and so on, to a large extent, are caused by unfulfilled wishes, so the fundamental Nuo altar puja is wish-fulfilment (Cai et al., 2007).

It is clear that the audience at many rituals more or less believe that they are seeing the spirit being awakened rather than the masked performer. What about the people wearing the masks? Are they aware that they are playing a role? To some extent, the masked performers also believed that they were experiencing a transformation, as mentioned earlier in the article and dictated by the heirs of Gan Nuo of the Sandbridge team, who themselves believed in some kind of power conferred by wearing the mask, a feeling that could put them in a trance and create visions that would engage, evoke or create some kind of spiritual power. Although audiences may have become increasingly aware of the fact that performers wore masks in the late twentieth century, the belief persists, often focusing on "not what is being concealed. It is what is being created behind the mask."

4. Audience

We say that the Gan Nuo mask is a symbol and carrier of the deity and is sacred, but the mask when sealed in the box does not have a unique deity, only when the mask is worn on the face of the dancer, it will have the role of the deity. In the rituals, the watching public sees the Nuo mask on the head of the dancer, as if they see a character with some kind of divine authority, or the ability to communicate with the spirits. As the audience cannot see the original face of the Nuo dancer, they only see the mask waving in front of their eyes, and in this atmosphere, they take it as a deity, so the interaction between the Nuo dancer and the watcher is like a dialogue between man and God, and the Nuo mask becomes a bridge between the two worlds of life and death, man and god.

From this the power of the Gan Nuo mask in the ritual is obvious, it gives the watcher of Nuo a faith, an inner spiritual need for life. Any Nuo mask is in fact a physical form of the way this group or this people believed during this period.

The function of Gan Nuo masks in the performing arts

With the development of Gan Nuo masks, not only plays an important role in rituals but also in secular life to meet people's aesthetic needs, in the form of folk art constituting an integral part of the cultural and artistic life of the countryside.

Since the Song Dynasty, Gan Nuo has evolved from Nuo rituals and dances to Nuo opera, which has the ritual function of driving away bad luck and the entertainment function of song and dance drama.

1. Similarities with rituals

In the Nuo dance performance, people do not think that the "mask" is fake, but is a real manifestation of the "go

d" that people play, that is, where people live to capture the object and a variety of anthropomorphic objects, people dance, that is, the reality of people's lives at the time. The dances that people danced were a picture of the real life of the people at the time, including the movements and combinations of people's lives, social production and distribution, and interaction (Cai et al., 2007, p.146).

In the rituals, the performers perform rituals by putting on the mask as a god and taking off the mask as a human being. The mask becomes a tool for communication between humans and the gods. In theatre, then, the first symbolic element to appear is the mask as a symbol of the gods and spirits. From a dramaturgical point of view, Nuo is seen as a kind of performance activity. Scholars of this view believe that Nuo is inseparable from theatre and that as a ritual, Nuo itself is already a performance or a "ritual performance". As a performance, Nuo also has a ritual function. The two complement each other, and in the sense of Nuo opera, it is an 'aesthetic spectacle under a ritual mentality' (Gu et al., 1989).

Nuo opera is a masked form of opera, which has no stringed music, only simple gongs and drums, and the performers themselves are shamans of the Nuo altar, performing in the form of rap, which has both a ritualistic meaning and the function of entertaining the gods and people (Cai et al, 2007). Nuo opera performances are mostly related to religious deities, and the common feature of all the masks is that they are imbued with emotion, and we can see good and evil in the world through different shapes on the masks.

China's primitive ancestors in prehistoric times wore masks and imitated the activities of animals to a distinctive rhythm. Although the early purpose of Gan Nuo was to expel evil spirits and demons, Nuo rituals and Nuo dance performances have become inseparable, with performers all protecting their faces and wearing make-up, running and hailing, rushing and jumping to the sound of drums and music. As society progressed, the primitive elements of this ritual activity as witchcraft gradually weakened, with totemic and sacred meanings gradually giving way to political and cultural needs, and its artistic and aesthetic elements unconsciously increasing. Therefore, the greatest significance of the aesthetic impact of this religious activity lies in the fact that religious sentiment stimulates the vitality of the artistic creation of Nuo believers, so that Nuo believers unconsciously grasp the stylistic features of Nuo masks from aesthetic needs, and in the experience and aspirations of believers, naturally communicate the connection between the aesthetic values of Nuo believers, thus achieving the organic unity of religious ritual beliefs and aesthetic needs (Huang, 2019).

2. Transformation in contemporary performing arts

The image of religious worship is popular in China because the image has two natures: one is the real world and the other is the imaginary world. The actor in the role also has a double nature: one is himself and the other is the image he plays. Theatre is therefore a sacred ritual of metamorphosis through the presentation of the actor as an image. If theatre is the threshold between the two worlds of the real actor and the virtual character, then the actor as the image is the portal between the earthly and spiritual worlds (Chan, 2009). The instrument of skeletal metamorphosis is the mask. When the actor puts on a mask, he becomes the character he plays on stage.

Masks work by hiding or modifying those signs of identity that often represent a transformed person or a completely new identity (Pollock, 1995). However, in contemporary theatre, the use of masks does not only represent an identity but can also complete the transition from actor to character, and from character to character, giving fluidity to the identity of the actor and enabling a switch in character identity. For example, in the play, *The King of Lan Ling*, one of the scenes is a play within a play, in which the characters on stage: the minister and the soldier wear Nuo masks to play another role, interpreting the different perspectives of the three characters of the King of Qi, the Queen of Qi and the King of Lan Ling. The function of the masks here is that they transform the characters' relationships very well.



Figure 4. King Lanling (https://www.sohu.com/a/254177822_201960)

Secondly, exaggerated and deformed masks are used to express the richness of character, making the inner world of the character externalized. The protagonist of "The King of Lanling" wears different masks to transform into different personalities. Wearing a female mask symbolizes meekness and wearing a beast mask symbolizes bravery, cunningness and cruelty, which highlights the richness of the character of the King of Lanling.

Finally, the mask is not only a complement to the theme of the play, but also an indispensable means of presenting and realizing ideas. The King of Lanling is based on a Chinese historical story, in which the King of Lanling kills his father to avenge the death of his father, and the whole play tells an allegorical story of "the soul and the mask" in a symbolic way. The character transformation of King Lan Ling before and after he puts on the mask dialectically reflects the complexity and depth of human variation, leading the audience to pay attention to and contemplate their own souls while watching the play and interrogating the souls of the characters.

3. The Audience

From an anthropological point of view, the mask acts as a metaphor or a sign of meaning, allowing the audience to separate the individual performers and to keep this perception at a distance, thus creating a distancing effect (Roy, 2016). That is, by forcing the audience to accept the need to suspend disbelief, the audience can willingly immerse themselves in the landscape and perform information and meaning, creating their own meaning.

Masks are inanimate when they are not in use. But in masked performances, audiences often comment that masks seem to change expressions, especially those with delicate and subtly complex expressions. I believe this is because the mask moves during the performance, allowing the audience to see it from different angles and with the help of the changing stage lighting, the expressions seem to change, which together with the actor's body language, creates a vivid impression of a living, breathing entity with changing expressions. This not only makes the audience pay more attention to the performance but also stimulates the audience's imagination and makes them think deeper about the piece.

Result and Discussion

Reasons for the functional conversion of Gan Nuo Masks

In primitive societies people feel powerless when they encounter threats from nature, influenced by primitive totem worship and belief in ghosts and gods, villagers hope to use Nuo, a primitive religious ritual, to pray to the gods, drive away ghosts and epidemics, and avoid disasters and seek blessings. As a carrier of religious rituals, the Nuo mask is both an art form with aesthetic value, reflecting the national aesthetic sentiment of the people's love of life, their search for truth and goodness, and their willingness to be grateful, and an ideal tool to hold deep popular emotions. As the times have rebounded, the function of the mask has changed, and its development and changes can be divided into the following stages:

1. Shang, Zhou and Han dynasties

The masks of the Shang, Zhou and Han dynasties were mainly used to chase epidemics.

The masks of the Shang dynasty were worn on the face for various ceremonies and were also engraved on square tripods and bronze helmets with human and animal faces, representing the transformation of man and God, the combination of witch and animal, and the connection between the semantic interpretation of "face" and the application of death by different nationalities. During the Zhou dynasty, the pillars of faith in heaven and earth and in human beings and ghosts, and the close connection between the harmony between heavenly and human affairs and natural blessings and disasters, were used in various Nuo ceremonies at court and among the people, and masks were used in the ceremonies, which were made as ugly and hideous as those of the devil in order to strengthen the intimidating effect on epidemics and ghosts. The combination of military, political and religious power in ruling and witchcraft beliefs characterised the Han dynasty kings, who held Nuo rituals at the end of the year according to the principle of the flourishing of yin and yang (Liu, 2013, p.32).

2. Tang Dynasty

The Tang Dynasty exorcism of ghosts and epidemics inherited the Han dynasty system of Da Nuo masks, but during its development, a shift from ritual to drama slowly developed. The transition from ritual to the drama was conditioned by the easing of people's fear of religion, a condition, however, that did not see the light of day in the history of Chinese social rituals until the mid to late-Tang period (Lssei, 2004). The focus of activity at the time was on feasting for the purpose of mutual assistance and harmony, on the demand for order, on Confucian-style interaction between people, and on the ritual side of the rituals, which gradually fell into disrepute. It can be seen that this transition was closely linked to the increase in productivity of the people at the time, with villagers increasing their productivity to a certain level and having the ability to anticipate unexpected events in the natural world, or at least to reduce their dependence on religious sorcery in their production, and having the ability to gradually break free from these constraints and gradually emerge as 'Nuo opera'.

3. Song and Yuan dynasties

During the Song Dynasty, rural rituals were finally freed from the religious strictures of the past and the conditions were maturing for a transformation into literature and art. During the Song and Yuan dynasties, Chinese opera was perfected, as the art of face-painting and make-up became an aid to the use of miscellaneous drama masks, which were largely restricted to roles such as gods, monsters, and animals. During the Yuan dynasty, the miscellaneous plays of gods and Buddhas were classified as 'god-headed, ghost-faced plays', using masks of ghosts and monsters. There were also singing and dancing acrobatics wearing ghost and god masks (Liu, 2013).

So there is a folk saying that Nuo opera is a living fossil of Chinese theatre. The reason for this change was the demand for the establishment of a new type of ritual organisation in the context of the gradually developing rural market economy of the time. With the decline in the religious authority of the rituals forcing the loss of the unifying village function of the social rituals, the landowning class felt the need to replace it with a new organisation. Secondly, the arrival of many nomadic tenants, which diversified the membership and increased its numbers dramatically (the very factor that weakened the religious character), created a dichotomy between a group of believers in the ritual and onlookers who looked on at the act of worship. In such a situation, the believers transform the once monotonous performance into a lively event with a variety of contents, but ultimately it is not possible for the whole village to have the same belief in the ritual as in the past, and this also serves as an objective transition from the ritual to a form of cultural performance with many people gathered around (Lssei, 2008).

4. Today's society

As people's wishes for worship change with modern life, Nuo rituals are gradually changing to better meet people's wishes. For example, the content of the masked repertoire and the form of performance, as well as the various masked deities themselves in the story, and even the content of the charms used to divine during the Nuo ritual, will change to varying degrees as people's interests change. To this day, it continues to provide endless inspiration to contemporary art creators. The scholar Zhu Hengfu summarises three main reasons for the contemporary Nuo fever, the third of which is that "many of the forms of expression can still be borrowed from today's literature and art". He cites the musical tunes of Nuo songs, the body movements of Nuo dances, and the masks and character conflicts of Nuo operas as examples of the many inspirations that can be given to today's artistic creation, which is a treasure and a resource that is in touch with the local atmosphere (Zhu, 2014).

The use of Nuo masks in contemporary performing arts not only represents a character but also enriches the stylistic style of theatre, making it more realistic and better presenting traditional intangible cultural heritage to contemporary eyes. However, the choice of masks is not limited to Nuo rituals or character masks in Nuo opera, the symbolic elements in the masks can be distilled, dismantled, combined and reused to help create a richer stage performance and create a richer stage art. For example, in the play "Fusheng", all the characters, except the main

ones, have masks. They sometimes wear masks and sometimes take them off when they perform. It reflects the fact that to put on a mask is to be a god and to take off a mask is to be a human being. The masks in Fusheng are divided into two categories, those that cover only the face and those that come with a headdress. The masks of the Confucians belong to the former category, while the masks of the ministers belong to the latter. The members of the troupe's song team all have a bun on their heads, while the Confucian students without titles only have a white mask covering their faces, and the ministers with titles have a headdress in front of the bun, with wings on both sides. These two types of costumes have their origins in Nuo Yi and Nuo Opera. According to Nuo mask expert Gu Puguang,

"A complete Fang Xiang's mask consists of two parts: a false face and a false head. When Fang Xiang exorcised ghosts and expelled epidemics, he first covered his head with a false head, and then wore a false face on top of the false head." Fang Xiang is the dominant figure in the Nuo ritual, and his mask represents the most elaborate and multifaceted form of Nuo ritual Nuo drama. The minister's long beard is clearly borrowed from the Beijing opera face painting, the so-called 'soft mask' (Gu, 1996, p.114). Fusheng fully exploits the symbolic significance of the Gan Nuo mask. The combination of the Nuo masks, which have been innovated by splitting and reorganising the artistic elements of the masks to give full play to their symbolic meaning, is both traditional and new, and this combination undoubtedly makes the work more vital.



Figure 5. Fu sheng (http://www.rmhb.com.cn/wh/201709/t20170919_800104920.html)



Figure 6. Fu sheng (https://www.sohu.com/a/439092521_717519)

Qu Liuyi, president of the Chinese Nuo Opera Research Association, mentioned in his article, "The Art of the

Chinese Nuo Mask" that the mask was the first "spokesperson" symbol created by man. It is a tool used to disguise and conceal one's original face and turn it into another image. (Qu, 1995). The mask was the first precious seed from which theatre sprouted. No matter what stage of history an audience lives in, they can appreciate the unique charm of the art of the mask and the variety of the masquerade characterisation. Gan Nuo mask has the cultural implication and academic value of broad and deep edge, it has absorbed the religious consciousness of Confucianism, Buddhism, Taoism and folk customs, folk sculpture, painting and other aspects of the content, is the essence of folk art, and has a high artistic appreciation value, it is thus clear that the theatre stage can shine with the use of ancient mask elements.

The meaning of the functional transformation of Gan Nuo mask

Before Gan Nuo mask entered the performance stage, it itself has contained the elements of performance. Whether it is a ghost image or an animal totem, it is detached from the infinite possibilities of reality. Whether it is sacrificial ceremony or contemporary stage performance, Gan Nuo mask can be regarded as a symbol with the most performance elements, more than a simple static props.

Gan Nuo mask has various stage functions and directions: through the mask, it can realize the free transformation of the role and obtain the reidentification of the identity; the mask itself contains the playing component and presents on the stage, which further strengthens the performance and hypothesis; its strange and exaggerated shape, attracting attention and focus, and has strong drama field and stage effect; in the audience and actors, the dominant motivation of performance lies in the audience's reaction and experience. The two sides promote the whole process of the drama (Li & Guo, 2011, p. 2).

For the audience, the audience saw a vivid picture through the mask and explores the subtext behind the mask, so as to produce images, stimulate emotion, touch the imagination, and obtain a great aesthetic experience. Mask unique exaggeration and deformation, bright color, that is, is a kind of modeling beauty and image beauty. This image and color can be more exciting and more strongly perceived by our senses, in a short time to mobilize the audience's excitement point. In a word, the sensory and visual modeling, abstraction and mobility of Jiangxi Nuo mask make the in-depth and dynamic communication between the views and performances. The symbolic and metaphorical components of the mask on the stage, and the reconstruction of multiple roles and images, provide the audience with different cognitive perspectives, divergent experience and imaginative psychological space, so as to inspire the audience with new aesthetic cognition and emotional experience in the communication, communication and interaction of the performance.

Conclusion

Masks have been so resilient that they have not withered from prehistoric societies until modern civilisation and have even become part of cultural and entertainment life, such as masquerade balls, masquerade parades, masquerade dances and masquerade plays. The basic reason for this is that with the progress of social civilisation, the light of rational human thinking has continued to dilute the fog of witchcraft and the mystery of religion in the realm of mask culture. The religious, witchcraft and exorcism functions of masks are becoming increasingly diluted, and the aesthetic and entertainment functions are becoming increasingly enhanced (Qu & Qian, 2003).

Gan Nuo masks, whether as magical tools of witchcraft, religious symbols, symbols of deities, totemic credentials, ancestral spirits and mythological and historical figures, as well as means of dressing up and rendering aesthetic emotions, all contain a basic feature, namely, the instantaneous derivation from the human "firstself" to the "second self". This transformation of the human self and the materialisation of transcendental consciousness became a major source or gobble of the later plastic arts, make-up and performing arts. The transformation of the function of the Gan Nuo mask from ritual to performance art reflects the elevation of man's conquest of nature. The progress of civilisation has led to a constant change in the function of Gan Nuo masks, thus adapting to the needs of the people and surviving to this day.

This paper summarizes the Gan Nuo mask from ancient times to the present period of development in the course of the conversion of the function, found that its early sacrificial function gradually applied to the field of performing arts. Gan Nuo mask in the eyes of modern people is not only a ritual symbol, but also an artistic symbol. Gan Nuo mask "conformity" of the traditional inheritance model can not be adopted by the times, Gan Nuo mask into the performing arts, not only let the Chinese traditional culture better show in the eyes of contemporary people, so that the Gan Nuo mask more modernized, but also on the inheritance of the regional culture and traditional artistic characteristics of the theoretical value of the research; at the same time, enriching the performance in the At the same time, enrich the performance of the expression and style style, make it more symbolic meaning, thus creating a richer performing arts.

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IMMENSE SUCCESS THROUGH ADAPTATION: THE TRAGICOMEDY 'HI, MOM' FROM STAGE TO SCREEN

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Abstract

This paper analyses the adaptation of a phenomenal film that was released in mainland China during the pandemic. In 2021, 'Hi, Mom' (*Ni hao, Li Huanying*) by a female director based on her mother's story caused a sensation in China. The researchers were concerned that the story had been performed on stage by the creators before being adapted to film, and that the crossover to the screen made the adaptation even more compelling. The researchers examined the basic issues involved in the stage to screen adaptation of 'Hi, Mom' using the 5W1H technique utilised by adaptation scholar Linda Hutcheon in developing her adaptation model. To illustrate audience appraisal of the story adaptations, information research methods were also employed to acquire relevant news, topics, and so on. Our results show that adaptations lead to differences in the time and space of the same story in the two art forms. The results also reflect that the proportion of tragic plots is higher in the film than in the theatrical version due to the more visual presentation of the film language. The successful adaptation has given this story of a mother's love a wider social impact. This study contributes to the understanding of the characteristics of plot adaptations by contemporary Chinese women directors and how the language of film can be used to better represent women's stories.

Keywords: adaptation, director, 'Hi, Mom', plot, tragicomedy

Introduction

During the pandemic, artists suffered, but at the same time, some phenomenal artistic creations emerged. In 2021, a film about a mother's love has attracted a lot of attention in China. In the words of Zhao (2021), "Chinese audiences thrilled to the emotional charge of the movie, which set off social media debates about motherhood and the role of women in what's still a patriarchal society." On social media, the conversation about mothers and motherhood has been unusually lively. The film 'Hi, Mom' is based on the true story of her mother by Jia Ling, a well-known Chinese female comedian. The film made Jia Ling the highest-grossing female director of a single film worldwide. The previous record was held by Patty Jenkins, the director of 'Wonder Woman' (Wu, 2021). In fact, this is the first film that Jia Ling has created as a director. Jialing also plays herself in this film, which tells the story of her and her mother (see Figure 1).



Figure 1. Jialing In The Film 'Hi, Mom'(2021)

'Hi, Mom' was released in mainland China after the Chinese New Year in 2021, when parts of China were still affected by the pandemic, but the film generated an 'Immense Success' of over one billion viewers in three days in the limited number of cinemas that could be opened (Zhai, 2021). Interestingly, the film version of 'Hi, Mom' is not the first time the story has been presented to Chinese audiences. The story was performed as a theatre on a Chinese comedy TV show before being adapted into a film. For the story itself, both adaptations, theatre and film,

have been successful. Adaptation theorists argue that theatre and film are both performance medium and that a story can exist in different performance medium (Hutcheon, 2006, p. 46). The researchers were concerned that, in addition to the impact of the differences between the two medium themselves, theatre and film, the stories in the films were heavily adapted in terms of plot, with a particular change in the weight of tragedy. As a result, the same story is presented in different medium, but the effect still varies significantly. The story 'Hi, Mom' is ostensibly a comedy, but has a powerful tragic core. In the film version of this story, it opens with a sci-fi comedy. A young Chinese woman travels from 2001 to 1981 and becomes friends with the mother of her youth. However, as the film progressed, a switch seemed to be triggered which made it a top tearjerker and the audience reached for the tissues (Kuipers, 2021). So, what exactly is this switch? And how does it play into the adaptation of the story? To answer these questions, one needs to start with the tragicomedy.

Literature Review

Literally, tragicomedy is like the product of the addition of comedy and tragedy. But this 'addition' is not an easy task. In the words of Barnes (1964), "If we are to call a drama a tragicomedy, this must be because it exhibits in its total structure and treatment a point of view that is demonstrably distinct from both comedy and tragedy" (p. 128). This means that tragicomedy is indeed related to both tragedy and comedy, but is by no means the product of some fixed pairing of the two. However, the difficulty in trying to figure out tragicomedy lies precisely in the fact that people have a preconception of tragedy and comedy, and the two are even dichotomous.

Aristotle And The Origins Of Tragicomedy

Aristotle's exploration of tragedy in *Poetics* laid the basic framework for drama, and people still use the terms he used (Dewar-Watson, 2007, p. 15). In the surviving manuscripts of *Poetics*, Aristotle notes that he will further discuss comedy, yet the latter became the second book to be lost (Watson, 2012). The lost manuscripts on the comic section have, on the one hand, provided space for later research, but they have also given some researchers a certain sense of unassailable authority over the existing tragic discourse. Early modern scholars argued that the authority of Aristotle's *Poetics* even became a guideline for the sadness that must be followed at the end of a tragedy (Zanin, 2017, p. 30). Aristotle does not discuss mixed genres of theater in the extant manuscripts, but his examination of a single dramatic genre can be useful in exploring tragicomedy (Stockert, 2020, p. 208). There is an unconscious tendency to fall into a 'black and white' paradigm, which is particularly detrimental to the understanding of art. For adults, we know that the world is not as white or black as we thought it was in our childhood, and some of it is often in between black and white. This is also true of theatre, which often comes from life. Tragedy and comedy are like two sides of life, and tragicomedy seem more like life itself. While tragedy and comedy can be presented separately in a comprehensive manner, they are necessarily one-sided in their perspective. If they are magnified indefinitely, this partiality is exposed and the viewer is naturally aware of the need for a third perspective that is independent of both (Barnes, 1964, p. 125).

The Hybrid Form Of Tragicomedy

The Roman dramatist Plautus first coined the term tragicomoedia (tragicomedy) in his masterpiece *Amphitryo*, which was so far-reaching that it even became one of the inspirations for Shakespeare's plays. Shakespeare's *The Winter's Tale* is thematically and structurally heavily influenced by the first tragicomedy, *Amphitryo*, and in particular his association of female pregnancy with the hybrid nature of tragedy and comedy further explores the appeal of this dramatic form and reaps the rewards of attention (Bradley & Pollard, 2017, p. 251). Before the emergence of the hybrid form of tragicomedy, traditional theatre theory viewed comedy and tragedy as separate: tragedy for the upper classes and comedy for the lower classes; tragedy if it involved death and suffering, comedy if it did not (Kluge, 2007, p. 297). For the first time since the tragicomedy appeared in *Amphitryo*, Plautus speaks of the mixture of man and God through the mouths of the characters in the play, and states that it is a tragicomedy by way of a line declaration (Chiu, 2015, p. 84). This mixture not only created a new mode of theatre production, but also inspired countless others to participate in the tragicomic genre. Just as Shakespeare began his career with a flexible mastery of comedy, his major achievements in tragedy were developed later, and the significance of exploring his tragicomedy is that they are always mixed together in one way or another (Habicht, 1981, p. 413). Further, later researchers have found that man and woman, tragedy and comedy, are issues worth exploring in Shakespeare's plays. As Boose (1984) have noted, "Linda Bamber's book heroically attempts to demonstrate both Shakespeare's differentiation between the two genders and the two genres and his association of generic form to gender-specific privilege" (p. 91). The analysis of the relationship between male and female, tragedy and comedy, by delving into the dramatic text, especially in the plot, provides a good idea for the study of tragicomedy as a hybrid form of artistic subject matter. Admittedly, the hybrid tragicomedy is as difficult a process as female fertility. At the same time, it offers a new vision for countless creators of a world where the stories of men and women are as bewildering and fascinating as the interplay of tragedy and comedy.

Tragicomedy & Language

The tragicomedy as a literary genre relies on a specific linguistic composition. When a text is brought to the stage or screen, the basic structure of the tragicomedy does not change; what changes is the 'language' of the stage or the 'language' of the film, both in terms of the different 'language' used to tell it. It is important to note that because of the obvious ethnicity of the language, exploring the issues requires analysis in the context of the local culture and the case. Doorley (2020) explained that an analysis of three Irish tragicomic works reveals that the plays are similar in their use of violent language, and points to language as an important component of the tragicomic genre. Scholars in the field of theatre argue that theatre is not a combination of verbal and visual but is inherently principled and that understanding the role of language in theatre requires an emphasis on the non-verbal aspects of language (Rozik, 1993, p. 112). If we leave aside the literary script of a tragicomedy and just look at the way it is adapted to the stage or screen as a narrative, the narrator at this point is based on the language of the artistic discipline, it could be a director or an actor, etc. Whether in theatre or film, tragicomedy relies on some form of media to be widely disseminated today. Researchers need to focus on the broader meaning of language today. The medium, as a new form of language, is changing perceptions.

Materials and Methods

As a rather hybrid literary art form, it is easy to see that the dominance of the literary text has always governed the origins and development of tragicomedy, from text to performance and even cross-media re-adaptation. This paper is an analysis of the plot changes in the same tragicomedy story in two mediums, based on the perspective of adaptation theory. The researcher analysed the content by observing the video of the official stage version of 'Hi, Mom' and the video of the movie version. The analytical approach is based on an adaptation theory model created by Linda Hutcheon.

As an initial example of a traditional theoretical response to the primacy of the original or literary text, adaptation theory opens up new avenues for the study of wide cultural phenomena. Elliott (2020) explores the current state of research methodology regarding adaptation theory in her monograph *Theorizing Adaptation*. She fully acknowledges the positive impact on the field of adaptation of Linda Hutcheon's out-of-the-box, micro-case study approach to her book *A Theory of Adaptation*, but notes that research on individual case adaptations remains the main form of publications (p. 8). After analyzing two adaptation theory monographs, Edwards (2007) concludes, "These 2006 books, especially Hutcheon's, are conversation-starters" (p. 376). In his review of the book, Edwards unfailingly praises Linda Hutcheon's monograph as being more enlightening (p. 374). The researcher believes that Linda Hutcheon's monograph on adaptation provides a clear and highly feasible approach to the relatively new field of adaptation research. As Pascal (2022) have noted, "She has rejuvenated research in the field, overwhelmed dead-ends encountered by the adaptation critique" (p. 1). Linda Hutcheon draws on the 5W1H research framework, common in journalism, to provide a very clear idea for the study of adaptation theory (2006, p. xiv). Therefore, this article will also start with the basic questions of *what, who, why, how, when, and where* (see Figure 2).

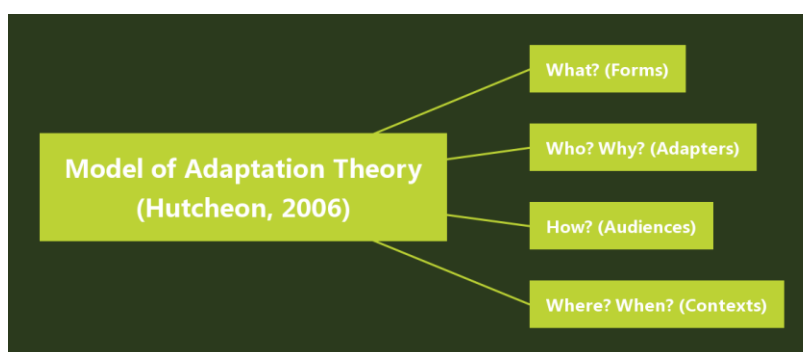


Figure 2. The basic model of adaptation theory created by Linda Hutcheon (2006)

Since the research cases covered in this paper are geographically limited and may not be familiar to readers outside of the Chinese region or Chinese community, the researcher decided to start with the "who?" part of the study. This is, of course, a very important contextual element.

Analysis and Discussion

Who? Why? (Adapter) - Jia Ling, A Famous Chinese Female Comedian

Jia Ling was born in the early 1980s in a mountain village in *Xiangyang*, Hubei Province, China. Compared to children in the city, she lived in an environment surrounded by mountains and factories, which seems far away from the performing arts industry. But Jia Ling showed artistic talent from a young age, and under the guidance of her sister, she studied acting at the Wuhan Municipal Art School for 2 years before enrolling in The Central

Academy of Drama, one of China's top universities in the acting field. Getting into this prestigious university was not an easy task, and Jia Ling was not accepted when she first applied. When she applied again the following year, a dramatic scene occurred. It was in 2001 that Jia Ling chose to enroll in two majors, Theatre Acting and Comedy Acting, in order to improve her chances of acceptance. These two majors are very similar in Mandarin pronunciation, with only one word having a different tone. So when a college admissions teacher called Jia Ling's home, her mother mistakenly said on the phone that her chosen major was comedy acting, when in fact, Jia Ling had been accepted into both majors for the year and only had to choose the one she liked best (BRTV, 2013). For the vast majority of candidates, it is a dream to study Theatre Acting because, in the future, they can act in theatre and film productions, which is the pathway towards acting. But her mother's slip of the tongue on the phone sends Jia Ling in another direction of acting that few people relate to. It is especially rare for her to do so as a girl. Jia Ling once said in an interview with Chinese media that for a long time, she could not accept herself as a *Xiangsheng* actress. The reason is that the humorous acting style of banter and mockery does not suit women (Colville, 2021). Although fate seemed to play a joke on Jia Ling, she later still chose to start her acting career from comedy and gained public recognition on one of the most famous stages in China (see Figure 3).



Figure 3. Jia Ling performs *Xiangsheng* at CCTV Spring Festival Gala Screenshot from CCTV official website <https://tv.cctv.com/2017/06/23/VIDEqbKPUSgem8q1mdbPhBWL170623.shtml>

Xiangsheng was the main form of performance that Jia Ling later studied after entering the field of comedy performance. *Xiangsheng* is one of the oldest forms of comedy performance in China, dating back as far as 1912. For quite a long time in their development, almost all famous comedians were men (Garrison, 2011). *Xiangsheng*'s performance themes tend to be more vulgar, and as Cai (2017) points out, "*Xiangsheng*, as a traditional folk art performing genre, has historically featured profane topics and vulgar elements" (p. 347). Although this form of performance has continued to change in recent times, the traditional perception of Chinese audiences is that it is predominantly male performers who engage in this performance, and indeed this is true to this day, with female performers still very rare. For Jia Ling, learning and performing in *Xiangsheng* requires not only hard work, but also the courage to face worldly perceptions. However, shortly after she gathered the courage to start her college career, an event had a major impact on Jia Ling's life when her mother died in an accident.

The sudden death of her mother was like a bolt from the blue for Jia Ling. Stepping into the ideal university was the starting point of her dream, and she wanted her mother to see her step by step towards success, however, because of the accident, it all became a regret. In the traditional Chinese concept, children need to give back to their parents after they become independent, but due to their parents' health and other reasons, many young people often do not have the time to do so. Author Ken Liu, who has won multiple Hugo Awards, provided the following description of grief in his book: "You know what the Chinese think is the saddest feeling in the world? It's for a child to finally grow the desire to take care of his parents, only to realize that they were long gone" (2010, p. 76). For Jia Ling, the sudden death of her mother became the most painful event in her heart. This directly influenced the trajectory of Jia Ling's life and was the basis for two subsequent theatrical and film adaptations of her mother's story. Jia Ling went on to become a very successful comedian, even in her *Xiangsheng* performances, and her innovative approach was recognized by many audiences. But every time she mentioned about her mother, she was always very sad. As a personal witness to the events and an adaptor of the story, Jia Ling's personal emotional element is the most important reason for her adaptations for stage and film. In her book, Linda Hutcheon explores the question of who is really the adaptor in art forms such as theater and film, which often require the assistance of multiple people, with directors, writers, actors, and others all involved to varying degrees in the creation of such works (2006, p. 80). For both adaptations of 'Hi, Mom', the answer to the question of the adaptor is not

complicated; Jia Ling is not only the one who wrote the story, but she is also the star and the director in multiple roles, making her a true adaptor in every sense of the word.

What? (Forms) - 'Hi, Mom' From Reality To Stage To Screen

In the construct of adaptation theory, Linda Hutcheon defines three modes of engagement that are important foundations for her subsequent discussion: "telling", "showing", and "interactive" modes (Kinney, 2013, p. 8). These three models basically cover a wide range of adaptations from print to stage, film, and online. Linda Hutcheon takes the perspective of medium and includes various medium platforms, such as fiction, theater, film, and games, in the study of adaptation, and summarizes three main forms, which are: Telling $\leftarrow \rightarrow$ Showing; Showing $\leftarrow \rightarrow$ Showing; Interacting $\leftarrow \rightarrow$ Telling or Showing (2006, p. 33-50). 'Hi, Mom' is a direct adaptation of a real event into a play and a movie, and it does not go through the stage of a novel, so it belongs to the form of "Showing $\leftarrow \rightarrow$ Showing". In Linda Hutcheon's view, the "showing" model can be adapted to each other, and she cites a number of examples of this, including the *Saturday Night Live* comedy that was adapted into a movie, which is similar to the 'Hi, Mom' one explored in this article.

The first adaptation of 'Hi, Mom' was in a comedy show on Zhejiang STV in China. In 2016, Zhejiang STV launched a brand-new original comedy competition variety show, Comedy General Mobilization, and 'Hi, Mom' was one of the productions featured in the first episode. Although the show is produced by a television station and broadcast through television, it is recorded on location more like a theater, and the actors perform on stage. Therefore, this article refers to this adaptation as a theatrical adaptation of 'Hi, Mom'. Although many years have passed since this performance, viewers can still find the full video of this episode via the Internet. This paper takes the 20:38-length version posted on the Zhejiang STV Official Channel on YouTube as the subject of this study (Zhejiang STV, 2016). It is easy to see that this version of the story set the stage for the later film version of 'Hi, Mom'. First of all, from the perspective of the members of the creative team, most of the creators of the two adaptations are the same. Secondly, although the length of the stage version and the movie version differed considerably, the main story line was the same. It is worth noting that the director of the theatrical version, Sun Jibin, has the title of screenwriter in the film version.

The film version of 'Hi, Mom' was released in theaters in mainland China on February 12, 2021, just in time for the traditional Chinese New Year holiday. For the time being, viewers can still watch the full version of the film on the video site, but they must be a paid member. The film's Internet broadcast rights are owned by ByteDance's video site. The researchers based their analysis of the plot on these two adapted versions of the video. Because the stage version is very limited in length and it is presented as a sketch comedy, the main plot of the 20-minute story is Jia Ling traveling back to her mother's younger days and trying to influence her mother to seek love. And the movie version is 128 minutes long, six times longer than the stage version. Through plot analysis, the researchers found that two new important events were added to the film adaptation, namely the purchase of a television set and the organization of a volleyball tournament (see Figure 4).

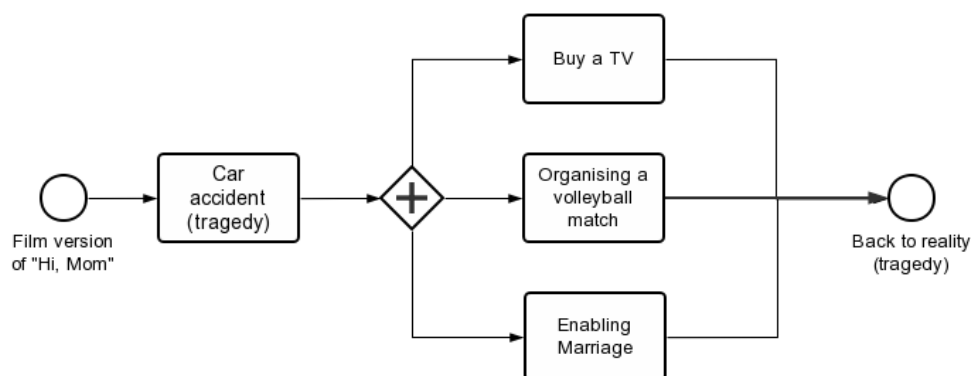


Figure 4. Main Events In The Film Version Of 'Hi, Mom'

The beginning and end of the story of the stage and film versions are basically the same, and both are tragic events. Although both the stage and film versions use comedy as the main label for this story, the tragic element of consistency in both adaptations of this story is maintained at the beginning and at the end. Zanin (2017) discusses the influence of Aristotle's authority on whether a tragedy must end with a sad event. According to Zanin (2017),

“Aristotle’s authority was applied to non-Aristotelian ideas (such as to the sad ending), was refused or displaced in order to legitimate or to discard new forms of drama, issued from a plurality of dramatic (and non-dramatic) models” (p. 33). In the case of tragic works alone, perhaps the ending does not have to be in the form of a tragic event, but in the structure of the story 'Hi, Mom' a tragic ending is very necessary. Because the car accident at the beginning is predetermined, and the end is a return to reality, otherwise the time-travel setting cannot be established, and the return to reality means that in the midst of the tragedy, Jia Ling has to face the reality. The three main events in the story, which take up more space, are comedic on the surface, but they all contain certain touching elements. This design of interweaving comedic and tragic elements makes the story of 'Hi, Mom' perfectly presented to the audience in the form of a tragicomedy, especially in the film version, the proportion of tragedy and comedy is even difficult to really distinguish, and this is precisely related to the way the film is presented.

How? (Audiences) - Fans Of Women's Stories

Adapting stories is a very complex process, especially when it comes to adapting them for different medium platforms. Edwards (2007) pointed out that, “Far from being a simple transfer of a single work, an adaptation often draws upon a range of pretexts that interact unpredictably in the protracted process of script development and staging” (p. 369). This discourse emphasizes the indeterminacy of adaptation studies, especially when situated in theatre or film, where the processes of stage performance and film production are very complicated. Because of this, the adaptor should consider from the beginning how to adapt, or what is the primary factor in adaptation, and the answer, without a doubt, is the audience, unless it is an independent artist who does not consider feedback from the market. Meikle (2017), after analyzing the production situation in Hollywood, described it as follows:

Audiences respond to the offerings of the adaptation industry or the adaptation industries with an array of local tactics, both by using and reusing those offerings in their own adaptations and by choosing or refusing (whether consciously or not) to accept adaptations as adaptations in the moment of reception itself.

Linda Hutcheon observed gender-specific preferences in conjunction with questions about girls' and boys' propensity to enjoy adapted stories. She further pointed out that another term for the audience of the adaptation is "fans", and the formation of their fan base is closely related to the intentional guidance of the adapters (2006, p. 116). Based on this, the primary question adapters need to consider is what genre do audiences like to watch now? In fact, if you trace the comedy movies that Chinese audiences have loved in recent years, it is easy to see that emotional stories about time travel are a very successful genre. For the story 'Hi, Mom', the use of time travel as a setting is also a very good practice. We can assume that without the factor of time interval, how can the daughter's nostalgia for her mother present a comic effect? It is precisely because of the dislocation of time and era that some comic elements are subtly presented without going against the theme of the story. It is undeniable that film has the advantage that drama cannot compare with in terms of time travel and visual presentation. We often describe movies as storytelling, so how does this medium "tell"? The answer then is through its own language, the language of cinema. In the case of the 'Hi, Mom' adaptation, the influence of film language is not only about the "how" but also about the "contexts".

Where? When? (Contexts) - From Text To Context, Zeitgeist Of Film Language

Since its birth, film has given rise to many discussions about the ontology of cinema due to its fusion of technology and art. Many theorists have compared film to different art forms such as literature and painting, but in contrast to these visible forms, film has a more invisible linguistic character. As Hudlin (1979) have noted, “Philosophers of language should concern themselves with the claims of many film theorists that cinema art is a candidate for a language system, either by itself or as a part of some other, preexisting language system” (p. 47). In contrast to the authorial subjectivity of literary language, film language is based on cinematographic techniques, and is constructed as an independent textual system through the interplay of various elements such as cinematography, lighting, and scenography. We cannot ignore the subjective influence of directors and screenwriters on the film text, but without the technical elements, these contents cannot be presented after all.

The film adaptation of 'Hi, Mom' has achieved many things that could not be presented in the stage version of the narrative, such as the time travel effect at the beginning of the story and the presentation of the social landscape in the 1980s. Time travel in the stage version is often achieved through a simple transition curtain, even with the help of the screen to create changes in the environment, it is still difficult to immerse the audience. If for older audiences, they can still experience the social environment of the time through imagination while watching the stage version of the story, for younger audiences, it is the visual presentation of scenes in the language of film that allows them to feel the time and space in which the story takes place. The specific time and space is crucial for the adaptation, and it also determines whether the story can reach the audience directly. “Whether an adapted story is told, shown, or interacted with, it always happens in a particular time and space in a society”(Hutcheon, 2006,

p. 144). The specific time frame is a limitation for the presentation of the story in the stage version. If we divide the plot according to tragedy and comedy, only a few seconds of sound effects of the car accident at the beginning and a 4-minute music clip at the end of the stage version are suitable for the tragedy part. As a result, the tragedy accounts for roughly one-fifth of the story in the stage adaptation. In the film version of the adaptation, the comedy part of the story has the same touching elements, such as helping the mother buy a TV set and organizing a volleyball game, two newly added events. Therefore, the proportion of tragedy (touching) is much higher in the film version than in the stage version. To a certain extent, the language of the film blurs the boundary between the reality felt by the audience and the story scenes in the film. "Cinema more than any other art is naturally able to capture and suggest the sense of a world which flows around and beyond us" (Andrew, 1976, p. 169).

Conclusion

This article looks at two adaptations of her mother's true story by Chinese comedienne Jia Ling. Compared to the type of comedy this story espouses in stage performances and films, the researcher believes this story should be better described as a typical tragicomedy. Through an analysis of literature related to the tragicomic genre, researchers have found that the genre has historically had a subtle relationship with gender, particularly women. Based on Linda Hutcheon's adaptation theory model, this paper analyzes two adaptations of 'Hi, Mom' with reference to related adaptation theories. The result reflect that the proportion of tragic plot is higher in the film than in the theatrical version due to the more visual presentation of the film language. The successful adaptation has given this story of a mother's love a wider social impact. The findings also demonstrate the inherent relationship between adaptation research and gender, with female adapters' presentations of mothers' stories still being of interest to a wide range of audiences. Of course, we also have to admit that the context of the pandemic has a great stimulating effect on the reactions the film forms in its audience base. As Zhai (2021) advised, "In ways that the director could not have foreseen when first conceiving of the movie, 'Hi, Mom' united a country hurting because of not being able to see loved ones." In general, the concept of motherhood is the most common emotional norm among humans. The pronunciation of 'dad' varies greatly across various languages, yet the pronunciation of 'mom' is nearly identical. It's like something that doesn't have to be said; it's engraved in our cultural DNA.

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THE EFFECTIVENESS OF USING TEMPLATE FOR COLOUR WHEEL IN IMPROVING DESIGN STUDENTS' UNDERSTANDING OF ART ELEMENTS AND THE COLOUR WHEEL

KEBERKESANAN PENGGUNAAN TEMPLATE FOR COLOUR WHEEL DALAM MENINGKATKAN KEFAHAMAN PELAJAR REKA BENTUK TERHADAP UNSUR SENI DAN RODA WARNA

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Abstract

This study was conducted to examine the effectiveness of using the Template for Colour Wheel product in improving design students' understanding of the elements of art and the colour wheel. As a design student, it is important for students to understand and master the elements of art such as the elements of colour and the principles of art in producing design works and the basis for visual presentation. This study is focused on the effectiveness of using the Template for Colour Wheel product which has been used as a teaching aid (ABM) by lecturers and a learning aid (ABB) by students in the production of the Colour Wheel for the course DVF10013 Introduction to Art Design, Department of Design and Visual Communication (JRKV) at Polytechnic Ibrahim Sultan (PIS). In order to carry out the study and data collection, a quantitative method was carried out in which a questionnaire was given to 62 respondents who were students of semester 1 from the four programs offered at PIS, namely Diploma in Industrial Design (DRI), Diploma in Fashion and Clothing Design (DFP), Diploma in Graphic Design (DRG), and Diploma in Creative Animation (DAK). The responses of the respondents who have answered this questionnaire have been collected and analysed using the Statistical Package for Social Science (SPSS) Version: 29. Based on the analysis of the study, a mean score of 4.27 was recorded for the question 'if there is a printed reference material to be used as a colour reference on the Colour Wheel' I will use it to the maximum to understand about colour theory. While the highest mean value with a value of 4.37 was recorded that the respondents were very satisfied with the use of the template in the production of the Colour Wheel task and would recommend the use of this template to other students. With that, the use of this Template for Colour Wheel product has helped to improve design students' understanding of colour elements in art in addition to saving time and simplifying the teaching and learning process in the lecture room.

Keywords: Design Students, Colour elements in art, Colour Theory

Abstrak

Kajian ini telah dijalankan untuk mengkaji tahap keberkesanan penggunaan produk *Template for Colour Wheel* dalam meningkatkan kefahaman pelajar reka bentuk terhadap unsur seni dan roda warna. Sebagai pelajar reka bentuk, adalah penting untuk pelajar memahami dan menguasai unsur seni seperti unsur warna dan prinsip seni dalam menghasilkan karya rekaan dan merupakan asas dalam menyampaikan visual. Kajian ini tertumpu kepada keberkesanan penggunaan produk *Template for Colour Wheel* yang telah digunakan sebagai alat bantu mengajar (ABM) oleh pensyarah dan alat bantu belajar (ABB) oleh pelajar dalam penghasilan Roda Warna bagi kursus DVF10013 *Introduction to Art Design*, Jabatan Reka Bentuk dan Komunikasi Visual (JRKV) di Politeknik Ibrahim Sultan (PIS). Bagi melaksanakan kajian dan pengumpulan data, kaedah kuantitatif dilakukan di mana soal selidik telah diberikan kepada 62 orang responden yang terdiri daripada pelajar semester 1 daripada empat program yang ditawarkan di PIS iaitu Diploma Reka Bentuk Industri (DRI), Diploma Reka Bentuk Fesyen dan Pakaian (DFP), Diploma Reka Bentuk Grafik (DRG), dan Diploma Animasi Kreatif (DAK). Maklumbalas responden yang telah menjawab soal selidik ini telah dikumpulkan dan telah dianalisis dengan menggunakan Perisian *Statistical Package for Social Science* (SPSS) Version: 29. Berdasarkan analisa kajian, skor min 4.27 dicatatkan bagi soalan 'jika terdapat bahan rujuk bercetak untuk dijadikan rujukan warna Roda Warna saya akan menggunakannya secara maksimum untuk memahami tentang teori warna. Manakala nilai min tertinggi iaitu dengan nilai 4.37 dicatatkan bahawa responden sangat berpuas hati dengan penggunaan templat dalam penghasilan tugas Roda Warna dan akan mencadangkan penggunaan templat ini kepada pelajar lain. Dengan itu, penggunaan produk *Template for Colour Wheel* ini telah membantu meningkatkan pemahaman pelajar reka bentuk terhadap unsur warna dalam seni disamping dapat menjimatkan masa dan memudahkan proses pengajaran dan pembelajaran (PdP) di bilik kuliah.

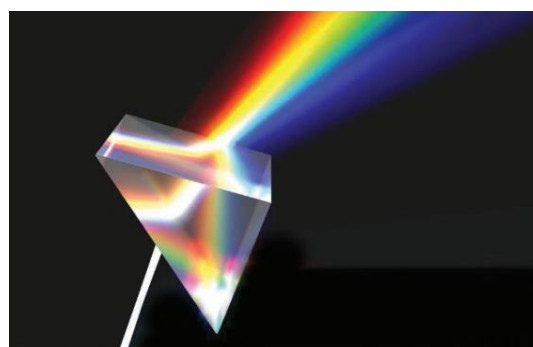
Kata Kunci: Pelajar Reka Bentuk, Unsur warna dalam seni, Teori Warna

Pengenalan

Istilah seni visual merangkumi unsur-unsur seni dan prinsip-prinsip reka bentuk yang digabungkan dan merupakan struktur asas untuk menghasilkan karya seni. Antara unsur-unsur dalam seni adalah seperti garisan, rupa, bentuk, warna, ruang dan jalinan. Manakala prinsip-prinsip seni pula adalah seperti harmoni, kontra, penegasan, irama dan pergerakan, imbangan, kepelbagaian, kesatuan, komposisi dan perkadaran. Ketika artis dan pereka menghasilkan karya seni dan rekaan, mereka menggabungkan unsur-unsur seni dalam membentuk dan mencipta komponen visual dalam karya rekaan mereka untuk meningkatkan literasi visual. Deborah Gustin & Zoe Gustin (2022) berpendapat, *“when an artist trains in the elements of art, they learn to overlap the elements to create visual components in their art”*. Pada kebiasaannya, setiap karya dan rekaan mengandungi sekurang-kurangnya satu unsur seni, namun kebanyakannya mempunyai lebih daripada satu unsur seni yang digabungkan bersama. Hasil karya seni dan rekaan dinilai berdasarkan keberkesanan artis dan pereka menggunakan asas reka bentuk ini dalam rekaan, membuatkan kita menjadi lebih terkesan dan sedar dengan perincian dan butiran yang dilihat dan mesej disebaliknya. Sementara itu, ketika di dalam bilik darjah, elemen dan prinsip seni dan reka bentuk terus menjadi ruji kepada pendidikan seni dan kini sering diintegrasikan sebagai alat untuk komunikasi visual (Joshua Field, 2018, p.v).

Unsur warna adalah merupakan unsur seni yang paling menonjol dalam sesebuah karya dan rekaan. Pereka dan penonton yang melihat karya dan rekaan menggunakan unsur warna sebagai salah satu cara komunikasi visual dalam menghubungkan mereka. Unsur warna seringkali digunakan oleh pereka dan artis untuk memberi gambaran dan perincian pada sesebuah rekaan seperti menggambarkan saiz, mood, kedalaman, bentuk, dan sudut pandangan perspektif. Johannes Itten (1961) mengatakan, *“Color is life. For a world without colors appears to us dead”*. Menurut Sean Adams (2017), *“In a physical sense, there is no such things as color; just light waves of different wavelengths”*. Warna merupakan sifat visual pigmen objek yang telah dikesan oleh mata manusia dan terhasil apabila terdapat pantulan pada sesuatu objek. Mata kita mampu melihat berjuta-juta warna dan setiap warna yang dilihat mempunyai tiga sifat iaitu warna, nilai dan keamatan. Hue adalah nama bagi setiap warna. Nilai pula merujuk kepada kecerahan atau kegelapan sesuatu warna yang berubah apabila hitam atau putih ditambahkan dalam warna tersebut. Manakala keamatan merujuk kepada betapa tepunya sesuatu warna (intensiti). Warna dengan intensiti tinggi adalah terang, dan warna dengan intensiti rendah adalah kusam. Mata manusia mempunyai keupayaan untuk membezakan antara panjang gelombang ini, jadi manusia berupaya melihat dunia dalam pelbagai warna. Kehadiran warna yang berlaku dalam otak manusia adalah hasil tindak balas penglihatan manusia terhadap panjang gelombang yang berbeza ini. Spektrum yang kelihatan oleh mata manusia ini termasuklah warna ungu, indigo, hijau, oren, merah, kuning dan biru.

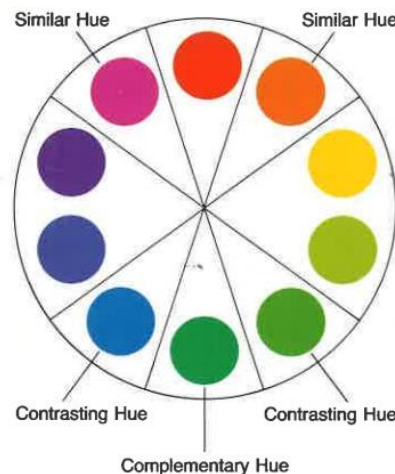
Sir Issac Newton telah melakukan kajian dengan menggunakan cahaya putih dan prisma kaca dan telah menemui beberapa warna atau spektrum warna terhasil apabila cahaya putih dipancarkan pada prisma kaca. Perkembangan roda warna telah berkembang dan penyelidik lain telah menjumpai beberapa pecahan warna baru yang berlainan dan bertambah mengikut peredaran zaman. *“While we think of color as something used in art, the color wheel truly originated in science; Sir Isaac Newton developed the first color wheel and published it in 1665 while studying white light and reflection (Daniella Alscher, 2019).”*



Rajah 1. Kajian Sir Isaac Newton menemukan apabila cahaya putih terkena prisma, cahaya membiaskan dan berpisah menjadi warna pelangi. Sumber: Patti Molica (2018) p.2

Kewujudan warna adalah datang daripada tiga warna utama iaitu kuning, merah dan biru. Warna ini adalah warna asas kepada warna-warna lain dan kita tidak boleh mencampurkan sebarang warna untuk menghasilkan warna utama tetapi kita boleh menghasilkan warna sekunder dan tertiar dengan campuran warna-warna utama ini. Warna- warna ini juga berada dalam kumpulan warna yang telah ditetapkan mengikut kumpulan warna seperti

warna analog, warna pelengkap, warna monokromatik, warna sejuk dan warna panas. Warna analog adalah dua warna yang bersebelahan antara satu sama lain di roda warna dan dapat mewujudkan perpaduan dalam seni kerana ianya adalah dari warna yang sama. Sebagai contoh, beberapa gandingan warna analog yang asas ialah biru – hijau, merah – oren dan kuning – hijau. Kumpulan warna pelengkap pula ialah warna yang bertentangan antara satu sama lain di roda warna. Warna ini dapat menciptakan kontras yang menarik dalam karya seni. Antara contoh gandingan warna pelengkap ialah merah – hijau, ungu – kuning dan oren – biru. Warna hangat pula adalah warna yang dapat menimbulkan keseronokan dalam karya seni, menciptakan tenaga dan ketegangan seperti warna merah, oren dan kuning. Manakala warna sejuk pula dapat memberikan gambaran ketenangan seperti warna biru, hijau dan ungu. “A color wheel is a visual representation of colors arranged according to their chromatic relationship. The basic color wheel consists of 12 colors that can be broken down into three different groups: primary, secondary, and tertiary (Patti Mollica, 2018, p.4).”

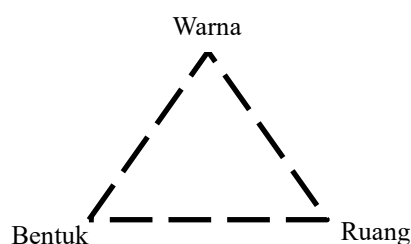


Rajah 2. Hubungan antara warna pada roda warna adalah tetap, tanpa mengira cahaya atau ketepuan warna. Hideaki Chijiwa. (1992) p.10

Teori warna merupakan satu set parameter yang menunjukkan panduan untuk pencampuran warna asas merah, biru dan kuning untuk mencipta warna sekunder dan tertier. Teori warna ini dapat menyelesaikan isu nilai dan nada, kegelapan dan kecerahan, dan digunakan untuk kita melihat warna pada spektrum. Teori warna, seperti yang mula-mula diperkenalkan oleh Sir Isaac Newton pada abad ketujuh belas, memberikan kita cara untuk mengukur hubungan antara warna, dan menggunakan serta menggabungkannya untuk kesan terbaik (Curtis Tappendenn, Nick Tidman, 2006, p.172). Sean Adams (2017) berpendapat, “Diagrams such as color wheel and triangles, help designers understand the theories and color interactions. A well-produced chart can be the tool to select and combine colors to construct harmony and power” (p.14).

Bahan dan Kaedah

Dari perspektif Pendidikan Seni, kejayaan sesebuah seni visual itu bergantung kepada penggabungan antara unsur-unsur seni utama iaitu ruang, bentuk dan warna. Penggabungan unsur ini berperanan dalam menentukan nilai, fungsi dan makna sesebuah karya seni visual tersebut. Menurut pendapat Dr. Husen Hendriyana. (2019), “Apapun nama dan bentuk dari suatu hasil interpretasi dan atau imajinasi pemikiran seseorang, dapat ditegaskan bahwa semua itu mengandung tiga unsur seni visual tersebut, yaitu bentuk, warna dan ruang.”(p.20).



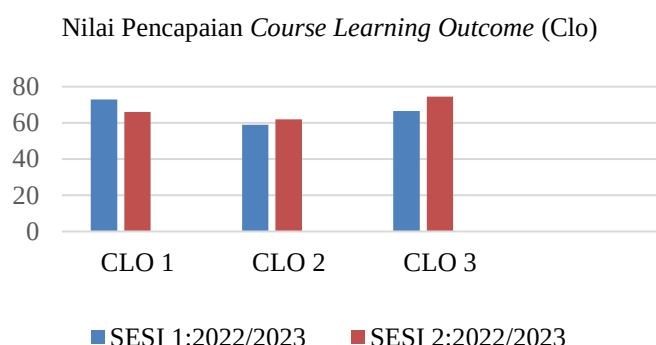
Rajah 3. Rajah Segitiga Unsur Utama Seni Visual. Dr. Husen Hendriyana. (2019) p.21

Adalah menjadi keutamaan kepada pelajar reka bentuk untuk memahami dan arif dalam menggunakan unsur-unsur seni terutamanya unsur warna dan teori warna dalam menghasilkan karya rekaan mereka. Pelajar reka

bentuk perlu memahami bagaimana penghasilan roda warna dan seterusnya menggunakan roda warna dan teori warna untuk meningkatkan nilai kepada rekaan karya. Teori warna yang berbeza mempunyai tujuan yang berlainan dan pelajar perlu menggunakan rujukan teori warna ini ketika membuat pemilihan warna. Ketika inilah pelajar reka bentuk perlu menggunakan pemahaman unsur warna dalam membuat pemilihan warna kerana kesilapan pemilihan warna boleh menjejaskan nilai sesuatu rekaan karya. “*There is perception that a discrete and complex set of rules applies to color; and one wrong choice will lead to failure. These are, indeed, rules that apply to color theory*” Sean Adams, 2017, p.7.

Kursus DVF10013 *Introduction to Art Design* adalah satu kursus asas dan mewajibkan pelajar untuk lulus. Kursus ini perlu diambil oleh pelajar semester 1, Jabatan Reka Bentuk dan Komunikasi Visual (JRKV) bagi empat (4) program yang ditawarkan di JRKV iaitu Diploma Reka Bentuk Industri (DRI), Diploma Reka Bentuk Fesyen dan Pakaian (DFP), Diploma Reka Bentuk Grafik (DRG), dan Diploma Animasi Kreatif (DAK). Sepanjang pengambilan kursus DVF10013 ini, pelajar reka bentuk akan mempelajari dan memahami kepentingan unsur warna dalam seni dan penggunaan teori warna dalam penghasilan karya rekaan. Ketika pembelajaran kursus ini, pelajar perlu menghasilkan dan menyiapkan tugas Roda Warna secara individu dan perlu dihantar dengan menepati warna sebenar bagi semua kumpulan warna primer, sekunder dan tertier. Di sini terdapat beberapa permasalahan yang timbul dan dikenalpasti setelah pelajar menghantar tugas Roda Warna seperti bancuhan kumpulan warna yang tidak tepat dan ukuran roda warna yang berbeza-beza menyebabkan tugas ini dihantar dalam keadaan tidak kemas dan tidak mencapai tahap yang ditetapkan. Keadaan ini telah menjejaskan pemahaman pelajar terhadap unsur warna dalam seni dan teori warna dan menyebabkan pencapaian *Course Learning Outcome (CLO) 2* iaitu *-Produce design composition by applying elements and principles of art and design in visual communication* berada di tahap yang rendah bagi *Course Outcome Review Report (CORR)* pelajar.

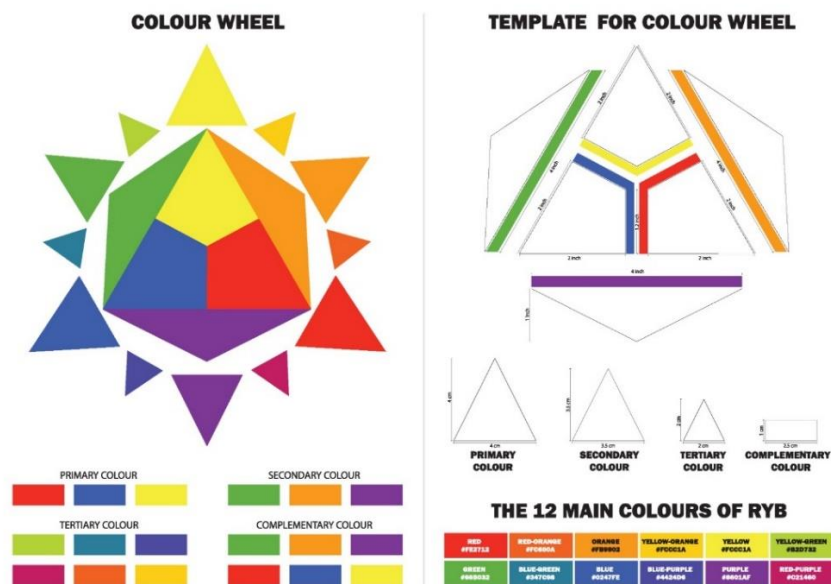
Jadual 1. Nilai pencapaian *Course Learning Outcome (CLO)* bagi Sesi 1:2022/2023 dan Sesi 2:2022/2023 (Sumber: SPMP- JRKV, PIS).



Melalui pemantauan dan maklum balas pelajar, ketika dalam proses menyiapkan tugas Roda warna ini, pelajar mempunyai kesulitan untuk mendapatkan warna bancuhan mengikut kumpulan warna dengan tepat kerana tiada bahan rujukan bercetak untuk dirujuk ketika di dalam bilik kuliah. Keadaan ini sedikit sebanyak telah menjejaskan semangat dan minat pelajar menyebabkan hasil tugas yang dihantar tidak berkualiti dan tidak mencapai tahap yang ditetapkan serta pelajar mengambil masa yang lama untuk menyiapkan tugas. Sebagai langkah penyelesaian kepada masalah ini, satu produk *Template for Colour Wheel* telah dibangunkan sebagai usaha dalam meningkatkan pencapaian CLO2 bagi kursus DVF10013 dan sebagai alat bantu mengajar (ABM) oleh pensyarah dan alat bantu belajar (ABB) oleh pelajar dalam penghasilan tugas Roda Warna. *Template for Colour Wheel* ini merupakan satu bahan rujukan bercetak di atas papan pelekap berukuran A3 (29.8cm x 42.0cm) dengan ketebalan 0.3mm dan mempunyai 2 bahagian merangkumi cetakan warna yang tepat sebagai rujukan bagi setiap kumpulan warna primer, sekunder dan tertier. Produk ini telah ditebus bertujuan untuk memudahkan pelajar dan pensyarah menyuaipadankan warna bancuhan dengan warna cetakan untuk mendapatkan warna yang tepat. Produk ini juga dilengkapi dengan ukuran bagi setiap sisi potongan roda warna yang akan memudahkan pelajar dalam membuat ukuran potongan roda warna dengan tepat. Berdasarkan pendapat Ellen S. Prince (2008), “*If you are not interested in color theory, why should your students be? people should teach from their passions whenever possible, but if you are teaching a subject because you must, not because you want to, please try to find it interesting first.*” (p.xv).



Rajah 4. Produk ABM Template for Colour Wheel



Rajah 5. Ilustrasi produk *Template for Colour Wheel*



Rajah 6. Contoh tugas pelajar sebelum menggunakan produk *Template for Colour Wheel*

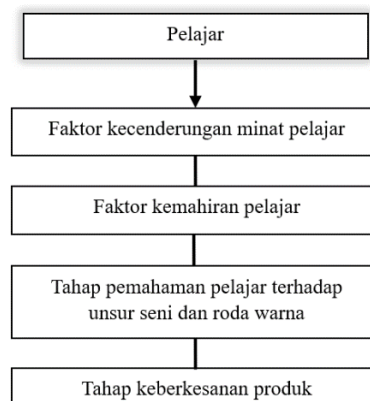


Rajah 7. Contoh tugas pelajar selepas menggunakan produk *Template for Colour Wheel*

Rajah 6 ialah beberapa contoh hasil tugas *Colour Wheel* pelajar reka bentuk sebelum menggunakan *Template for Colour Wheel*. Berdasarkan rajah di atas, antara permasalahan yang jelas dilihat adalah terdapat warna bancuhan bagi warna sekunder dan warna tertier yang salah telah digunakan dalam roda warna dan warna yang digunakan adalah berlainan antara satu pelajar dengan pelajar lain. Selain itu, kekemasan dalam menyiapkan tugas juga diambilkira ketika pelajar menghantar tugas *Colour Wheel* ini. Di sini dapat dilihat contoh-contoh tugas di atas tidak mempunyai keseragaman dari segi rupa dan ukuran. Potongan warna adalah tidak mengikut ukuran yang betul mengakibatkan proses menampal tidak seragam dan tidak kemas. Manakala Rajah 7 adalah contoh hasil tugas pelajar setelah menggunakan *Template for Colour Wheel* sebagai rujukan dalam menyiapkan tugas *Colour Wheel*. Berdasarkan rajah, jelas menunjukkan penggunaan templat ini berjaya mendapatkan keseragaman warna yang tepat bagi warna sekunder dan warna tertier. Pelajar juga dapat meningkatkan kefahaman unsur warna apabila berjaya menghasilkan roda warna yang betul dan memahami teori warna. Tugas-tugas yang disiapkan pelajar juga adalah lebih cepat, kemas dan telah mencapai tahap kualiti yang telah ditetapkan.

Objektif Kajian

Objektif kajian ini adalah untuk mengkaji tahap pemahaman pelajar terhadap unsur seni dan roda warna setelah penggunaan *Template for Colour Wheel* dan tahap keberkesanan penggunaan templat ini terhadap tugas pelajar bagi kursus DVF10013 *Introduction to Art Design*. Produk ABM ini juga akan membantu proses pengajaran dan pembelajaran (PdP) di dalam bilik kuliah agar menjadi lebih mudah dan menjimatkan masa.



Rajah 8. Kerangka konseptual kajian

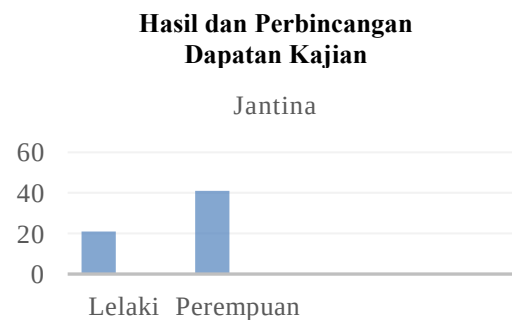
Rajah 8 ialah kerangka konseptual kajian yang merujuk kepada tujuan penggunaan roda warna dalam pemahaman unsur seni dan teori warna yang berguna kepada pelajar dalam menghasilkan rekaan dan karya seni.

Metodologi Kajian

Kajian ini merupakan kajian eksperimen dengan tujuan untuk mengenal pasti kesan penggunaan *Template for Colour Wheel* dalam meningkatkan kefahaman pelajar reka bentuk terhadap unsur seni dan roda warna. Kajian ini telah dijalankan melalui pendekatan kuantitatif iaitu dengan menggunakan kaedah soal selidik yang telah diagihkan kepada 62 orang pelajar reka bentuk bagi program Diploma Reka Bentuk Industri di JRKV, PIS. Bagi mendapatkan hasil kajian terbaik, dokumen tugas lampau pelajar telah dianalisis dan semakan *Course Outcome Review Report* (CORR) telah dibuat bagi menyumbang maklumat kepada pengkaji dalam menyelesaikan isu berkaitan masalah yang dikaji. Borang soal selidik ini terbahagi kepada dua bahagian iaitu bahagian A merupakan maklumat berkenaan demografi responden yang terdiri daripada jantina responden, bangsa, program pengajian dan umur responden. Manakala di bahagian B, merupakan item-item soalan tentang pengetahuan asas responden berkenaan penguasaan kursus dan Roda Warna. Di bahagian C pula terdiri daripada soalan berkisarkan pendapat dan keberkesanan *Template for Color Wheel* serta kesediaan responden untuk menyebarkan penggunaan templat ini untuk meningkatkan kefahaman terhadap unsur seni dan roda warna. Data kajian telah dianalisis dengan menggunakan Perisian *Statistical Package for Social Science* (SPSS) Version: 29. Maklum balas responden yang telah menjawab soal selidik ini telah dikumpulkan melalui kaedah pemungutan data menggunakan skala Likert yang dibahagikan kepada 5 pilihan jawapan.

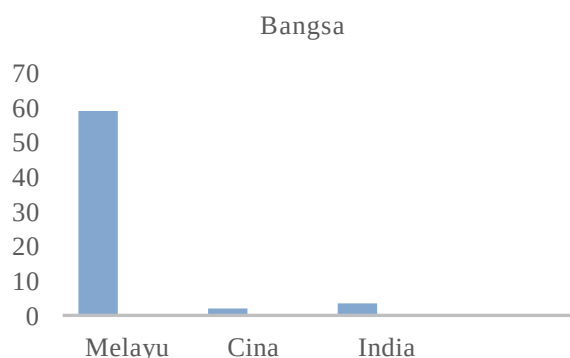
Jadual 2. Pilihan skala Likert yang digunakan pengkaji dalam mendapatkan maklum balas responden.

Sangat Tidak Setuju	Tidak Setuju	Tidak Pasti	Setuju	Sangat Setuju
1	2	3	4	5



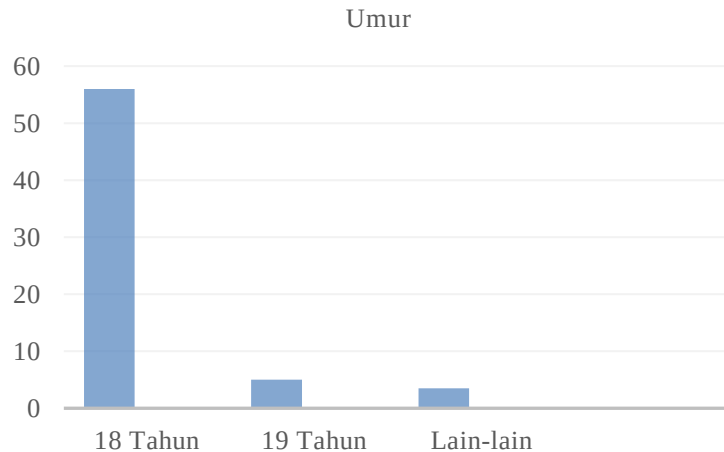
Rajah 9. Carta bar di atas menunjukkan dapatan data kekerapan bagi jantina responden.

Rajah 9 di atas menunjukkan pecahan jantina responden yang terdiri daripada 21 orang lelaki (33.9%) dan 41 orang perempuan (66.1%).



Rajah 10. Carta bar di atas menunjukkan dapatan data kekerapan bagi kaum responden.

Rajah 10 di atas menunjukkan pecahan bangsa responden mengikut kekerapan iaitu bangsa Melayu (95.2%), bangsa India (3.2%) dan bangsa Cina (1.6%).



Rajah 11. Carta bar di atas menunjukkan dapatan data kekerapan bagi umur responden.

Rajah 11 di atas adalah pecahan umur responden. Sebanyak 56 responden (90.3%) yang berumur 18 tahun, 5 responden (8.1%) yang berumur 19 dan seorang (1.6%) tidak diketahui umur ketika menjawab soal selidik.

Jadual 3. Tahap penguasaan kursus DVF10013 *Introduction to Art Design* oleh pelajar.

Soalan Kaji Selidik	Peratusan (100%)					Skor Min
	1 Sangat Tidak Setuju	2 Tidak Setuju	3 Tidak Pasti	4 Setuju	5 Sangat Setuju	
S1. Modul DVF 10013 adalah modul yang menarik minat saya sebagai pelajar reka bentuk.	-	-	24.2%	67.7%	8.1%	3.83
S2. Topik Teori Warna dalam elemen seni merupakan topik yang perlu saya kuasai untuk menghasilkan karya seni / rekaan.	-	-	-	83.9%	16.1%	4.16
S3. Pemahaman 'Roda Warna' kepada pelajar adalah sangat penting dalam membantu pelajar memahami kepentingan campuran dan penghasilan warna kedua dan ketiga daripada warna pertama.	-	-	8.1%	77.4%	14.5%	4.06
S4. Ketika saya membuat bancuhan untuk 'Roda Warna', adalah sukar untuk mendapatkan warna yang tepat disebabkan tiada rujukan warna yang tepat perlu dirujuk	-	-	4.8%	79.0%	16.1%	4.11
S5. Pengulangan proses bancuhan warna bagi tugas 'Roda Warna' mengambil masa yang lama apabila saya bermasalah untuk mendapatkan warna bancuhan yang tepat.	-	-	4.8%	72.6%	22.6%	4.17
S6. Untuk membuat 'Roda Warna' yang kemas, potongan kertas yang telah diwarnakan perlu dipotong mengikut ukuran yang tepat sebelum ditampal pada mounting board. Kesilapan ukuran dan potongan akan mengakibatkan 'Roda Warna' yang dihasilkan menjadi tidak kemas..	-	-	6.5%	74.2%	19.4%	4.12
S7. Potongan secara tepat mengikut ukuran pada kertas yang telah diwarnakan dengan warna bancuhan dapat menjimatkan masa dalam penghasilan 'Roda Warna' dan memberikan hasil tugas yang lebih kemas dalam waktu yang singkat.	-	-	9.7%	79.0%	11.3%	4.01

S8.	Jika terdapat bahan rujuk bercetak untuk dijadikan rujukan warna 'Roda Warna', saya akan menggunakannya secara maksimum untuk memahami tentang teori warna.	-	-	-	72.6%	27.4%	4.27
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Jadual 3 di atas menunjukkan dapatan data soal selidik bagi bahagian B iaitu mengkaji tahap penguasaan kursus DVF10013 *Introduction to Art Design* oleh pelajar, elemen unsur seni dan permasalahan bagi tugas Roda Warna. Skor min tertinggi yang dicatatkan adalah 4.27 iaitu bagi soalan 'jika terdapat bahan rujuk bercetak untuk dijadikan rujukan warna 'Roda Warna' saya akan menggunakannya secara maksimum untuk memahami tentang teori warna. Manakala skor min terendah adalah 3.83 iaitu bagi soalan 'modul DVF10013 adalah modul yang menarik minat saya sebagai pelajar reka bentuk'. Berdasarkan dapatan ini, jelas menunjukkan bahawa pelajar memerlukan bahan ABM yang dapat membantu pelajar untuk lebih mudah memahami kursus ini, memahami tentang teori warna dan seterusnya meningkatkan pencapaian CLO2.

Jadual 4. Pendapat dan keberkesanan *Template for Color Wheel* serta kesediaan responden untuk menyebarkan penggunaan templat.

Soalan Kaji Selidik	Peratusan (100%)					Skor Min
	1 Sangat Tidak Setuju	2 Tidak Setuju	3 Tidak Pasti	4 Setuju	5 Sangat Setuju	
S1. Ini adalah merupakan kali pertama saya menggunakan Alat Bantu Mengajar – <i>TEMPLATE FOR COLOUR WHEEL</i> untuk mempelajari 'teori warna' di bilik kuliah.	-	-	11.3%	56.5%	32.3%	4.20
S2. Penggunaan Alat Bantu Mengajar – <i>TEMPLATE FOR COLOUR WHEEL</i> telah meningkatkan pemahaman saya dalam memahami unsur seni dan roda warna.	-	-	-	72.6%	27.4%	4.27
S3. Penggunaan Alat Bantu Mengajar – <i>TEMPLATE FOR COLOUR WHEEL</i> dapat membantu saya menyiapkan campuran warna dengan lebih cepat berdasarkan warna yang sebenar.	-	-	4.8%	79.0%	16.1%	4.11
S4. Penggunaan Alat Bantu Mengajar – <i>TEMPLATE FOR COLOUR WHEEL</i> dapat menjimatkan masa saya dalam penghasilan tugas Color Wheel	-	-	4.8%	77.4%	17.7%	4.12
S5. Dengan penggunaan Alat Bantu Mengajar – <i>TEMPLATE FOR COLOUR WHEEL</i> , saya dapat membuat 'Roda Warna' yang kemas dengan mengikut ukuran yang tepat.	-	-	3.2%	71.0%	25.8%	4.22
S6. Saya sangat berpuas hati dengan penggunaan Alat Bantu Mengajar – <i>TEMPLATE FOR COLOUR WHEEL</i> dalam penghasilan tugas 'Roda Warna' dan akan mencadangkan penggunaan <i>TEMPLATE FOR COLOUR WHEEL</i> ini kepada pelajar lain.	-	-	1.6%	59.7%	38.7%	4.37

Jadual 4 adalah merupakan dapatan data analisis bagi bahagian C iaitu pendapat dan keberkesanan *Template for Color Wheel* serta kesediaan responden untuk menyebarkan penggunaan templat. Berdasarkan analisis, nilai min terendah ialah 4.11 iaitu bagi soalan 'penggunaan alat bantu mengajar- *Template for Colour Wheel* dapat membantu saya menyiapkan campuran warna dengan lebih cepat berdasarkan warna yang sebenar. Manakala skor min tertinggi adalah 4.37 iaitu 'saya sangat berpuas hati dengan penggunaan Alat Bantu Mengajar – *Template for Colour Wheel* dalam penghasilan tugas 'Roda Warna' dan akan mencadangkan penggunaan *Template for Colour Wheel* ini kepada pelajar lain.

Perbincangan

Setelah analisis data dan hasil kajian diperolehi, kajian tertumpu kepada dua persoalan kajian yang dibincangkan iaitu bagaimanakah tahap pemahaman pelajar terhadap unsur warna setelah penggunaan templat? dan apakah tahap keberkesanan penggunaan templat terhadap tugas pelajar bagi kursus DVF10013 *Introduction to Art Design*.

1. Bagaimanakah tahap pemahaman pelajar terhadap unsur seni dan roda warna setelah penggunaan templat?

Tahap pencapaian pemahaman pelajar terhadap unsur seni dan roda warna setelah penggunaan templat menunjukkan keadaan yang baik di mana skor min yang dicatatkan adalah 4.27 di mana merupakan skor kedua tertinggi dalam dapatan analisa data. Keadaan ini telah dikukuhkan dengan pendapat Artlex, “*Color theory can be defined as the set of rules and guidelines that helps us understand color and its interactions with each other. It also allows artists to understand and organize colors in a well-structured system*”.

2. Apakah tahap keberkesanan penggunaan templat terhadap tugas pelajar bagi kursus DVF10013 *Introduction to Art Design*?

Pencapaian keberkesanan penggunaan templat terhadap tugas pelajar bagi kursus DVF10013 *Introduction to Art Design* adalah baik di mana peningkatan CLO2 dalam CORR kursus telah menunjukkan peningkatan sebanyak 3% berbanding pencapaian CLO2 sesi sebelumnya.

Kesimpulan

Secara kesimpulannya, pembangunan produk *Template for Colour Wheel* ini telah memberi impak dan keberkesanan kepada pengguna selari dengan objektif kajian. Dengan itu penggunaan templat ini perlu disebarluaskan kepada pensyarah dan pelajar untuk digunakan sepanjang proses PdP bagi kursus *DVF10013 Introduction to Art Design*. Produk ini telah berjaya meningkatkan pemahaman pelajar dalam memahami unsur seni dan roda warna. Selain itu pelajar mampu menghasilkan dan menyiapkan tugas ‘*Colour Wheel*’ dalam masa yang singkat dengan hasil tugas yang lebih berkualiti, kemas dan mengikut standard yang telah ditetapkan. Malah melalui penggunaan templat ini, pencapaian CLO2 pelajar dalam menghasilkan olahan rekaan dengan mengaplikasikan elemen dan prinsip seni dan rekaan dalam komunikasi visual berjaya ditingkatkan.

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THE FUNCTIONS AND EFFECTS OF LIGHTING ON PHOTOGRAPHY: OBSERVATIONS ON STUDENTS' LEVEL OF UNDERSTANDING

FUNGSI DAN KESAN PENCAHAYAAN PADA FOTOGRAFI: PEMERHATIAN TERHADAP TAHAP PEMAHAMAN PELAJAR

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Abstract

This study was conducted to measure students' level of understanding in mastering the basic techniques in photography to produce quality and attractive photos. The study was conducted because there was a percentage imbalance in the Course Learning Outcome (CLO) assessment for the DVG10012 Digital Photography course offered at the Department of Visual Design and Communication (JRKV), Ibrahim Sultan Polytechnic. The focus of the study focuses on the students' level of understanding, especially the topic of the function and effect of lighting on photography in the DVG10012 Digital Photography course. This study focuses on three (3) main objectives, namely (i) identifying the level of student understanding of the Digital Photography basic course and (ii) identifying effective methods to help students master the Digital Photography basic course and (iii) measuring the student's level of understanding in mastering the topic of the function and effect of lighting on photography. This study was conducted using a quantitative method which is data collection conducted through a targeted survey to measure the level of understanding of individuals. The research instrument used in this study is in the form of a questionnaire which is divided into four (4) parts, namely respondent information, students' level of general knowledge about the DVG10012 Digital Photography course, the level of understanding of the topic of the function and effect of lighting on photography as well as suggestions for improving the DVG10012 Digital Photography course. The study sample consisted of semesters one (1) to five (5) of the Diploma in Graphic Design (DRG) program under the Department of Visual Design and Communication (JRKV). The results of the study were analyzed using the Statistical Package for Social Science (SPSS) version 27.0 software for description in the form of frequency, percentage and mean. The results of the study show that 72.4% of students' level of understanding in the DVG10012 Digital Photography course, 58.2% of the level of understanding in the topic of functions and effects of lighting in photography.

Keywords: Photography, Photography Techniques, Light and Shadow in Photography

Abstrak

Kajian ini dijalankan bagi mengukur tahap kefahaman pelajar dalam menguasai teknik asas dalam fotografi bagi menghasilkan foto yang berkualiti dan menarik. Kajian dijalankan kerana wujud ketidakseimbangan peratusan dalam penilaian Course Learning Outcome (CLO) bagi kursus DVG10012 Digital Photography yang ditawarkan di Jabatan Rekabentuk dan Komunikasi Visual (JRKV), Politeknik Ibrahim Sultan. Fokus kajian menumpukan terhadap tahap kefahaman pelajar khususnya topik fungsi dan kesan pencahayaan pada fotografi dalam kursus DVG10012 Digital Photography. Kajian ini berfokuskan terhadap tiga (3) objektif utama iaitu (i) mengenalpasti tahap pemahaman pelajar terhadap kursus DVG10012 Digital Photography, (ii) mengenalpasti kaedah yang berkesan bagi membantu pelajar dalam menguasai kursus DVG10012 Digital Photography dan (iii) mengukur tahap kefahaman pelajar dalam menguasai topik fungsi dan kesan pencahayaan pada fotografi. Kajian ini dijalankan dengan menggunakan kaedah kuantitatif iaitu pengumpulan data yang dijalankan melalui kajian tinjauan bersasar untuk mengukur tahap kefahaman individu. Instrumen kajian yang digunakan dalam kajian ini berbentuk soal selidik yang terbahagi kepada empat (4) bahagian iaitu maklumat responden, tahap pengetahuan umum pelajar tentang kursus DVG10012 Digital Photography, tahap pemahaman terhadap topik fungsi dan kesan pencahayaan pada fotografi serta cadangan penambahbaikan kursus DVG10012 Digital Photography. Sampel kajian terdiri daripada semester satu (1) hingga lima (5) bagi program Diploma Rekabentuk Grafik (DRG) di bawah Jabatan Rekabentuk dan Komunikasi Visual (JRKV). Hasil dapatan kajian telah dianalisis dengan menggunakan perisian Statistical Package for Social Science (SPSS) versi 27.0 bagi huraian dalam bentuk frekuensi, peratus serta min. Keputusan kajian menunjukkan bahawa 72.4% tahap pemahaman pelajar dalam

kursus DVG10012 Digital Photography, 58.2% bagi tahap pemahaman dalam topik fungsi dan kesan pencahayaan pada fotografi.

Kata Kunci: Fotografi, Teknik Fotografi, Cahaya dan Bayang dalam Fotografi

Pengenalan

Pendidikan merupakan tunjang utama dalam sesebuah negara bagi menjadikan negara itu maju dan berkembang luas. Melalui sistem pendidikan, sesebuah negara akan mempunyai kelebihan dalam aspek daya saing kerana pendidikan ialah pemberdaya (enabler) yang menjadi asbab kepada seseorang individu untuk mencapai potensi penuh mereka, yang seterusnya secara tidak langsung akan menyumbang kepada pertumbuhan sosioekonomi negara. Oleh itu, adalah penting untuk menumpukan usaha ke arah membina dan menyokong sistem pendidikan tinggi berkualiti bagi memenuhi keperluan semasa negara. Pendidikan berkualiti akan meningkatkan keyakinan dan menarik pelabur asing ke negara ini. Hal ini seterusnya akan menyediakan peluang pekerjaan yang lebih banyak kepada rakyat. Pendidikan juga mendidik manusia berfikir secara rasional, bebas dan baik dan juga dapat menyelesaikan masalah dengan berkesan (Abdul Fatah Hassan, 2003). Menurut Amin (2021), pendidikan di Malaysia adalah suatu usaha berterusan ke arah memperkembangkan potensi individu secara menyeluruh dan bersepadu untuk mewujudkan insan yang harmonis dan seimbang dari segi intelek, rohani, emosi dan jasmani berdasarkan kepercayaan dan kepatuhan kepada Tuhan.

Merujuk pada Pelan Pembangunan Pendidikan Negara Malaysia 2015-2025 (pendidikan tinggi), melalui 10 lonjakan yang dikenalpasi berhasrat untuk menghasilkan graduan yang seimbang dan holistik dengan minda keusahawanan, melahirkan ‘penjana pekerjaan’ dan bukan sahaja ‘pencari pekerjaan’, meletakkan program berasaskan Pendidikan dan Latihan Teknikal dan Vokasional (TVET) setaraf dengan program akademik, dan membudayakan pembelajaran sepanjang hayat di peringkat kebangsaan. TVET adalah proses pendidikan dan latihan yang mempunyai hala tuju pekerjaan dengan penekanan utama terhadap amalan industri. Ia bertujuan untuk menghasilkan tenaga kerja yang kompeten dalam bidang-bidang yang tertentu. Skop TVET perlu berdasarkan standard pekerjaan yang diiktiraf, dengan penekanan kepada komponen praktikal, kemahiran psikomotor dan pendedahan kepada latihan di industri.

Tujuan TVET diperkenalkan adalah bagi memenuhi permintaan industri dan menyumbang kepada pertumbuhan ekonomi, selaras dengan globalisasi, ekonomi berasaskan pengetahuan, kemajuan teknologi dan mobiliti tenaga kerja global. TVET dengan mengupayakan pendekatan yang diterajui industri adalah penting untuk menyediakan modal insan berkemahiran yang diperlukan industri, terutama untuk menyokong peralihan sektor ekonomi ke arah aktiviti berasaskan pengetahuan, selari dengan aspirasi menjadi negara maju pada tahun 2020. Bidang TVET bukan sahaja mampu melahirkan bilangan pekerja mahir dan terlatih, malah berupaya mencipta pekerjaan sendiri berbekalkan kemahiran yang dimiliki. Sehubungan dengan itu, Politeknik merupakan institusi TVET yang mana program yang ditawarkan mengikut kehendak industri dan diterima baik oleh industri apabila graduan menamatkan sesi pengajian. Melalui konsep *Work Based Learning* (WBL) yang diperkenalkan, ia dapat melahirkan graduan yang berkualiti dan berkemahiran disamping dapat menjamin pekerjaan sebaik saja menamatkan sesi pengajian.

Justeru itu bagi melahirkan graduan TVET dan graduan yang berkebolehan, sistem pembelajaran dan pengajaran (PdP) perlulah bergerak seiring dan berdaya saing bagi mencapai matlamat tersebut. Sistem PdP perlu dinaiktaraf agar membolehkan pelajar dapat menyerap ilmu yang diberikan oleh pendidik. Pengajaran berkesan juga ditakrifkan sebagai pengajaran yang dapat meningkatkan pembelajaran dalam diri pelajar (Hunter, 1995 ditulis semula oleh Esah, 2003). Ianya bukan saja hanya berfokuskan pada konsep *chalk and talk* yang sering warga pendidik pratikkan namun sistem PdP perlukan dijalankan dengan aktiviti yang lebih kreatif dan teratur.

Penyataan Masalah

Bagi melahirkan graduan TVET yang berkebolehan dan berkemahiran, kursus DVG10012 Digital Photography merupakan kursus yang ditawarkan di bawah Jabatan Rekabentuk dan Komunikasi Visual (JRKV), Politeknik Ibrahim Sultan dan ianya adalah kursus teras wajib dalam program Rekabentuk serta ianya akan memberi impak terhadap keseluruhan nilai mata GCPA sekiranya pelajar tidak lulus dalam kursus tersebut. Untuk membolehkan pelajar menguasai dengan mahir tentang sesuatu bidang yang dipelajari, setiap kursus yang ditawarkan mempunyai *Course Learning Outcome* (CLO) yang mana CLO merujuk terhadap hasil pembelajaran kursus yang dapat dicapai oleh pelajar dari segi pengetahuan, kefahaman dan kebolehan secara lansung dan penilaian dijalankan melalui ujian, kerja khusus, kuiz dan sebagainya. Hasil daripada penilaian itu menunjukkan sama ada kursus tersebut diterima baik oleh pelajar atau sebaliknya.

Secara khususnya, bagi kursus DVG10012 Digital Photography terdapat tiga (3) CLO kursus yang perlu dicapai

iaitu CLO01 'Identify functions of photography and history development', CLO02 'Explain photography production processes from conventional towards digital era' dan CLO03 'Comprehend basic operations of handling a camera, lighting and photo- retouching composition techniques in various themes' yang mana CLO itu merujuk terhadap pecahan topik yang dipelajari oleh pelajar. Oleh itu bagi tujuan penambahbaikan pada kursus, satu tinjauan telah dijalankan bagi mengesan ketidakseimbangan peratusan CLO yang mana keputusannya mencapai purata peratusan sebanyak 61-71%. Ianya dikesan melalui laporan Summary Review Report (CORR) kursus yang dijana melalui Sistem Pengurusan Maklumat Politeknik (SPMP) bagi Program Diploma Rekabentuk Grafik (DRG) untuk sesi 2:2022/2023 (rujuk jadual 1).

Jadual 1 menunjukkan peratusan CLO01 mencapai peratusan 70.3% manakala CLO02 mencapai peratusan 71% dan CLO03 pula mencapai peratusan 61%. Hal ini menunjukkan CLO03 berada di tahap yang rendah jika dibanding dengan dua CLO lain yang melepasi peratusan 70%. CLO03 merujuk terhadap teknik asas pengendalian kamera, fungsi pencahayaan dan teknik pengolahan fotografi dalam pelbagai tema yang mana dalam topik tersebut menunjukkan tahap pemahaman pelajar berada di tahap yang lemah berbanding topik yang lain. Tambahan lagi pelajar menunjukkan kurang mahir dalam mengendalikan kamera dengan baik dan kurang penerokaan tentang teknik-teknik yang sesuai bagi menghasilkan fotografi yang menarik. Kesimpulannya, sekiranya permasalahan ini tidak diberi perhatian, ianya akan memberi impak secara keseluruhan program dan sekaligus terhadap pelajar.

Jadual 1. Peratusan Pencapaian CLO bagi Kursus DVG10012 Digital Photography bagi Laporan Courses Review Report (CORR) (Sumber: Spmp Politeknik Ibrahim Sultan, Sesi 2:2022/2023)

Review Report (10121) (Submitted Spring 1) Perencanaan Peranman Saktian, Desember 2022/2023)

1. COURSE INFORMATION						
PROGRAMME	: DIPLOMA REKABENTUK GRAFIK					
COURSE NAME	: DVG10012 - DIGITAL PHOTOGRAPHY					
CLASS	: DRG1A,DRG1B,DRG2A,DRG4A,					
SESSION	: II : 2022/2023					
2. COURSE LEARNING OUTCOME						
CLO	CONTENT	SECTION				GROUP ATTAINMENT (%)
		DRG1A	DRG1B	DRG2A	DRG4A	
CLO01	Identify functions of photography and history development.	74	77	60	xx	70.3
CLO02	Explain photography production processes from conventional towards digital era.	74	75	64	xx	71
CLO03	Comprehend basic operations of handling a camera, lighting and photo-retouching composition techniques in various themes.	80	79	24	xx	61

Objektif Kajian

Dalam melaksanakan kajian ini, terdapat tiga (3) objektif penting yang perlu dicapai iaitu;

- Mengenalpasti tahap pemahaman pelajar terhadap kursus DVG10012 *Digital Photography*
- Mengenalpasti kaedah yang berkesan bagi membantu pelajar dalam menguasai kursus DVG10012 *Digital Photography*
- Mengukur tahap kefahaman pelajar dalam penguasaan topik fungsi dan kesan pencahayaan pada fotografi

Latar Belakang Kajian

Dalam fotografi, fungsi dan pengawalan cahaya adalah sangat penting bagi menghasilkan fotografi yang menarik kerana kesan pencahayaan akan mempengaruhi tekstur, warna, mencipta kesan pada foto dan menyampaikan emosi secara langsung melalui fotografi. Ia terbahagi kepada dua jenis iaitu fotografi di luar studio dan fotografi di dalam studio. Bagi fotografi diluar studio, pengaruh cahaya dikawal melalui pengendalian kamera dan bergantung pada cahaya semulajadi serta kualiti foto yang terhasil adalah berbeza dengan kualiti foto yang dihasilkan dalam studio (rujuk gambar 1). Manakala fotografi dalam studio penekanan kesan cahaya lebih menggunakan penggunaan cahaya artifisial bagi membantu menghasilkan fotografi yang menarik disamping kawalan pengendalian kamera yang baik.



Fotografi diluar studio

Fotografi dalam studio

Gambar 1. Perbezaan Fotografi dalam Studio dan Luar Studio (Sumber: diambil Dari <https://blog.photoshelter.com/>, <https://www.lightstalking.com/>, <https://www.foodbloggersofcanada.com/> dan <https://henningphoto.net/>)

Oleh yang demikian, kajian ini dijalankan bagi tujuan untuk mengesan tahap kefahaman pelajar dalam kursus DVG10012 *Digital Photography* yang ditawarkan di Jabatan Rekabentuk dan Komunikasi Visual, Politeknik Ibrahim Sultan. Skop kajian memfokuskan terhadap tahap pemahaman pelajar dalam menguasai topik fungsi dan kesan pencahayaan pada fotografi khususnya fotografi dalam studio. Hasil tinjauan awal menunjukkan tahap pemahaman pelajar dalam menghasilkan fotografi yang menarik berada di tahap yang rendah sepertimana yang di nyatakan pada laporan CORR kursus. Tambahan lagi, kaedah pembelajaran dan pengajaran (PdP) yang dipraktikkan oleh pensyarah dalam mengajar topik tersebut kurang meningkatkan kemahiran pelajar bagi memahami topik yang dipelajari dengan lebih berkesan. Secara pratikkalnya, pensyarah menggunakan '*photo light box*' sebagai alat bantu mengajar (ABM) (rujuk gambar 2) dalam proses PdP dalam bilik kuliah khususnya untuk fotografi dalam studio. Namun begitu terdapat beberapa impak yang dikesan melalui penggunaan ABM tersebut iaitu penggunaan lampu yang mengawal cahaya sukar dikawal, rekabentuk yang tidak begitu stabil dan tiada garisan grid untuk menentukan '*rule of third*'. Hal ini menunjukkan tahap pemahaman pelajar begitu kurang dan hasil fotografi yang terhasil kurang berkualiti dari segi salah kawalan cahaya (kawalan *aperture*, *shutter speed* dan *ISO*), kedudukan objek tidak sesuai, tidak mempraktikkan teknik fotografi dan tiada '*white balance*' pada keseluruhan fotografi yang dihasilkan (rujuk gambar 3).



Gambar 2: Alat ABM '*photo light box*'



Gambar 3. Perbezaan Gambar Fotografi Yang Betul dan Salah dari Segi Kawalan *Aperture*, *Shutter Speed* dan *ISO*)

Persoalan Kajian

Tujuan kajian ini dijalankan adalah untuk mengesan tahap pemahaman pelajar dalam topik fungsi dan kesan

cahaya pada fotografi bagi pelajar semester satu (1) hingga lima (5) bagi program Diploma Rekabentuk Grafik (DRG). Oleh itu, objektif kajian adalah menjadi panduan terhadap persoalan kajian seperti berikut:

- i) Adakah tahap penguasaan pelajar terhadap kursus DVG10012 *Digital Photography*?
- ii) Apakah kaedah yang berkesan bagi membantu pelajar dalam menguasai kursus DVG10012 *Digital Photography*?
- iii) Apakah tahap penguasaan pelajar terhadap topik fungsi dan kesan pencahayaan pada fotografi?

Kepentingan Kajian

Kajian yang dijalankan ini dapat membantu dalam penambahbaikan kursus DVG10012 *Digital Photography* khususnya pada pencapaian *course learning outcome* (CLO) kursus. Disamping itu juga dapat membantu dalam mewujudkan alat bantu mengajar (ABM) untuk pensyarah dan alat bantu belajar (ABB) untuk pelajar. Cadangan dan langkah penambahbaikan yang diterima dalam kajian ini sekaligus dapat membantu bagi mengesan tahap kefahaman dan penerimaan pelajar dalam sesuatu kursus yang ditawarkan bagi sesebuah program.

Batasan Kajian

Batasan kajian yang dikesan dalam kajian ini ialah:

- a. Limitasi Kajian
Kajian hanya memfokuskan terhadap 15 orang pelajar yang terpilih bagi setiap semester satu (1) hingga lima (5) program Diploma Rekabentuk Grafik (DRG) untuk sesi 2:2022/2023 di Politeknik Ibrahim Sultan.
- b. Dilimitasi Kajian
Ketelusan dan ketepatan data yang diisi oleh responden dalam menjawab borang soal selidik dan borang cadangan.
Keberkesanan borang soal selidik dalam membantu menyelesaikan masalah ketidakfahaman pelajar dalam topik.

Kajian Literatur

Habibah Hassan dan Shaharom Nordin (2014) dalam kajian Tahap Kefahaman Kemahiran Mengukur Dan Kemahiran Mengenal Pasti Pemboleh Ubah Di Kalangan Pelajar Tingkatan Empat Merentas Aliran menunjukkan tahap kefahaman pelajar aliran Sains bagi kemahiran mengukur dan kemahiran mengenal pasti pemboleh ubah masing-masing adalah baik (63.90%) dan sederhana (41.45%). Manakala pelajar bukan Sains pula adalah sederhana (42.15%, 31.50%). Keadaan ini mungkin disebabkan oleh kurangnya penekanan kepada aspek KPS dalam P&P Sains. Oleh itu penggunaan KPS perlu dipertingkatkan lagi supaya kurikulum pendidikan Sains dapat melahirkan masyarakat yang celik Sains dan Teknologi (S&T).

Menurut Siti Sakinah binti Mohd Yusoff, Mazni binti Kohlit, Faizah binti Maarof dan Amal Zunnairah binti Abu Bakar (2021) dalam kajian Keberkesanan Penggunaan Alat Bantu Mengajar Interaktif Dalam Pengajaran Dan Pembelajaran Asas Pengaturcaraan, hasil kajian menunjukkan bahawa penggunaan abm interaktif dalam proses pembelajaran telah menyumbang kepada peningkatan pada pencapaian pelajar dalam topik pengaturcaraan.

Kajian Persepsi Pelajar terhadap Penggunaan Alat Bantu Mengajar Sifir Pita Ukur dalam Membantu Kemahiran Membaca Tali Pita Ukur dari Farahana Nadirah dan Mahamad Nadzar (2022) menyatakan penggunaan sifir pita ukur dapat memberikan gambaran dan proses jalan kerja yang mudah dalam membantu pelajar memahami proses pengajaran dan dapat memabantu pelajar agar proses pengajaran dan pembelajaran mencapai matlamatnya.

Menurut kajian Penggunaan Alat Bantu Mengajar (ABM) Di Kalangan Guru-Guru Teknikal Di Sekolah Menengah Teknik Daerah Johor Bahru, Johor daripada Abdul Rahim Hamdan, Hayazi Mohd Yasin (2010), penggunaan ABM dalam proses pengajaran dan pembelajaran adalah penting menurut guru-guru teknikal, hasil kajian memerlukan tindakan dari pihak guru, pentadbir sekolah, Jabatan Pelajaran Negeri dan Kementerian Pelajaran Malaysia bagi membantu meningkatkan lagi penggunaan alat bantu mengajar di kalangan guru-guru.

Merujuk Hanifah Mahat, Satryani Arshad, Yazid Saleh, Kadaruddin Aiyub, Mohmadisa Hashim, Nasir Nayan (2020) dalam kajian Penggunaan dan penerimaan bahan bantu mengajar multimedia terhadap keberkesanan pembelajaran Geografi menunjukkan bahawa keberkesanan pembelajaran geografi terhadap pelajar dipengaruhi oleh penggunaan elemen BBM multimedia dan reka bentuk BBM multimedia yang menarik dan berkesan. Implikasi kajian ini secara tidak langsung dapat dijadikan sebagai panduan dan hala tuju kepada guru dalam merancang perubahan teknik dan strategi pengajaran dan pembelajaran Geografi yang lebih mudah, menarik dan menyeronokkan seterusnya dapat memberi kesan terhadap peningkatan pencapaian maksimum akademik dan

sikap pelajar.

Mohamed Nor Azhari Azmana, Nur Amierah Azlia, Ramlee Mustaphaa , Balamuralithara Balakrishnan, Nor Kalsum Mohd Isac (2014) dalam kajian Penggunaan Alat Bantu Mengajar ke Atas Guru Pelatih Bagi Topik Kerja Kayu, Paip dan Logam menunjukkan penggunaan ABM berunsur elektronik seperti audio visual, komputer dan software diberi perhatian khusus memandangkan penggunaan ini lebih menarik murid apatah lagi dalam pengajaran Kemahiran Hidup yang telah disignifikan dengan kerja amali melibatkan kemahiran berunsurkan video dan audio visual.

Metodologi Kajian Rekabentuk Kajian

Kajian yang dijalankan adalah berbentuk kajian kuantitatif bagi mengenalpasti dan mengkaji secara sistematik berkaitan tahap kefahaman pelajar dalam topik fungsi dan kesan pencahayaan pada fotografi. Kajian ini menggunakan reka bentuk kajian tinjauan. Menurut Mohd Majid Konting (1998), kajian ini diklasifikasikan sebagai salah satu jenis kajian dalam penyelidikan deskriptif. Reka bentuk kajian tinjauan merupakan presedur dalam penyelidikan kuantitatif yang mana pengkaji menjalankan satu tinjauan terhadap sampel atau keseluruhan populasi (Creswell, 2005).

Menurut Lewin (1946) yang ditulis semula oleh Cohen et.al (2000), kajian tindakan sering digunakan dalam penyelidikan pendidikan. Kajian ini bersifat mengubah atau menambahbaikkan proses pengajaran dan pembelajaran serta meningkatkan mutu kualiti sistem pendidikan. Antara model kajian tindakan Lewin ialah merancang, bertindak, memerhati dan mereflek. Berikut adalah kerangka teori dan kerangka operasional kajian yang digunakan dalam kajian ini.

i) Kerangka Teori

Kerangka teori memfokuskan pada model asas teori fotografi yang ditulis semula oleh Alizaifik (2021), teknik pencahayaan dalam fotografi sangat penting dipraktikkan bagi mendapatkan hasil fotografi yang baik dan cahaya adalah komponen yang penting dalam fotografi. Model ini adalah sebagai panduan untuk individu untuk menghasilkan fotografi yang menarik (rujuk rajah 1).

TEORI CAHAYA DALAM FOTOGRAFI

FUNGSI CAHAYA:

1. Menerangi objek
2. Mempengaruhi warna dan tekstur pada foto
3. Memberi kesan emosi pada foto
4. Mencipta paparan imej artistik
5. Mencipta kesan khas
6. Menghapuskan bayang yang mengganggu
7. Mencipta imej semula jadi
8. Mencipta suasana

SUMBER CAHAYA:

1. Nature Light
2. Artificial Light
3. Mix Light

TEKNIK CAHAYA DAN KESAN:

1. Teknik *Front Light* - Bahagian depan objek akan mendapat cahaya penuh seperti menggunakan lampu *flash*
2. Teknik *Oval Light* - Teknik pencahayaan yang memanfaatkan arah cahaya yang datang dari sudut 45° dari posisi juru foto berada 3/4 dari posisi objek yang digambarkan.
3. Teknik *Side Light* - Posisi cahaya berada pada sisi objek sehingga bayangan dan terang objek akan terbahagi menjadi dua, bahagian terang dan bayangan akan berada pada posisi yang berlawanan.
4. Teknik *Rim Light* - Teknik yang arah cahaya yang datang dari belakang objek dengan sudut 1/4 objek, bahagian depan objek akan kelihatan gelap.
5. Teknik *Back Light* - Teknik pencahayaan yang arah cahaya yang datang tepat dari belakang objek yang dipotret.
6. Teknik *Top Light* - Teknik pencahayaan yang arah cahaya yang datang dari bahagian atas objek yang dipotret.
7. Teknik *Down Light* - Teknik cahaya dibawah objek
8. Teknik *Ray of Light* - Teknik yang memanfaatkan karakteristik cahaya semulajadi



KESAN CAHAYA PADA FOTOGRAFI

1. Mencipta kesan dramatik, illusionistik, semulajadi
2. Menjadikan foto lebih berkualiti
3. Memberi kesan emosi dan memberi tekstur pada foto
4. Mengolah perubahan warna foto
5. Mewujudkan keseimbangan dalam foto

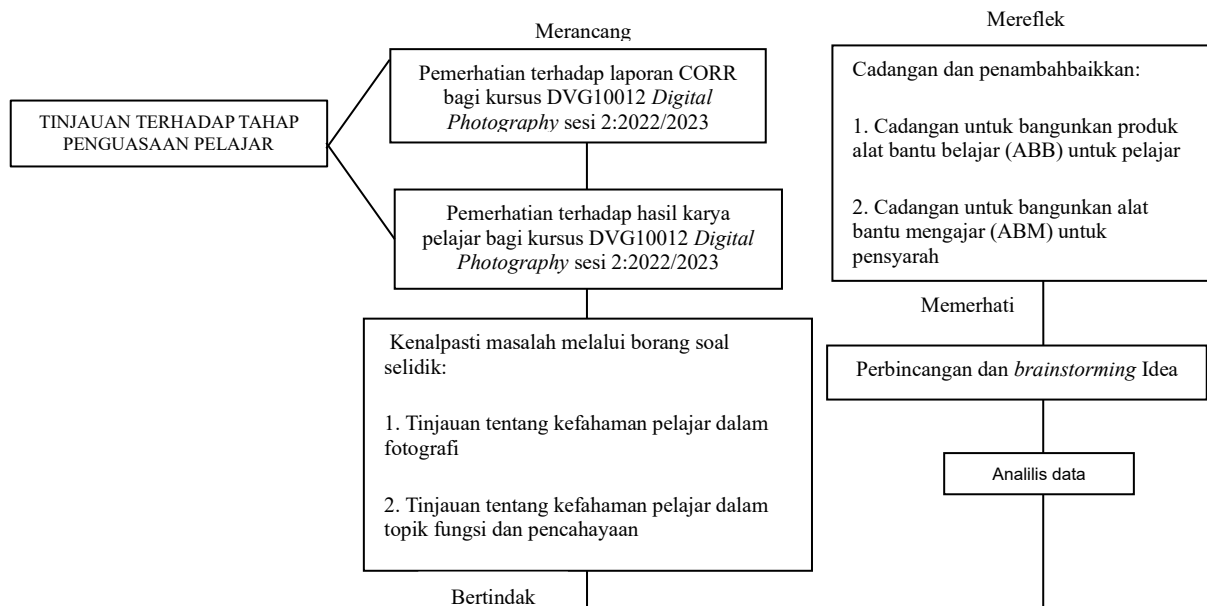
Rajah 1. Model Asas Teori Fotografi (ditulis semula oleh Alizaifik (2021))

ii) Kerangka Operasional

Kerangka operasional dirujuk bagi tujuan untuk mengkaji dan merangka serta mereflek kajian yang telah dijalankan, ianya terbahagi kepada empat fasa iaitu:

i) Fasa pertama (merancang) - merancang dan tinjauan

- ii) Fasa kedua (bertindak) - bertindak dengan mengenalpasti masalah melalui tinjauan borang soal selidik
- iii) Fasa ketiga (memerhati) – memerhati dan perbincangan hasil daripada dapatan data
- iv) Fasa keempat (mereflek) – cadangan penambahbaikan dan penyelesaian masalah.



Rajah 2. Kerangka Operasional Kajian (Sumber: Kerangka Kajian Tindakan Lewin (1946))

Populasi Dan Sample Kajian

Menurut Gay dan Airasian (2003), populasi adalah kumpulan sasaran pengkaji, iaitu kumpulan kepada siapa hasil kajian akan digeneralisasikan manakala sampel kajian pula ialah responden-responden kajian yang dipilih untuk mewakili sesuatu populasi. Menurut Krejcie and Morgan (1970), 77 sampel perlu diambil sekiranya jumlah keseluruhan responden adalah 95 orang. Justeru, sasaran kajian ini memfokuskan terhadap 77 responden yang terpilih bagi pelajar semester satu (1) hingga lima (5) bagi sesi 2: 2022/2023 untuk Program Diploma Rekabentuk Grafik (DRG) di bawah Jabatan Rekabentuk dan Komunikasi Visual, Politeknik Ibrahim Sultan. Jadual 2 menunjukkan sasaran pelajar yang terpilih.

Jadual 2. Taburan Responden Mengikut Program (Sumber: SPMP Politeknik Ibrahim Sultan, Sesi 2:2022/2023)

Bil. Pelajar	Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Jumlah Keseluruhan
	15	15	15	15	15	75

Instrumen Kajian

Pelaksanaan kajian adalah menggunakan kaedah kuantitatif iaitu pengumpulan data yang dilaksanakan melalui kajian tinjauan bersasar untuk mengesan tahap kefahaman pelajar dalam topik fungsi dan kesan pencahayaan pada fotografi. Instrumen kajian yang digunakan dalam kajian ini berbentuk:

- a) Borang soal selidik
 - Borang soal selidik terbahagi kepada empat (4) bahagian iaitu:
- 1) Komponen A:
 - i) Maklumi latar belakang responden
- 2) Komponen B:
 - i) Tahap penguasaan umum pelajar terhadap Kursus DVG10012 *Digital Photography*
- 3) Komponen C:
 - i) Tahap penguasaan umum pelajar terhadap topik fungsi dan kesan pencahayaan pada fotografi
- 4) Komponen D:

i) Cadangan dan penambahbaikan kursus DVG10012 *Digital Photography*

Borang soal kaji selidik yang digunakan dalam kajian ini berbentuk skala *likert* yang mana skala *likert* (1932) digunakan untuk mengukur sikap, pendapat dan persepsi seseorang mengenai suatu fenomena (rujuk jadual 3). Menurut Mohamad Najib (1999), kebolehpercayaan item soalan boleh ditentukan dengan menggunakan kaedah Pekali Alpha Cronbach. Manakala menurut Sekaran (2003), Alpha Cronbach adalah antara kaedah yang paling meluas digunakan bagi menentukan kebolehpercayaan sesuatu soal kaji selidik. Borang soal kaji selidik yang digunakan dalam kajian ini berbentuk skala *likert* yang mana skala *likert* (1932) digunakan untuk mengukur sikap, pendapat dan persepsi seseorang mengenai suatu fenomena.

Skala interval juga digunakan dalam kajian ini yang mana skala interval merujuk skala yang menginginkan jawapan tegas, seperti jawapan benar - salah, ya - tidak, pernah - tidak pernah, positif - negatif, tinggi - rendah, baik - buruk, dan seterusnya. Menurut Guttman (1994), hanya ada dua interval contohnya pernyataan setuju dan tidak setuju bagi menentukan jawapan (rujuk jadual 4).

Jadual 3. Skala Pemeringkatan Likert

Skor Pemilihan Jawapan	
2)	Sangat Tidak Setuju (Sts)
3)	Kurang Bersetuju (Kb)
4)	Sedikit Bersetuju (Sb)
5)	Bersetuju (B)
6)	Sangat Bersetuju (Sb)

Sumber: Mohamad Najib (1999)

Jadual 4. Skala Interval (Guttman, 1997)

Skala	
Setuju	Tidak Setuju
Benar	Tidak Benar
Tinggi	Rendah
Positif	Negatif
Baik	Buruk
Pernah	Tidak Pernah

Prosedur Pengumpulan Data

Data kajian ini dikumpul melalui soal selidik. Soal selidik telah diedarkan melalui medium aplikasi *goggle form* dan diedarkan kepada semua responden yang terlibat.

Kaedah Analisis Data

Data primer dikumpulkan dengan menggunakan kaedah kaji selidik. Instrumen yang digunakan dalam kajian ini adalah soal selidik yang diedarkan kepada pelajar semester satu (1) hingga lima (5) di Jabatan Reka Bentuk Komunikasi Visual. Data yang diperolehi adalah berbentuk kuantitatif dan kaedah penganalisaan digunakan termasuklah peratusan dan skor min iaitu analisis instrumen deskriptif. Bagi memudahkan responden untuk menjawab soal selidik, skala likert 5 mata dan skala interval digunakan bagi melihat kecenderungan responden terhadap sesuatu pernyataan.

Menurut Rudzi (2003), Nilai skala diukur dengan menggunakan interpretasi skor min sesuatu item menunjukkan julat diantara 1.00 sehingga 1.99 menganggap bahawa item itu berada di tahap yang rendah. Manakala julat diantara 2.00 sehingga 2.99 berada di tahap sederhana dan julat 3.00 sehingga 4.00 berada di tahap baik serta 4.01 hingga 5.00 berada di tahap sangat baik (rujuk jadual 5). Setelah data dikumpulkan, penyelidik menganalisa data tersebut dengan menggunakan perisian *Statistical Package Science Social* (SPSS) untuk mendapatkan instrumen deskriptif yang berbentuk carta pai, graf dan jadual.

Jadual 5. Nilai Min Empat Skala Markah (Sumber: Rudzi (2003))

Nilai Min	Tahap
1.00 – 1.99	Rendah
2.00 – 2.99	Sederhana
3.00 – 4.00	Baik
4.01 – 5.00	Sangat Baik

Kajian Rintis

Kajian rintis telah dilaksanakan kepada sekumpulan pelajar seramai 77 orang bagi melengkapkan soal selidik yang telah dibina dan diadaptasi daripada Muhd Tajuddin (2016). Hasil dapatan instrumen daripada responden kajian rintis telah diambil kira untuk diperbaiki sebelum soal selidik diedarkan kepada responden sebenar.

Kesahan Dan Kebolehpercayaan

Hasil keputusan penilaian kesahan dan kebolehpercayaan diperolehi melalui data yang dianalisis melalui perisian *Statistical Package Science Social* (SPSS). Terdapat beberapa strategi yang boleh digunakan dalam meningkatkan kebolehpercayaan kajian kuantitatif seperti yang telah dinyatakan oleh Kamarul Azmi (2012) yang mana kaedah ini digunakan bagi menentukan kerelevanan instrumen dan memberi makna pada data yang diperolehi dalam membuat keputusan. Berdasarkan kepada keputusan yang diperolehi daripada SPSS, nilai Cronbach's Alpha bagi kajian ini ialah 0.734. Justeru, nilai ini mentafsirkan bahawa soalan yang dikemukakan kepada responden adalah baik dan boleh diterima (rujuk jadual 6).

Jadual 6: Interpretasi Skor Alpha Cronbach (Marian & Rahim, 2019)

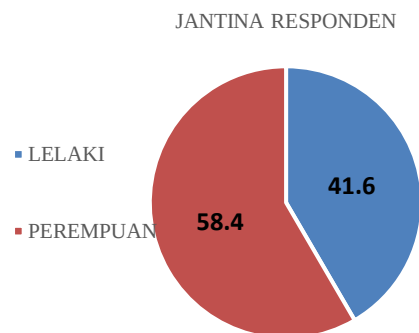
Skor Alpha Cronbach	Tahap Kebolehpercayaan
0.8 hingga 1.0	Sangat baik dan efektif dengan tahap konsistensi yang tinggi
0.7 hingga 0.8	Baik dan boleh diterima
0.6 hingga 0.7	Boleh diterima
<0.6	Item perlu dibaiki
<0.5	Item perlu digugurkan

Keputusan Dan Perbincangan

Hasil dari borang soal selidik yang telah diedarkan kepada responden, keputusan data yang diperolehi adalah seperti berikut:

KOMPONEN A: Komponen A merujuk demografi/latar belakang responden

a. Jantina Responden

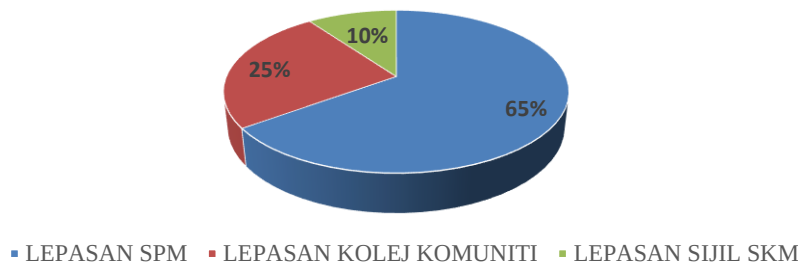


Carta 1. Taburan Peratusan Maklumat Latar Belakang Responden bagi Jantina

Carta 1 menunjukkan taburan peratusan maklumat latar belakang responden bagi jantina iaitu lelaki sebanyak 41.6% dan perempuan 58.4%.

b. Tahap Akademik

TAHAP AKDEMIK RESPONDEN



Carta 2. Taburan Peratusan Maklumat Tahap Akademik Responden

Bagi peratusan maklumat tahap akademik responden menunjukkan peratusan tahap akademik lepasan SPM iaitu 65%, tahap lepasan Kolej Komuniti sebanyak 25% dan tahap akademik lepasan sijil SKM pula sebanyak 10% (rujuk carta 2).

c. Sesi Pengajian

Jadual 7. Taburan Peratusan Sesi Pengajian bagi Responden

Semester	Jumlah Responden	Jumlah %
Semester 1	15	20
Semester 2	15	20
Semester 3	15	20
Semester 4	15	20
Semester 5	15	20

Jadual 7 menunjukkan sesi pengajian responden iaitu semester 1 hingga semester 5 mewakili 20% dan jumlah responden mewakili 15 orang setiap semester (rujuk jadual 7).

KOMPONEN B: Komponen B merujuk tahap penguasaan umum responden terhadap Kursus DVG10012 *Digital Photography*

Jadual 8. Tahap Penguasaan Umum Responden Terhadap Kursus DVG10012 *Digital Photography*

No.	Item Soalan	Ya (%)	Tidak (%)	Tahu Sedikit Sahaja (%)	Kurang Tahu Langsung (%)	Tidak Berapa Minat (%)
1.	Adakah anda pernah belajar kursus Fotografi sebelum ini?	87	13	0	0	0
2.	Adakah anda pernah mengendalikan kamera?	96.1	3.9	0	0	0
3.	Adakah anda tahu cara mengambil gambar dengan baik?	2.6	0	89.6	7.8	0
4.	Adakah anda tahu teknik-teknik dalam Fotografi?	15	0	85	0	0
5.	Adakah anda berminat dengan Fotografi?	94.8	3.9	0	0	1.3
6.	Bagi saya Fotografi satu bidang seni yang menarik?	70	30	0	0	0
7.	Saya berminat dengan kelas Fotografi yang ditawarkan di JRKV?	96.1	3.9	0	0	0
8.	Adakah ingin belajar Fotografi lanjutan?	93.4	6.6	0	0	0
9.	Sebagai pelajar Rekabentuk, Fotografi adalah bidang yang penting bagi seseorang pereka bagi menghasilkan rekaan yang terbaik	97.4	2.6	0	0	0
Jumlah Keseluruhan		72.4	7.1	19.4	0.9	0.2

Rujuk pada jadual 8, hasil keputusan bagi komponen B iaitu tahap penguasaan umum responden terhadap kursus DVG10012 *Digital Photography* menunjukkan soalan 1 mencapai 87% responden menjawab ‘YA’, soalan 2 mencapai 96.1% responden menjawab ‘YA’, soalan 3-pula mencapai 89.6% responden menjawab ‘Tahu Sedikit Sahaja’ dan soalan 4 mencapai 85% responden menjawab ‘Tahu Sedikit Sahaja’. Manakala soalan 5 mencapai 94.8% responden menjawab ‘YA’, soalan 6 mencapai 100% responden menjawab ‘YA’, soalan 7-pula mencapai 96.1% responden menjawab YA, soalan 8 dan soalan 9 pula mendapat 93.4% serta 97.4% responden menjawab ‘YA’ (rujuk jadual 8). Kesimpulannya, bagi tahap penguasaan umum responden terhadap *Photography* menunjukkan 72.4% secara keseluruhan data yang diterima.

KOMPONEN C: Tahap pemahaman terhadap topik fungsi dan kesan pencahayaan pada Fotografi

Kandungan item soalan komponen C mempunyai 10 soalan yang perlu dijawab oleh responden (rujuk jadual 9). Item soalan 1 – 5 menggunakan skala likert 5 mata manakala item soalan 6-10 menggunakan skala interval. Item soalan itu ialah:

- a) Item soalan 1 hingga 5

Jadual 9. Item Soalan Tahap Pemahaman Terhadap Topik Fungsi Dan Kesan Pencahayaan Pada Fotografi

No.	Item Soalan
1.	Topik fungsi dan kesan pencahayaan pada fotografi sangat senang difahami dan dipelajari
2.	Penerangan topik dari pensyarah sangat berkesan bagi menjelaskan tentang topik kesan pencahayaan pada Fotografi
3.	ABM yang diaplikasikan oleh pensyarah meningkatkan kefahaman saya dalam memahami topik kesan pencahayaan pada Fotografi
4.	Topik fungsi dan kesan cahaya pada gambar tidak penting bagi menghasilkan gambar yang berkualiti
5.	Saya tidak perlu mempelajari kawalan cahaya pada gambar bagi menghasilkan gambar yang cantik
6.	Pada saya, cahaya amat penting dalam Fotografi
7.	Saya kurang faham apabila pensyarah menerangkan tentang topik fungsi dan kesan cahaya pada gambar ketika sesi PdP
8.	Saya amat lemah dalam mengawal cahaya pada gambar dan gambar yang saya ambil tidak kualiti
9.	Jika ada alat yang lebih pratikan untuk saya pratikkan kawalan cahaya pada gambar, saya akan gunakan
10.	Saya sangat perlukan bantuan dalam memahami dengan lebih baik dalam topik fungsi dan kesan pencahayaan pada gambar

Jadual dibawah menunjukkan hasil keputusan bagi komponen C untuk soalan 1, item soalan ‘topik fungsi dan kesan pencahayaan pada Fotografi sangat senang difahami dan dipelajari’ 59.7% menunjukkan responden menjawab ‘sangat tidak bersetuju’ dan purata keseluruhan nilai min ialah 1.7 serta berada ditahap kedudukan ‘rendah’ (rujuk jadual 10).

Jadual 10. Item Soalan ‘Topik Fungsi Dan Kesan Pencahayaan Pada Fotografi Sangat Senang Difahami Dan Dipelajari (Item Soalan 1)

Frekuensi	Purata Nilai Min	Tahap Kedudukan
Sangat Tidak Setuju (Sts) 49	59.7	
Kurang Bersetuju (Kb) 19	24.7	
Sedikit Bersetuju (Sb) 9	11.7	
Bersetuju (B) 1	1.3	
Sangat Bersetuju (Sb) 2	2.6	
Jumlah 77	100.01.7	Rendah

Bagi keputusan soalan 2, item soalan ‘penerangan topik dari pensyarah sangat berkesan bagi menjelaskan tentang topik kesan pencahayaan pada Fotografi’ menunjukkan 52% responden menjawab ‘sangat tidak bersetuju’ dan purata keseluruhan nilai min ialah 1.7 serta berada ditahap kedudukan rendah (rujuk jadual 11).

Jadual 11. Item Soalan ‘Penerangan Topik Dari Pensyarah Sangat Berkesan Bagi Menjelaskan Tentang Topik Kesan Pencahayaan Pada Fotografi (Item Soalan 2)

Frekuensi	Peratusan	Purata Nilai	Min Tahap Kedudukan
Sangat Tidak Setuju (Sts)	40	52.0	
Kurang Bersetuju (Kb)	26	33.4	
Sedikit Bersetuju (Sb)	1	1.3	
Bersetuju (B)	9	12	
Sangat Bersetuju (Sb)	1	1.3	
Jumlah	77	100.01.7	Rendah

Keputusan bagi soalan 3, item soalan ‘ABM yang diaplikasikan oleh pensyarah meningkatkan kefahaman saya dalam memahami topik kesan pencahayaan pada Fotografi’ menunjukkan keputusan 58% responden menjawab ‘sedikit bersetuju’ dan purata keseluruhan nilai min ialah 3.4 serta berada ditahap kedudukan baik (rujuk jadual 12).

Jadual 12. Item Soalan ‘ABM Yang Diaplikasikan Oleh Pensyarah Meningkatkan Kefahaman Saya Dalam Memahami Topik Kesan Pencahayaan Pada Fotografi (Item Soalan 3)

Frekuensi	Peratusan	Purata Nilai	Min Tahap Kedudukan
Sangat Tidak Setuju (Sts)	0	0	
Kurang Bersetuju (Kb)	0	0	
Sedikit Bersetuju (Sb)	45	58.0	
Bersetuju (B)	32	42.0	
Sangat Bersetuju (Sb)	0	0	
Jumlah	77	100.03.4	Baik

Soalan 4, item soalan ‘topik fungsi dan kesan cahaya pada gambar tidak penting bagi menghasilkan gambar yang berkualiti’ pula menunjukkan 73% responden menjawab ‘kurang bersetuju’ dan purata keseluruhan nilai min ialah 4.7 serta berada ditahap kedudukan sangat baik (rujuk jadual 13).

Jadual 13. Item Soalan ‘Topik Fungsi Dan Kesan Cahaya Pada Gambar Sangat Penting Bagi Menghasilkan Gambar (Item Soalan 4)

Frekuensi	Peratusan	Purata Nilai	Min Tahap Kedudukan
Sangat Tidak Setuju (Sts)	21	27.0	
Kurang Bersetuju (Kb)	56	73.0	
Sedikit Bersetuju (Sb)	0	0	
Bersetuju (B)	0	0	
Sangat Bersetuju (Sb)	0	0	
Jumlah	77	100.04.7	Sangat Baik

Jadual 14. Item Soalan ‘Saya Tidak Perlu Mempelajari Kawalan Cahaya Pada Gambar Bagi Menghasilkan Gambar Yang Cantik’ (Item Soalan 5)

Frekuensi	Peratusan	Purata Nilai	Min Tahap Kedudukan
Sangat Tidak Setuju (Sts)	26	34	
Kurang Bersetuju (Kb)	51	66	
Sedikit Bersetuju (Sb)	0	0	
Bersetuju (B)	0	0	
Sangat Bersetuju (Sb)	0	0	
Jumlah	77	100.0	1.6 Rendah

Bagi soalan 5-pula, item soalan ‘saya tidak perlu mempelajari kawalan cahaya pada gambar bagi menghasilkan gambar yang cantik’ pula menunjukkan 34% responden menjawab ‘sangat tidak bersetuju’ dan purata keseluruhan nilai min ialah 1.6 serta berada ditahap kedudukan rendah (rujuk jadual 14).

Jadual 15. Jumlah Keseluruhan Purata Nilai Min dan Peratusan bagi Komponen C, Item Soalan 1-6

Item Soalan	Purata Nilai Min	Peratusan
Soalan 1	1.734	
Soalan 2	1.734	
Soalan 3	33.468	
Soalan 4	44.794	
Soalan 5	51.632	
Jumlah Keseluruhan	2.62	52.4

Rumusannya item soalan 1 hingga 6 bagi komponen C menunjukkan purata nilai min iaitu 2.62 iaitu berada ditahap sederhana dan purata peratusan iaitu 52.4% (rujuk jadual 15) bagi keseluruhan data yang diperolehi.

b) Item soalan 6 hingga 10

Jadual 16. Item Soalan 6 – 10 Bagi Komponen C Tahap Pemahaman Terhadap Topik Fungsi Dan Kesan Pencahayaan Pada Fotografi

No.	Item Soalan	Benar (%)	Jumlah Responden	Tidak Benar (%)	Jumlah Responden
S6.	Topik fungsi dan kesan pencahayaan pada Fotografi diterangkan dengan lebih jelas oleh pensyarah sesi PdP	22	17	78	60
S7.	Saya kurang faham apabila pensyarah menerangkan tentang topik fungsi dan kesan cahaya pada gambar ketika sesi PdP	78	60	22	17
S8.	Alat bantu belajar (ABB) yang sedia ada membantu saya untuk faham tentang topik	31	24	69	53
S9.	Jika ada alat yang lebih pratikan untuk saya pratikkan kawalan cahaya pada gambar, saya akan gunakan	91	70	9	7
S10.	Saya sangat perlukan bantuan dalam memahami dengan lebih baik dalam topik fungsi dan kesan pencahayaan pada gambar	95	73	5	4
Jumlah Keseluruhan		63.4%		36.6%	

Item soalan 6 hingga 10 bagi komponen C (rujuk jadual 16), keputusan menunjukkan item soalan 6 iaitu ‘topik fungsi dan kesan pencahayaan pada Fotografi diterangkan dengan lebih jelas oleh pensyarah sesi PdP’ mencapai 78% responden menjawab ‘tidak benar’ dan 22% menjawab ‘benar’. Bagi item soalan 7 pula, responden menjawab pernyataan ‘benar’ yang mewakili 78% dan menjawab pernyataan ‘tidak benar’ mewakili 22% bagi item soalan ‘saya kurang faham apabila pensyarah menerangkan tentang topik fungsi dan kesan cahaya pada gambar ketika sesi PdP’. Item soalan 8 merujuk soalan ‘alat bantu belajar (ABB) yang sedia ada membantu saya untuk faham tentang topik’, responden menjawab 69% bagi pernyataan ‘tidak benar’ dan 31% bagi pernyataan ‘benar’. Responden menjawab pernyataan ‘benar’ yang mewakili 91% manakala pernyataan ‘tidak benar’ mewakili 9% bagi item soalan 9 iaitu ‘jika ada alat yang lebih pratikan untuk saya pratikkan kawalan cahaya pada gambar, saya akan gunakan’. Item soalan 10 pula responden menjawab pernyataan ‘benar’ yang mewakili 95% dan 5% pula responden menjawab pernyataan ‘tidak benar’ bagi item soalan ‘saya sangat perlukan bantuan dalam memahami dengan lebih baik dalam topik fungsi dan kesan pencahayaan pada gambar’. Oleh itu, secara rumusannya menunjukkan komponen C iaitu tahap pemahaman responden terhadap topik fungsi dan kesan pencahayaan pada Fotografi mencapai 64% purata keseluruhan.

Kesimpulannya untuk komponen C, keputusan purata keseluruhan menunjukkan pencapaian peratusan sebanyak 58.2% yang mana berada di tahap sederhana.

KOMPONEN D: Cadangan dan penambahbaikan Cadangan dan penambahbaikan kursus DVG10012 *Digital Photography*

Kandungan item soalan komponen C mempunyai tiga (3) soalan yang perlu dijawab oleh responden (rujuk jadual 17). Bagi komponen ini data dianalisis melalui kekerapan dan peratusan. Item soalan itu ialah:

Jadual 17. Item Soalan bagi Komponen D, Cadangan dan Penambahbaikkan Alat Bantu Belajar (ABB) Bagi Kursus DVG10012 *DIGITAL PHOTOGRAPHY*

No.	Item Soalan
1.	Cadangan anda dalam penambahbaikkan kursus DVG10012 <i>DIGITAL PHOTOGRAPHY</i>
2.	Cadangan anda dalam meningkatkan kefahaman anda pada topik fungsi dan kesan cahaya pada gambar dalam kursus DVG10012 <i>DIGITAL PHOTOGRAPHY</i>
3.	Cadangan anda dalam alat bantu belajar (ABB) yang boleh digunakan dalam sesi PdP bagi kursus DVG10012 <i>DIGITAL PHOTOGRAPHY</i>

i) Cadangan anda dalam penambahbaikkan kursus DVG10012 *DIGITAL PHOTOGRAPHY*

Merujuk pada jadual 18, 65% responden memberi cadangan ‘saya cadangkan agar pensyarah perlu sediakan alat belajar untuk lebih faham, contohnya alat yang boleh digunakan untuk bantu belajar di kelas’ mewakili 50 orang responden (rujuk jadual 18).

Jadual 18. Item Soalan ‘Cadangan Anda Dalam Penambahbaikkan Kursus DVG10012 *DIGITAL PHOTOGRAPHY*’

Cadangan anda dalam penambahbaikkan kursus DVG10012 *DIGITAL PHOTOGRAPHY*

No.	Item Soalan	Jumlah Responden	Peratusan (%)	Kekerapan
1.	Saya cadangkan agar pensyarah perlu sediakan alat belajar untuk lebih faham, contohnya alat yang boleh digunakan untuk bantu belajar di kelas	50	65	
2.	Cadangan saya kursus Fotografi perlu menunjukkan cara penggunaan secara fizikal yang lebih mudah dilihat dan memaparkan video yang lebih banyak untuk rujukan semasa di kelas	10	13	
3.	Saya cadangkan agar pensyarah memperbanyakkan alat bantu belajar sebagai contoh banyakkkan <i>light box</i> supaya dapat ambil gambar dalam studio	5	6	
4.	Sekiranya ada alat bantu belajar untuk pelajar gunakan di kelas, pelajar akan lebih faham semua topik yang diajar oleh pensyarah terutamanya topik yang susah	10	13	
5.	Jam pertemuan kelas perlu dibanyakkkan kerana kursus Fotografi adalah kursus praktikal berbanding kursus lain	2	3	

ii) Cadangan anda dalam meningkatkan kefahaman anda pada topik fungsi dan kesan pencahayaan pada Fotografi

Bagi jadual 19 pula, 45% responden memberi cadangan ‘saya cadangkan pensyarah perlu gunakan alat bantu belajar yang lebih berkesan bagi membantu pelajar untuk faham tentang topik’ mewakili 35 orang responden (rujuk jadual 19).

Jadual 19. Item Soalan ‘Cadangan Anda dalam Meningkatkan Kefahaman Anda Pada Topik Fungsi dan Kesan Pencahayaan Pada Fotografi’

Cadangan anda dalam meningkatkan kefahaman anda pada topik fungsi dan kesan pencahayaan pada Fotografi

No.	Item Soalan	Jumlah Responden	Peratusan Kekerapan (%)
1.	Pensyarah perlu buat video simulasi agar lebih faham	15	19
2.	Saya cadangkan pensyarah perlu gunakan alat bantu belajar yang lebih berkesan bagi membantu pelajar untuk faham tentang topik	35	45
3.	<i>Photo Light Box</i> yang sedia ada tidak mencukupi dan tidak praktikal, pelajar perlukan <i>photo light box</i> yang lebih praktikal	10	13
4.	Alat bantu belajar dapat menarik minat saya untuk memahami topik yang diajar oleh pensyarah	10	13

5. Saya lebih faham sekiranya pensyarah banyakkkan praktikal berbanding teori	7	9
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Jadual 20 pula, 42% mewakili 32 orang responden yang memberi cadangan ‘sekiranya pensyarah dapat menggunakan alat bantu belajar yang lebih baik, tahap pemahaman saya akan meningkat’ (rujuk jadual 20).

Jadual 20. Item Soalan ‘Cadangan Anda Dalam Alat Bantu Belajar (ABB) yang Boleh Digunakan dalam Sesi PdP bagi Kursus DVG10012 Digital Photography’

Cadangan anda dalam alat bantu belajar (ABB) yang boleh digunakan dalam sesi PdP bagi kursus DVG10012 DIGITAL PHOTOGRAPHY

No.	Item Soalan	Jumlah Responden	Peratusan Kekerapan (%)
1.	Alat bantu belajar berbentuk produk lebih pratikkan digunakan di kelas	10	13
2.	Sekiranya pensyarah dapat menggunakan alat bantu belajar yang lebih baik, tahap pemahaman saya akan meningkat	56	73
3.	Jika ada alat bantu belajar yang menarik, saya akan gunakan di kelas	5	6
4.	Alat bantu belajar mestilah yang mudah digunakan di kelas	3	4
5.	Saya lebih suka alat bantu belajar bentuk produk berbanding video	3	4

Secara keseluruhannya, bagi komponen D iaitu cadangan dan penambahbaikan kursus DVG10012 *Digital* menunjukkan 65% responden memberi cadangan ‘saya cadangkan agar pensyarah perlu sediakan alat belajar untuk lebih faham, contohnya alat yang boleh digunakan untuk bantu belajar di kelas’, 45% responden memberi cadangan ‘saya cadangkan pensyarah perlu gunakan alat bantu belajar yang lebih berkesan bagi membantu pelajar untuk faham tentang topik’ dan 42% mewakili 32 orang responden yang memberi cadangan ‘sekiranya pensyarah dapat menggunakan alat bantu belajar yang lebih baik, tahap pemahaman saya akan meningkat’.

Perbincangan Dan Implikasi

Hasil daripada dapatan data yang diperolehi, secara jelas menunjukkan bahawa tahap penguasaan pelajar kurang berada di tahap sederhana terutamanya bagi pemahaman dalam topik fungsi dan kesan pencahayaan pada fotografi. Pensyarah kursus perlu mengambil satu tindakan bagi menyelesaikan masalah tersebut supaya tidak menjejaskan ‘summary review report’ (CORR) kursus. Perkara ini perlu diambil peranan segera disebabkan ianya akan menjejaskan peratusan CORR khususnya terhadap pelajar itu sendiri. Bagi memenuhi kehendak dan keperluan kursus, pelajar perlu menguasai dengan baik kesemua topik yang terdapat dalam kursus disebabkan kerana ianya adalah kursus yang perlu lulus bagi membolehkan pelajar ke peringkat seterusnya. Pensyarah kursus boleh mengambil inisiatif lain seperti mewujudkan suasana pembelajaran dengan lebih interaktif dengan penggunaan nota interaktif bagi menarik minat pelajar untuk belajar dan sekaligus memahami topik yang diajar. Selain itu, pensyarah kursus juga boleh menggunakan alat bantu mengajar yang lebih efektif bagi membantu penyampaian proses PdP ketika di dalam bilik kuliah.

Antara cadangan yang boleh diambil ialah:

- Penambahbaikan stuktur kandungan topik dengan penambahan elemen-elemen yang membolehkan pelajar lebih faham.
- Pembangunan dalam alat bantu mengajar (ABM) khususnya untuk topik terminologi cahaya dan bayang bagi membantu pelajar menguasai topik.
- Memberi penekanan yang lebih terhadap topik dengan mengadakan aktiviti PdP yang lebih interaktif bagi meningkatkan minat pelajar untuk memahami topik.

Kesimpulan

Secara keseluruhannya hasil tinjauan kajian menyeluruh mendapati tahap penguasaan pelajar tidak begitu baik bagi mencapai objektif kursus. Cadangan dan penambahbaikan yang diterima begitu positif yang mana cadangan lebih kearah untuk penambahbaikan kursus. Tindakan perlu diambil segera bagi mengekang isu tersebut di masa akan datang. Hal ini kerana, kursus tersebut adalah kursus asas yang perlu dikuasai penuh oleh pelajar dan perlu lulus bagi membolehkan pelajar bergraduasi. Sekiranya pelajar tidak dapat kuasai dengan baik, pelbagai implikasi yang akan terjadi khususnya dari segi pengetahuan pelajar dalam kursus. Ia juga akan memberi implikasi terhadap

program dari segi struktur keberkesanan program terhadap pelajar secara keseluruhan.

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LEVEL OF MASTERY OF COMMUNICATION SKILLS BASED ON EVALUATION OF GENERIC SKILLS ASSESSMENT AMONG ENGINEERING DIPLOMA STUDENTS AT POLITEKNIK MERSING.

TAHAP PENGUASAAN KEMAHIRAN KOMUNIKASI DARI PENILAIAN KEMAHIRAN GENERIK DALAM KALANGAN PELAJAR DIPLOMA KEJURUTERAAN POLITEKNIK MERSING.

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Abstract

This research was conducted in order for the purpose of determining the stage of communication abilities, which is one component of the generic skills assessment (GSA) of students at Mersing Polytechnic, Johor during the teaching and learning process. Students pursuing a Diploma in Electrical Engineering constituted 150 of the quantitatively-based participants in this study. This investigation employs a Google Forms-distributed questionnaire as its primary research instrument. Statistical software was used to calculate mean values, standard deviations, and percentages for descriptive data analysis. The t-test inference analysis aims to examine gender-based communication skill levels. The findings of the study indicate that the analyzed level of communication skills is high, with a combined mean value of 4.29 for communication skills. While the t-test showed no significant mean difference in communication skills against the gender of the students. This study is crucial for the Mersing Polytechnic to determine how well the level of leadership skill practice among Diploma in Electrical Engineering students can be improved by diversifying student-centered teaching and learning strategies.

Keywords: generic skill, communication skill, teaching and learning, oral communication, non-verbal communication

Abstrak

Penyelidikan kepada kajian di lakukan bertujuan untuk memahami tingkat kemahiran komunikasi yang merupakan salah satu elemen dalam penilaian kemahiran generik (GSA) terhadap pelajar di Politeknik Mersing, Johor dalam proses pengajaran dan pembelajaran. Seramai 150 orang responden yang terlibat dalam kajian menggunakan kaedah kuantitatif yang terdiri daripada pelajar Diploma Kejuruteraan Elektrik. Kajian ini menggunakan borang soal selidik sebagai instrumen kajian yang telah diedarkan melalui Google Forms. Perisian memproses data statistik digunakan bagi menganalisis data kajian secara deskriptif untuk mendapatkan peratusan, skor min, dan sisihan piawai. Analisis secara inferens dengan ujian-t sebagai medium penilaian adalah untuk melihat perbandingan tahap kemahiran komunikasi antara jantina. Hasil kajian mendapati bahawa nilai min semua item untuk kemahiran komunikasi ialah 4.29. Keputusan dari ujian-t menunjukkan tiada perubahan yang signifikan bagi kemahiran komunikasi terhadap jantina pelajar. Keputusan kajian amat bermakna bagi Politeknik Mersing untuk mengenal pasti tahap amalan kemahiran komunikasi di kalangan pelajar Diploma Kejuruteraan Elektrik perlu di pertingkatkan dengan memvariasikan pendekatan pengajaran dan pembelajaran yang berasaskan pelajar.

Kata kunci: kemahiran generik, kemahiran komunikasi, pengajaran dan pembelajaran, komunikasi lisan, komunikasi bukan lisan

Pengenalan

Membangunkan bakat masa hadapan merupakan salah satu pemangkin dasar yang digariskan sebagai salah satu daripada agenda utama negara dalam RMK-12. Agenda ini juga berkait rapat dengan kerangka Pelan Tindakan Pendidikan Tinggi Malaysia 2021-2025 yang menggariskan graduan masa hadapan akan mempunyai ilmu pengetahuan, kemahiran dan kebolehan untuk memenuhi permintaan industri. Politeknik melalui Jabatan Pendidikan Politeknik dan Kolej Komuniti juga menetapkan sasaran menghasilkan graduan TVET berkualiti berdasarkan Pelan Strategik Politeknik dan Kolej Komuniti 2018 – 2025 sebagai teras pertama.

Kemahiran generik dalam era globalisasi adalah keperluan utama bagi setiap individu bagi pembentukan modal insan cemerlang yang berasaskan ilmu pengetahuan, sikap berdaya saing dan usaha untuk peningkatan

produktiviti (Mohd Hasril, Noorazman & Norasmah, 2015). Kemahiran generik juga merupakan satu elemen terpenting bagi membantu tahap kebolehpasaran graduan dari institusi pengajian tinggi (Ngadiman & Jamaludin, 2018). Kemahiran generik atau sebahagian penyelidik menamakannya sebagai kemahiran insaniah mempunyai beberapa komponen seperti kemahiran menyelesaikan masalah, kemahiran kepimpinan, kemahiran etiket dan professional, kemahiran komunikasi, kemahiran kerja berpasukan, dan lain-lain merupakan trend terkini dalam penggubalan kurikulum kursus di seluruh dunia khususnya di Malaysia. Penyelidik memilih kemahiran komunikasi dalam kajian yang dilaksanakan di Politeknik Mersing untuk pelajar Diploma Kejuruteraan Elektrik.

Kemahiran komunikasi merupakan satu kemahiran yang amat penting dalam membangunkan bakat graduan dalam ruang lingkup pembangunan diri dan sahsiah pelajar serta berguna untuk melahirkan insan yang mempunyai ilmu pengetahuan, kemahiran dan yang holistik di peringkat nasional mahupun antarabangsa. Komunikasi merupakan satu aspek kemahiran yang perlu dikuasai oleh setiap pelajar yang melanjutkan pengajian di institusi pengajian tinggi. Pihak majikan kebiasaannya akan menilai pelajar dari aspek kemahiran komunikasi bermula dari proses temuduga. Penetapan kriteria oleh pihak majikan mengenai kemahiran komunikasi adalah bergantung pada keperluan tugas dan bidang pekerjaan yang di pohon. Kemahiran komunikasi merupakan salah satu dari kemahiran pembelajaran di alaf ke-21 yang diperlukan bagi seorang pelajar untuk menguasai bidang yang dipelajari seterusnya bersedia untuk menempuh alam pekerjaan (Lamri, 2019). Kejayaan seseorang individu berkait rapat dengan kebolehan berkomunikasi dan ianya penting dalam menjalani kehidupan seharian kita (Abdul Rahman & Abdul Aziz, 2000). Berdasarkan arus globalisasi pada masa kini, kemahiran komunikasi adalah suatu kebolehan yang utama perlu dimiliki oleh individu (Nurul Salmi & Mohd Isha, 2014).

‘Communiatus’ dari perkataan Latin yang bermaksud biasa atau perkongsian sesuatu adalah perkataan asal komunikasi. Berdasarkan Kamus Dewan (2008) kemahiran komunikasi ialah kemahiran berhubung antara penghantar (sumber) dan penerima (sasaran) melalui medium komunikasi. Definisi khusus berdasarkan Mansor, Ramli dan Shawaluddin (1984), komunikasi ialah merupakan satu proses sesuatu sikap, nilai, idea dan sebagainya dihubung dan disampaikan serta dikongsikan oleh individu kepada individu lain. Komunikasi merupakan pertukaran tentang pendapat, maklumat, idea, perhubungan dan lain-lain yang mempunyai tujuan tertentu dan pertukaran itu samaada secara peribadi atau tidak peribadi melalui isyarat atau simbol yang bertujuan untuk mencapai matlamat sesebuah organisasi (Rosenblatt, 1983). Komunikasi merupakan satu proses menyampaikan atau memindahkan maklumat dari individu kepada individu dan berupaya menyampaikan maksud kepada individu lain mengenai maklumat yang disampaikan serta kedua-duanya memaklumi serta memahami maksud maklumat tersebut.

Komunikasi dibahagikan kepada dua kategori iaitu lisan dan bukan lisan. Komunikasi lisan berlaku secara bersemuka atau langsung apabila berlaku perbualan antara individu (Sulaiman, 2002). Komunikasi bukan lisan adalah proses penyampaian maklumat melalui isyarat tangan, mata atau bahasa badan. Egan (1994) merujuk komunikasi bukan lisan kepada ekspresi wajah, tingkah laku badan, dan kualiti suara. Tingkah laku badan merujuk kepada isyarat tangan dan badan, kedudukan badan, dan pergerakan badan. Ekspresi wajah merujuk kepada pergerakan kening, senyuman, mengerutkan dahi atau bermasam muka manakala kualiti suara merujuk kepada perubahan intonasi suara, kenyaringan suara dan tahap kepantasan bersuara (Ivey & Ivey, 1999). Pemahaman dalam proses komunikasi, bagaimana individu berkomunikasi, kesukaran dalam berkomunikasi dan peningkatan kemahiran individu semasa berkomunikasi akan membantu individu dalam memperbaiki potensi diri dan membantu individu memperbaiki kemahiran komunikasi mereka (James, 2002).

Laporan kajian pengesanan graduan 2021 oleh Kementerian Pengajian Tinggi Malaysia menyatakan kadar kebolehpasaran graduan TVET mengikut jantina, 2019-2021 bahawa kadar kebolehpasaran graduan lelaki melebihi perempuan iaitu 94.1%(lelaki) dan 92.4%(perempuan) pada tahun 2019. Bagi tahun 2020, kadar kebolehpasaran graduan bagi lelaki adalah sebanyak 87.9% dan perempuan 86.6%. Manakala bagi tahun 2021, kadar kebolehpasaran graduan bagi lelaki adalah sebanyak 88.8% dan perempuan 86.8%. Oleh itu, amat penting untuk melihat tahap penguasaan kemahiran komunikasi antara jantina merupakan salah satu faktor penyumbang kepada kebolehpasaran perempuan. Para majikan pada era globalisasi memilih pekerja yang mempunyai elemen kemahiran generik dan tidak mengkhususkan kecemerlangan akademik sahaja. Kemahiran generik khususnya kemahiran komunikasi antara keutamaan dalam memilih calon pekerja khususnya dalam bidang-bidang tertentu. Tiada modul khas yang digubal bagi membangunkan kemahiran generik melainkan ia dimasukkan seiring secara bersama dalam pembangunan kurikulum kursus yang diwajibkan kepada pelajar. Institusi pendidikan khususnya yang berasaskan TVET perlu menyenaraikan kemahiran generik yang diperlukan dalam persekitaran kerja yang dinamik dan menentukan tahap kompetensi pelajar bagi setiap semester untuk penilaian kemahiran generik secara keseluruhannya. Pelajar seharusnya mengetahui setiap elemen kemahiran generik yang menjadi keperluan utama dalam kemahiran generik supaya bersedia menggilap serta meningkatkan kekompetenan pelajar (Norasmah *et al.*, 2011). Institusi dapat melakukan perancangan untuk penerapan elemen kemahiran generik bermula dari semester

pertama kemasukan pelajar.

Secara tuntas, pemilihan kajian penyelidikan ini adalah bertujuan bagi mengetahui tahap elemen kemahiran komunikasi pelajar aliran kejuruteraan di Politeknik Mersing melalui tinjauan supaya pelajar bersedia untuk meneruskan pengajian ke semester seterusnya atau memasuki alam pekerjaan dari aspek kemahiran komunikasi.

Objektif Kajian

Objektif utama kajian adalah:

2. Mengetahui tahap penguasaan kemahiran Komunikasi lisan pelajar Diploma kejuruteraan elektrik di Politeknik Mersing.
3. Mengetahui perbezaan kemahiran komunikasi lisan antara jantina.

Soalan Kajian

1. Apakah tahap penguasaan kemahiran komunikasi lisan dikalangan pelajar Diploma Kejuruteraan Elektrik di Politeknik Mersing?
2. Adakah terdapat perbezaan yang jelas bagi tahap komunikasi pelajar mengikut jantina?

Hipotesis kajian

Hipotesis untuk soalan kajian yang pertama adalah menganalisis data dalam bentuk deskriptif dengan menggunakan skor min, sisihan piawai dan peratus. Hipotesis bagi soalan yang kedua di mana data akan diuraikan secara inferensi yang mempunyai hipotesis seperti berikut;

H₀ Tidak terdapat perbezaan yang signifikan kemahiran komunikasi berdasarkan jantina.

Bahan dan Metodologi

Kaedah kajian ini mengaplikasikan penyelidikan deskriptif yang bersifat objektif serta bertujuan mendapatkan maklumat yang tepat dan menyeluruh dari penerapan unsur-unsur kemahiran komunikasi pada kurikulum untuk pelajar diploma kejuruteraan elektrik di Politeknik Mersing. Reka bentuk kajian secara kuantitatif digunakan kerana kaedah ini bersesuaian dengan tujuan kajian. Menurut Cohan dan Monion, kajian kes merupakan suatu usaha bagi meneliti unit pada suatu masa tertentu bagi melihat secara menyeluruh dan teliti suatu perkara yang berlaku (Mohamad Najib, 1999). Borang soal selidik diedarkan melalui *Google Form* dikalangan semua pelajar Diploma kejuruteraan Politeknik Mersing dan dianalisis menggunakan Statistical Package for Social Science (SPSS) untuk data penerapan unsur-unsur kemahiran komunikasi.

Persampelan untuk Kajian

Persampelan untuk kajian adalah dari Jabatan Kejuruteraan Elektrik (JKE), yang melibatkan semua pelajar semester dua hingga semester enam. Jumlah populasi yang memfokuskan pelajar kejuruteraan elektrik adalah seramai 260 orang pelajar. Penyelidik menggunakan kaedah Krejcie dan Morgan (1970) untuk penentuan sampel kajian iaitu seramai 150 orang daripada seluruh populasi. Kajian ini dilaksanakan di Politeknik Mersing dan melibatkan pelajar institusi ini sebagai responden.

Instrumen utama kajian

Instrumen utama kajian menggunakan kaedah borang soal selidik yang diinspirasi daripada kajian lalu penyelidik terdahulu seperti Othman & Syed Ali (2019), Pua (2014) dan Musa (2009). Borang kaji selidik ini mengandungi 2 bahagian iaitu bahagian A mengenai demografi bagi responden dan bahagian B mengandungi item konstruk bagi kemahiran komunikasi. Nilai Alpha cronbach bagi elemen-elemen yang diuji ialah 0.9 membuktikan kebolehpercayaan item dalam instrument sangat baik dan efektif serta mempunyai tahap konsistensi tinggi. Namun, item yang pernyataannya adalah tidak jelas serta kabur, penyelidik telah melakukan pengubahsuaian untuk responden dapat menjawab semua item dengan kesahan yang baik.

Analisa data

Data dari kajian di analisis secara data kuantitatif berbentuk deskriptif dan analisis inferen iaitu ujian t bagi melihat perbezaan elemen kemahiran komunikasi terhadap jantina responden. Semua data yang dihasilkan dianalisis dengan perisian Statistical Package for Social Science (SPSS) for Windows Version 17.0 (SPSS V17.0). Tahap perbezaan kemahiran komunikasi ditentukan berpandu kepada julat skor min seperti Jadual 1 dibawah.

Jadual 1. Tahap skor min

Min	Tahap Kecenderungan
1.00 – 2.33	Rendah
2.34 – 3.67	Sederhana
3.68 – 5.00	Tinggi

Data yang di analisis dari bahagian A di tulis secara peratusan. Tahap kecenderungan skor min seperti Jadual 1 digunakan bagi menilai tahap penguasaan kemahiran komunikasi (bahagian B) dan akan dipaparkan dalam bentuk jadual sisihan piawai dan min. Bagi menunjukkan dapatan skor jawapan untuk bahagian B yang didapati dari responden, pengukuran matlamat untuk kajian menggunakan skor min untuk mengetahui pencapaian kajian ini dikalangan pelajar Politeknik Mersing.

Keputusan dan Perbincangan

Analisis secara deskriptif di bahagian A digunakan bagi mengenalpasti latarbelakang responden mengikut jantina dengan menggunakan kaedah peratusan. Manakala data terhasil dari bahagian B dianalisis menggunakan perisian SPSS.

Maklumat dan latar belakang responden mengikut jantina

Rajah 1 menunjukkan daripada 150 orang responden, 118 (79%) adalah dikalangan responden lelaki dan 32 (29%) merupakan responden perempuan.



Rajah 1. Peratusan responden mengikut jantina

Tahap penguasaan kemahiran komunikasi

Analisis kajian yang dihasilkan adalah daripada pengumpulan data teras dalam kajian secara kuantitatif. Kajian ini menggunakan borang soal selidik sebagai instrumen kajian kuantitatif oleh pengkaji di mana satu set soalan telah disediakan untuk pelajar-pelajar program Diploma Kejuruteraan Elektrik, Politeknik Mersing. Data yang diperolehi dianalisis dengan menggunakan program Statistical Package for Social Science (V17.0). Instrumen ini distruktur mengandungi dua komponen iaitu;

- Bahagian A: Mengandungi latar belakang demografi pelajar iaitu jantina.
- Bahagian B: Mengandungi sepuluh item soalan iaitu kemahiran komunikasi.

Tahap penguasaan kemahiran komunikasi

Analisis dan hasil dapatan kajian yang terdiri dari bentuk data kuantitatif dianalisis menggunakan keputusan sisihan piawai, min, dan tafsiran tahap untuk kemahiran komunikasi digunakan untuk membuat kesimpulan pada tahap penguasaan pelajar bagi kemahiran komunikasi.

Menurut Williams dan Nussabaum (2013), kemahiran komunikasi merupakan suatu kebolehan pada individu bagi mewujudkan hubungan antara media perantara, interaksi atau dengan individu yang berlainan. Ia meliputi kemahiran mendengar, membaca, menulis, berhujah, adab dalam berkomunikasi, serta mempunyai kaitan dengan penggunaan teknologi. Kemahiran ini amat penting kepada individu untuk sesuatu organisasi itu mencapai matlamat yang dirancang dengan lancar dan cemerlang.

Jadual 2 menunjukkan dapatan bagi kemahiran komunikasi yang dianalisis daripada data soal selidik responden.

Dapatan kajian bagi sisihan piawai, min, dan tafsiran min bagi setiap item yang diukur untuk mengenalpasti tahap penguasaan pelajar dari aspek kemahiran komunikasi semasa tempoh pengajaran dan pembelajaran. Dapatan analisis membuktikan bahawa tingkat penguasaan kemahiran komunikasi berada pada tahap tinggi dengan nilai min tertinggi sebanyak 4.33 ($SP=0.599$) bagi elemen kemahiran komunikasi (B2) “*Saya boleh berkomunikasi dengan baik apabila berinteraksi dengan pensyarah dan rakan semasa sesi soal jawab*”. Item (B6) berkongsi nilai min yang sama dengan item (B2), manakala nilai sisihan piawai kedua-dua item membezakan dapatan kajian ini. Nilai sisihan piawai item (B2) adalah 0.599 manakala nilai sisihan piawai item (B6) adalah 0.652. Dapatan ini juga menggambarkan bahawa aktiviti interaksi dua hala antara pelajar dengan pensyarah juga rakan merupakan elemen terpenting bagi pelajar-pelajar Diploma Kejuruteraan Elektrik di Politeknik Mersing. Kerja-kerja amali di makmal memerlukan interaksi aktif antara pelajar dan pensyarah. Item (B6) yang menunjukkan nilai min tertinggi ini menunjukkan bahawa pelajar memberikan tumpuan di dalam kelas sewaktu sesi pembelajaran serta melibatkan diri secara aktif semasa sesi soal jawab dapat membantu pelajar memahami kursus yang dipelajari. Nilai min terendah pula adalah dari item (B9) iaitu “*Saya bersedia untuk menggunakan pelbagai kemahiran komunikasi selain bahasa, seperti komunikasi bahasa isyarat*” dengan nilai min terendah 4.11 dan nilai sisihan piawai 0.769. Berdasarkan sisihan piawai item B6 menunjukkan nilai sisihan piawai tertinggi dari semua item. Lim Chong Hin (2007) menyatakan nilai sisihan piawai yang lebih rendah menggambarkan set data yang lebih homogen manakala nilai sisihan piawai yang lebih tinggi menggambarkan set data yang lebih heterogen.

Jadual 2. Sisihan piawai, min, dan tafsiran untuk penguasaan kemahiran komunikasi

No Item	Item Kemahiran Komunikasi	Min	Sisihan Piawai	Tafsiran
B1	Saya boleh berkomunikasi secara berkesan apabila melakukan pembentangan.	4.15	0.713	Tinggi
B2	Saya boleh berkomunikasi dengan baik apabila berinteraksi dengan pensyarah dan rakan semasa sesi soal jawab.	4.33	0.599	Tinggi
B3	Memberikan tumpuan ketika pensyarah sedang melaksanakan pengajaran dan pembelajaran merupakan kaedah dalam kemahiran berkomunikasi.	4.22	0.698	Tinggi
B4	Kemahiran berkomunikasi dapat dikembangkan melalui pernyataan idea yang jelas dan baik secara lisan.	4.28	0.691	Tinggi
B5	Saya sering mengadakan perbincangan dengan rakan sekumpulan semasa aktiviti amali di bengkel.	4.31	0.648	Tinggi
B6	Saya sentiasa mendengar dengan teliti penjelasan rakan sebelum menyatakan pendapat.	4.33	0.652	Tinggi
B7	Saya mahir berkomunikasi dengan baik ketika berinteraksi dengan rakan sekursus yang berlainan agama dan bangsa.	4.29	0.659	Tinggi
B8	Saya bersedia menjadi orang tengah antara dua pihak yang berlainan pendapat.	4.19	0.730	Tinggi
B9	Saya bersedia untuk menggunakan pelbagai kemahiran berkomunikasi selain bahasa, seperti penggunaan bahasa isyarat.	4.11	0.769	Tinggi
B10	Saya akan memastikan untuk menguasai kemahiran komunikasi sebagai kemahiran utama bagi saya pada masa depan.	4.12	0.692	Tinggi
Min Keseluruhan		4.29		Tinggi

Analisis inferens (ujian-t) bagi kemahiran komunikasi berdasarkan jantina

Analisis secara perbandingan perbezaan min antara jantina dengan menggunakan ujian-t bagi menilai tahap penguasaan kemahiran komunikasi berdasarkan jantina.

Jadual 3. Analisis ujian-t perbandingan tahap kemahiran komunikasi mengikut jantina

Jantina	Bilangan	Min	Sisihan Piawai
Lelaki	118	4.43	0.386
Perempuan	32	4.36	0.435

Jadual 3 di atas menunjukkan nilai skor min bagi kemahiran komunikasi lelaki iaitu 4.43. Pelajar lelaki menunjukkan skor min yang lebih tinggi jika dibandingkan dengan nilai skor min bagi perempuan iaitu 4.36.

Dapatan ini menjelaskan bahawa pelajar lelaki mempunyai keyakinan komunikasi yang lebih tinggi jika dibandingkan dengan pelajar perempuan. Sebaliknya, rumusan ujian statistik seperti di Jadual 4 menunjukkan bahawa perbezaan ini tidak signifikan. Jadual 4 menunjukkan tingkat keyakinan bagi kemahiran komunikasi antara lelaki dan perempuan tidak terdapat perbezaan secara signifikan iaitu t nilainya 0.46 dan p melebihi 0.05.

Jadual 4. Analisa ujian-t kemahiran berkomunikasi mengikut jantina

t	df	Sig. (2 tailed)
0.458	150	0.636

Hasil dapatan ini menghampiri dengan hasil dapatan kajian yang dilakukan oleh Mohd Yusof dan Seri Bunian (2009). Kajian mengenai penerapan kemahiran generik terhadap pelajar program Kejuruteraan di Politeknik Sultan Azlan Shah. Kajian tersebut bertujuan untuk melihat perbezaan antara tahap enam kemahiran generik antara jantina. Hasil kajian mendapati bahawa tidak terdapat perbezaan yang signifikan dalam penerapan kemahiran generik mengikut jantina. Kajian yang dilakukan oleh Umi Nadihaa (2011) dan Fuziah (2005) mendapati bahawa tiada perbezaan penguasaan tahap kemahiran komunikasi lisan antara jantina di kalangan pelajar. Siti Kausar (2020) yang menjalankan kajian kemahiran insaniah di kalangan pelajar IPTA merentas jantina juga mendapati tiada perbezaan yang signifikan bagi kemahiran komunikasi antara lelaki dan perempuan.

Dapatan kajian ini menunjukkan bahawa majoriti pelajar Diploma kejuruteraan elektrik di Politeknik Mersing tidak mempunyai sebarang masalah dari aspek komunikasi dengan pensyarah samaada dalam bentuk perbincangan mengenai tugas, mengeluarkan idea serta cadangan dan mampu melaksanakan pembentangan dengan penyampaian maklumat yang jelas. Tahap penguasaan pelajar terhadap kemahiran komunikasi berdasarkan jantina juga adalah sama. Kecenderungan pelajar untuk berkomunikasi antara satu sama lain dapat dikesan jika interaksi antara kedua pihak mampu memahami sesuatu perkara yang dibincangkan. Kesedaran yang tinggi di kalangan pelajar dalam kemahiran komunikasi mendorong peningkatan motivasi diri serta keyakinan diri (Marliana Musa & Ahmad Esa, 2009). Interaksi di kalangan pelajar dan pensyarah dapat menyebabkan kecenderungan komunikasi yang berkesan sekiranya dua pihak memahami intipati perkara yang ingin disampaikan.

Kesimpulan

Hasil analisis dan dapatan dari kajian ini menunjukkan penguasaan kemahiran komunikasi yang merupakan salah satu elemen dalam kemahiran generik berada pada tahap tinggi. Pengkaji berpendapat bahawa pelajar dapat menguasai kemahiran berkomunikasi kerana pelajar terdedah dengan aktiviti kerja-kerja amali di makmal atau bengkel. Aktiviti ini dengan jelas memerlukan pelajar aktif mengaplikasikan kemahiran komunikasi dalam bentuk perbincangan bagi menyelesaikan tugas. Namun, pensyarah juga berperanan untuk mempelbagaikan cara pengajaran dan pembelajaran yang memberikan fokus kepada interaksi dua hala agar pelajar dapat memanfaatkan proses tersebut bagi mengukuhkan lagi penguasaan kemahiran komunikasi. Pelbagai kaedah dalam peningkatan kemahiran komunikasi mampu mendorong pelajar meningkatkan kemahiran generik khususnya kemahiran komunikasi di sepanjang pengajian agar dapat digunakan dan dipraktikkan seawal program latihan industri dan seterusnya di alam pekerjaan yang sebenar. Tahap penguasaan kemahiran komunikasi yang tinggi oleh pelajar di Politeknik Mersing membuktikan bahawa mereka yang merupakan bakal graduan telah bersedia untuk menempuhi alam pekerjaan khususnya pada era persaingan global yang memerlukan kemahiran generik sebagai nilai tambah dalam majikan memilih bakal pekerja.

Pengakuan

Kajian ini telah berjaya dilaksanakan melalui bantuan rakan-rakan pensyarah yang membantu penyelidik sepanjang menyiapkan kajian ini. Setinggi-tinggi penghargaan ditujukan kepada individu-individu yang terlibat membantu samaada secara langsung atau tidak langsung dalam proses kajian ini. Saya mengaku bahawa artikel ini adalah bebas daripada unsur plagiat, terjemahan atau penyiaran mana-mana penerbitan. Artikel yang dihantar adalah hasil penulisan saya sebagai penulis bersama.

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THE LEVEL OF USE OF CHATGPT AMONG LECTURERS

TAHAP PENGGUNAAN CHATGPT DALAM KALANGAN PENSYARAH

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Abstrak

Aplikasi ChatGPT masih dianggap baru dalam dunia pendidikan tetapi mempunyai potensi sebagai instrumen pendidikan yang sangat membantu dalam bidang akademik. Namun teknologi dalam aplikasi ini mempunyai had dan kemungkinan masih banyak kelemahan. Tujuan utama kajian deskriptif ini adalah untuk menentukan tahap kekerapan penggunaan dan tahap pengalaman dalam kalangan warga pensyarah di politeknik dan kolej komuniti di Sarawak terhadap aplikasi ChatGPT. Seramai 100 orang pensyarah yang telah mengambil bahagian. Instrumen yang digunakan untuk mendapatkan data ialah soal selidik yang diedarkan secara rawak dalam kalangan pensyarah. Dapatan kajian menunjukkan tahap penggunaan dan pengalaman menggunakan aplikasi ChatGPT dalam kalangan pensyarah politeknik dan kolej komuniti di Sarawak berada pada tahap yang rendah. Ini kerana masih ramai pensyarah yang terlibat dengan kajian ini belum pernah menggunakan aplikasi ChatGPT selepas ia dilancarkan pada November 2022.

Kata kunci: ChatGPT, pendidikan, tahap penggunaan, pensyarah

Pengenalan

Sejarah kecerdasan buatan (AI) bermula pada tahun 1950-an ketika para penyelidik dan saintis pertama kali memulakan kajian dan eksperimen tentang bagaimana komputer dan program komputer dapat meniru atau meniru kemampuan pemikiran manusia. Pada waktu itu, AI menjadi subjek kajian yang menarik dan berpotensi untuk berkembang. Sejak itu, terdapat peningkatan yang signifikan dalam pembangunan teknologi AI, yang membawa kepada pengembangan aplikasi praktikal yang meluas dalam berbagai bidang. AI telah berubah daripada sekadar konsep teori menjadi suatu realiti yang dapat mengubah cara manusia bekerja, belajar, dan berinteraksi dengan dunia tanpa sempadan. Salah satu perkembangan terkini dalam AI adalah teknik pembelajaran mesin yang mendalam, yang lebih dikenali sebagai 'deep learning.' Deep learning melibatkan penggunaan rangkaian neural yang kompleks untuk memproses data dan mengekstrak maklumat yang lebih mendalam, dan inilah yang telah membuka pintu kepada aplikasi AI yang lebih canggih.

Sejak kebelakangan ini, banyak aplikasi telah dicipta untuk membantu dalam meningkatkan prestasi pendidikan sama ada untuk memenuhi keperluan pensyarah mahupun pelajar. Salah satu aplikasi yang sedang popular adalah ChatGPT. ChatGPT merupakan alat pemrosesan bahasa semula jadi yang didorong oleh teknologi AI yang membolehkan seseorang melakukan perbualan seperti manusia dan banyak lagi dengan chatbot. Model bahasa yang telah diprogramkan membolehkan aplikasi ini menjawab soalan dan membantu seseorang pelajar mahupun pensyarah untuk menyiapkan tugas, seperti mengarang e-mel, esei dan kod. ChatGPT ialah varian GPT (Generative Pre-trained Transformer) yang menggunakan model pembelajaran mesin yang kompleks, di mana ChatGPT memproses bahasa dan membantu mencipta respons secara automatik, GPT juga merupakan model kecerdasan buatan (AI) yang boleh menjana manusia seperti teks, serta menawarkan banyak aplikasi seperti terjemahan bahasa, ringkasan dan penjana kandungan. Secara ringkasnya, fungsi-fungsi ChatGPT dapat membantu seseorang untuk meningkatkan prestasi pembelajaran khususnya kepada penulisan.

Namun begitu, aplikasi ini masih dianggap baru dalam dunia pendidikan (Nugraha & Sufanti, 2023; Ramadhan et al., 2023). ChatGPT, walaupun merupakan instrumen pendidikan yang sangat membantu, namun teknologi dalam aplikasi ini mempunyai had dan kemungkinan masih banyak kelemahan. Banyak pengguna mempunyai persepsi bahawa ChatGPT boleh mengumpul dan menyimpan data pada pengguna, dan tidak mematuhi piawaian etika dan undang-undang untuk pengumpulan dan penyimpanan data. Ini menimbulkan kebimbangan mengenai privasi dan keselamatan. Oleh yang demikian, objektif kajian empirikal ini dijalankan untuk menilai sejauh mana tahap penggunaan dalam kalangan warga institusi pengajian tinggi di Politeknik dan Kolej Komuniti Sarawak. Walaupun begitu, kajian ini sangat penting untuk menentukan bentuk galakan yang perlu, sekiranya tahap penggunaan masih dalam tahap rendah. Ini kerana aplikasi ini sangat membantu dalam penulisan asas seseorang.

Sorotan Kajian

Banyak kajian dijalankan berkaitan ChatGPT dalam pendidikan. Kajian Setiawan & Luthfiyani (2023) membincangkan aplikasi ini sangat membantu dalam menghasilkan penulisan yang baik. Kajian Faiz dan Kurniawaty (2023) pula membincangkan halangan dan etika dalam menggunakan ChatGPT. Manakala kajian Ausat et al. (2023) memberikan penyelidikan dan pandangan mengenai bahawa dalam penggunaan aplikasi ini. ChatGPT dalam sektor pendidikan ialah alat AI yang baru muncul, dibangunkan oleh OpenAI (Hosni et al., 2023). Aplikasi ChatGPT ini dilihat sebagai platform atau model bahasa lanjutan yang sangat membantu pensyarah mahupun pelajar kerana mempunyai fungsi untuk mendapatkan sebarang maklumat, tidak terhad kepada bidang pendidikan. Menurut Biswas (2023), ChatGPT merupakan ialah alat yang berharga kerana menyediakan maklumat dan menjawab soalan dalam pelbagai bidang, termasuk kesihatan awam.

Menurut Lo (2023), Chatbot berasaskan kecerdasan buatan, ChatGPT, telah dilancarkan pada November 2022 dan mampu menjana respons seperti manusia yang padu dan bermaklumat kepada input pengguna. ChatGPT telah merevolusikan sektor pendidikan dengan keupayaannya untuk menyediakan pengalaman pembelajaran yang diperibadikan dan adaptif kepada pelajar (Adiguzel, et al., 2023). ChatGPT juga dapat meningkatkan prestasi akademik pelajar seperti yang dibincangkan dalam banyak literatur kerana mampu menjawab soalan mereka dan memastikan mereka bermotivasi. Menurut Lo (2023) ChatGPT berpotensi untuk berkhidmat sebagai pembantu pengajar seperti untuk menjana bahan kursus dan memberikan cadangan; dan tutor maya untuk pelajar seperti membantu pelajar untuk menjawab soalan dan memudahkan kerjasama. Namun begitu terdapat cabaran yang berkaitan dengan penggunaannya seperti kemungkinan ChatGPT akan menjana maklumat yang salah atau palsu dan memintas pengesan plagiarisme. Tindakan segera perlu diambil untuk mengemas kini kaedah penilaian dan dasar institusi di sekolah dan universiti. Latihan pengajar dan pendidikan pelajar juga penting untuk bertindak balas terhadap kesan ChatGPT terhadap persekitaran pendidikan.

Metodologi Kajian

Kajian ini dijalankan dengan menggunakan pendekatan kuantitatif. Sampel kajian merupakan pensyarah daripada Politeknik dan Kolej Komuniti di negeri Sarawak. Seramai 100 pensyarah daripada pelbagai program dan bidang telah memberikan respon mereka terhadap penggunaan ChatGPT. Borang *Google Form*, telah diedarkan menggunakan Teknik pensampelan rawak. Teknik ini digunakan supaya semua pensyarah berpeluang untuk mengambil bahagian dalam kajian ini. Data yang terhasil akan dianalisis secara deskriptif untuk mendapatkan skor min. Bagi menilai penggunaan ChatGPT dalam kalangan pensyarah, nilai purata min yang diperolehi daripada analisis menggunakan SPSS akan diterjemahkan kepada empat kategori, iaitu daripada rendah kepada tinggi. Tafsiran tahap adalah berdasarkan skor min ditunjukkan dalam Jadual 1, yang dipetik dalam kajian oleh Ngadiman et al. (2019).

Jadual 1. Tafsiran Skor Min

Skor min	Tafsiran
1.00– 1.99	Lemah
2.00– 2.99	Rendah
3.00– 3.99	Sederhana
4.00– 5.00	Tinggi

Hasil Kajian

a) Latar Belakang Responden

Responden kajian terdiri daripada kakitangan Politeknik dan Kolej Komuniti di Sarawak. Perincian latar belakang responden adalah seperti yang ditunjukkan dalam Jadual 2.

Jadual 2. Latar Belakang Responden

Demografi		n	%
Jantina	Lelaki	31	31.0
	Perempuan	69	69.0
Gred	DH41	47	47.0
	DH44	27	27.0
	DH48	22	22.0
	DH52	4	4.0
Pendidikan	Diploma/ Ijazah	65	65.0

	Master	35	35.0
Institusi	Kolej Komuniti Betong	12	12.0
	Kolej Komuniti Kuching	15	15.0
	Kolej Komuniti Mas Gading	8	8.0
	Kolej Komuniti Miri	8	8.0
	Kolej Komuniti Santubong	10	10.0
	Kolej Komuniti Sarikei	6	6.0
	Kolej Komuniti Sarikei Cawangan Sibu	3	3.0
	Politeknik Kuching Sarawak	11	11.0
	Politeknik Metro Betong Sarawak	14	14.0
	Politeknik Mukah Sarawak	13	13.0
Tahun berkhidmat	1 - 2 tahun	4	4.0
	3 - 5 tahun	25	25.0
	5 tahun ke atas	71	71.0
Pernahkah mennggunakan ChatGPT?	Tidak	56	56.0
	Tidak pasti	6	6.0
	Ya	38	38.0
Faham tentang cara AI Generatif termasuk ChatGPT berfungsi?	Tidak	44	44.0
	Tidak pasti	18	18.0
	Ya	38	38.0

b) Analisis Dapatan Kajian

Objektif kajian ini adalah untuk kenentukan tahap penggunaan dalam kalangan warga institusi pengajian tinggi di Politeknik dan Kolej Komuniti Sarawak. Hasil analisis tahap penggunaan ChatGPT adalah seperti yang ditunjukkan dalam Jadual 3, dibahagikan kepada dua iaitu:

- b. Tahap kekerapan anda menggunakan ChatGPT
- c. Pengalaman anda menggunakan ChatGPT

Jadual 3. Ringkasan Analisis Dapatan Kajian

Item Kajian	Sisihan Piawai	Skor Min	Tahap Kekerapan
A. Tahap kekerapan anda menggunakan ChatGPT			
Untuk menterjemah teks	1.15	1.65	Lemah
Untuk mendapatkan bantuan menyiapkan suatu tugas	1.19	1.74	Lemah
Untuk mencari nota-nota untuk kuliah	1.16	1.69	Lemah
Untuk mencari idea	1.35	1.98	Lemah
Untuk mencari sumber untuk menyokong penulisan	1.27	1.85	Lemah
Untuk mendapatkan penilaian dan menerima maklum balas	1.13	1.66	Lemah
Untuk mendapatkan bantuan tentang tanda baca, ejaan, huruf besar dan tatabahasa	1.11	1.61	Lemah
Untuk bertanya soalan tentang sesuatu maklumat	1.38	1.94	Lemah
Untuk menghasilkan esei atau perenggan	1.20	1.73	Lemah
Untuk menyemak draf	1.18	1.61	Lemah

B. pengalaman anda menggunakan ChatGPT

ChatGPT sangat membantu anda.	1.38	2.65	Rendah
Anda mempercayai respons ChatGPT.	1.23	2.42	Rendah
Maklumat yang diberikan oleh ChatGPT boleh dipercayai.	1.25	2.42	Rendah
Gaya atau nada respons yang diberikan oleh ChatGPT sesuai.	1.29	2.52	Rendah
Kualiti respons keseluruhan ChatGPT memuaskan?	1.28	2.52	Rendah
Sangat berpuashati menggunakan ChatGPT?	1.26	2.49	Rendah
Menggalakkan pelajar anda menggunakan ChatGPT?	1.31	2.39	Rendah
Anda akan mengesyorkan ChatGPT kepada orang lain?	1.37	2.59	Rendah
Anda fikir ChatGPT lebih baik daripada enjin carian [Google, Yahoo]?	1.24	2.53	Rendah

Berdasarkan kepada dapatan Jadual 3, Sebanyak 10 item memperoleh skor min antara 1.61 hingga 1.98. Secara kesimpulannya, tahap kekerapan responden menggunakan ChatGPT adalah pada tahap yang lemah. Manakala untuk item pengalaman keseluruhan menggunakan ChatGPT, semua item memperoleh skor min yang rendah. Dapatan ini menunjukkan bahawa penggunaan ChatGPT dalam kalangan pensyarah Politeknik dan Kolej Komuniti di Sarawak adalah pada tahap yang rendah. Dapatan ini menjelaskan bahawa perlunya latihan dan bimbingan dijalankan untuk memberi pendedahan kepada kakitangan di institusi TVET tentang penggunaan ChatGPT.

Kesimpulan

Hasil kajian menunjukkan bahawa tahap penggunaan aplikasi ChatGPT dalam kalangan warga institusi pengajian tinggi di Politeknik dan Kolej Komuniti Sarawak adalah rendah. Terdapat beberapa faktor yang mungkin menyebabkan hal ini, dan salah satu faktor yang signifikan adalah bahawa aplikasi ini masih terlalu baru. Sehingga kajian ini dibuat, aplikasi ini belum lagi mencapai setahun penggunaannya selepas ia dilancarkan pada November 2022. Dalam tempoh yang singkat ini, para pensyarah masih belum berkesempatan untuk sepenuhnya mengenali, memahami, dan mengadaptasi aplikasi ini dalam proses pengajaran dan pembelajaran mereka.

Dicadangkan juga supaya pihak pengurusan JPPKK mengadakan latihan berkaitan dengan aplikasi ChatGPT bagi proses pengajaran dan pembelajaran dalam kalangan pensyarah dan memberi peluang kepada pensyarah untuk mengenali potensi dan manfaat aplikasi ini sebagai salah satu alat bantu mengajar yang seiring dengan teknologi yang terkini. Latihan tersebut juga akan memberikan kesempatan kepada pensyarah untuk memahami cara kerja aplikasi ChatGPT, termasuk kelebihan dan kelemahannya, supaya mereka dapat menggunakannya dengan bijak dan berkesan dalam proses pengajaran dan pembelajaran. Dengan pemahaman yang mendalam tentang teknologi baru ini, pensyarah dapat mengintegrasikan aplikasi ChatGPT dengan lebih baik dalam kurikulum dan membantu meningkatkan interaksi dan kualiti pembelajaran dengan pelajar.

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STUDENTS' ACCEPTANCE OF VIRTUAL TOUR GUIDE KUANTAN (VTGK) AMONG STUDENTS DTM30114 TOURIST GUIDING TECHNIQUES COURSE.

PENERIMAAN PELAJAR TERHADAP VIRTUAL TOUR GUIDE KUANTAN (VTGK) DI KALANGAN PELAJAR DTM30114 KURSUS TOURIST GUIDING TECHNIQUES.

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Abstrak

Kemunculan wabak Corona Virus 2019 (Covid19) yang melanda Malaysia pada bulan Mac 2020. Ia telah menyebabkan banyak aktiviti harian terpaksa dihentikan contohnya seperti jadual penerbangan yang dibatalkan, tempat tarikan pelancongan ditutup untuk kunjungan pelancong serta sekolah/institusi perlu dilaksanakan secara atas talian. Arahan perintah kawalan pergerakan Malaysia (PKP) telah menyebabkan pergerakan rakyat terhad di dalam lingkungan kawasan yang ditetapkan oleh kerajaan Malaysia. Pelajar Pelancongan dan Hospitaliti (JPH) yang mengambil kursus DTM 30114 Tourist Guiding Techniques turut terkesan dengan pandemik ini kerana Pengajaran dan Pembelajaran (PdP) perlu dijalankan secara langsung di lokasi tarikan pelancongan. Situasi ketika pandemik Covid19 ini telah mewujudkan lawatan secara virtual melalui zoom, google meet, Instagram live, FB live dan lain-lain di lokasi tarikan yang dipilih. Satu inisiatif oleh tenaga pengajar di JPH untuk mewujudkan pre-recorded Virtual Tour Guide Kuantan (VTGK) dan di muatnaik ke Youtube untuk membantu proses PdP DTM30114. Sehubungan dengan itu, satu tinjauan secara atas talian telah dibuat untuk mengenalpasti tahap pengetahuan, sikap dan kesediaan pelajar terhadap penggunaan VTGK tersebut untuk memahami pembelajaran komentar meet and greet, komentar di lokasi dan komentar di dalam bas. Kajian ini melibatkan 70 orang yang mengambil kursus DTM 30114 di Politeknik Muadzam Shah Pahang dan yang pernah menggunakan VTGK sebagai rujukan. Dalam kajian ini, instrumen soal selidik dengan lima skala Likert digunakan bagi tujuan pengumpulan data. Statistik deskriptif digunakan untuk melihat analisis min, sisihan piawai, kekerapan dan peratusan. Analisis deskriptif mendapati keempat-empat min, iaitu Perceived Usefulness (penggunaan) (4.29), Perceived Ease of Use (memudahkan) (4.07) Tingkah Laku (4.07) dan Kandungan VTGK 4.33. Secara keseluruhannya pandangan pelajar terhadap penggunaan VTGK berada pada tahap tinggi. Hal ini menunjukkan bahawa pelajar mempunyai minat yang tinggi terhadap penggunaan VTGK dalam PdP mereka. Penggunaan bahan berteraskan lokasi pelancongan dapat menarik minat pelajar untuk belajar Komentar Meet & Greet, lokasi dan di dalam bas. Keputusan menunjukkan bahawa, pelajar bersetuju bahawa kewujudan youtube ini dapat membantu memudahkan dan menjimatkan proses PdP mereka. Walaupun VTGK ini tidak dapat menggantikan lawatan secara bersemuka, ianya tetap menyajikan pengalaman yang menarik dan memudahkan proses pembelajaran mereka. VTGK ini merupakan satu alternative pelancongan di musim pandemic Covid-19 ini kerana pergerakan pelancong yang terhad dan membantu proses PdP untuk berjalan seperti sediakala.

Kata Kunci : Virtual Tour, Covid-19, tourism, Politeknik Muadzam Shah (PMS), Kuantan

Pengenalan

Pada Tarikh 16 Mac 2020, kerajaan Malaysia telah memutuskan untuk melaksanakan Perintah Kawalan Pergerakan (PKP) bagi mengurangkan penyebaran COVID-19 melalui penjarakan sosial. Disebabkan oleh pelaksanaan Perintah Kawalan Pergerakan (PKP), Pandemik COVID-19 telah meninggalkan impak besar terhadap ekonomi Malaysia. Banyak operasi perniagaan terpaksa membiasakan diri dengan konsep penjarakan sosial serta perintah berkurung yang mempengaruhi operasi dan pendapatan mereka termasuk sektor pelancongan. Rakyat tidak dibenarkan keluar melancong kerana bimbang akan penularan wabak COVID-19. Kementerian Pelancongan, Seni dan Budaya (MOTAC) menyatakan kerugian industri pelancongan negara mencecah RM 135 billion pada tahun 2020 dan RM165 billion pada tahun 2021 (Shamsudin, 2021). Industri pendidikan negara turut terjejas, kerana institusi pendidikan negara ditutup penuh untuk memutuskan rantai covid-19 ini. Namun sesi pengajaran dan pembelajaran diteruskan secara maya. Pihak institusi perlu memikirkan kaedah alternatif untuk menjalankan pengajaran dan pembelajaran (PdP). Polisi bekerja daripada rumah turut diperkenalkan oleh pihak kerajaan Malaysia, sehubungan dengan itu saluran media sosial menjadi pilihan utama untuk menjalankan tugas seharian (Rastati, 2020).

Media sosial seperti saluran youtube menjadi salah satu pilihan pada masa kini untuk menjalankan proses PdP kerana ia dapat membantu melancarkan pelbagai kegiatan aktiviti harian manusia dan ianya bergantung dengan system maklumat berasaskan internet dan boleh dicapai oleh penonton (Legiawan, et al. 2021). Penghasilan Virtual Tour Guide Kuantan (VTGK) ini sesuai kerana di dalam kursus *DTM30114 Tourist Guiding Techniques*, sesi PdP pelajar perlu melaksanakan komentar di lokasi sebenar di sesebuah lokasi tarikan pelancongan. VTGK ini juga boleh dijadikan satu pilihan alternatif bagi pelancong, pensyarah dan juga pelajar untuk menyelusuri bandar Kuantan tanpa hadir secara fizikal ke lokasi. VTGK ini turut memuatkan elemen tambahan iaitu bahasa isyarat untuk membantu golongan kelainan upaya memahami maklumat bandar Kuantan yang ingin disampaikan.

Soroton Kajian Situasi Covid di Malaysia

Pada akhir bulan Januari 2020 telah dikabarkan satu virus telah menular di Malaysia. Menurut Timeframe (2020), virus tersebut telah disahkan menular di Malaysia pada akhir bulan Januari 2020 apabila para pelancong dari Cina yang tiba di Johor melalui Singapura dikesan positif virus berkenaan pada 25 Januari 2020, berikutan pandemik COVID-19 di Hubei, China. Pada mulanya kes yang dilaporkan hanya menunjukkan kadar kes yang rendah sehinggalah kluster tempatan mulai muncul pada bulan Mac 2020 yang membawa kepada kenaikan kes besar – besaran dalam kes tempatan. Dalam beberapa minggu, Malaysia telah mencatatkan jumlah kumulatif jangkitan COVID-19 terbesar di Asia Tenggara. Pada Tarikh 16 Mac 2020, kerajaan Malaysia telah memutuskan untuk melaksanakan perintah kawalan pergerakan (PKP) bagi mengurangkan penyebaran COVID-19 melalui penjarakan sosial.

JPH PMS – (DTM 30114 Tourist Guiding Techniques)

Aktiviti pelancongan yang telah terhenti seketika juga turut memberi kesan kepada PdP kursus *Tourist Guiding Techniques* (TGT) (*DTM30114*) yang dijalankan di Politeknik Malaysia umumnya dan di Politeknik Muadzam Shah khususnya. Arahan pematuan PKP yang telah dinyatakan telah membataskan kursus ini untuk dijalankan di lapangan yang sebenar. Kursus TGT ini banyak melibatkan aktiviti latihamal komentar lokasi tarikan pelancongan, sehubungan dengan itu pelajar perlu mengunjungi lokasi tersebut. Melalui pelaksanaan PKP kursus TGT ini sukar mencapai objektif yang telah ditetapkan. Kewujudan video youtube VTGK ini sangat membantu pelajar dan pensyarah untuk melaksanakan proses PdP dengan lebih berkesan ketika musim pandemik melanda Malaysia. Menurut Vizcaya-Moreno dan Pérez-Cañaveras (2020), penggunaan teknologi media dalam bidang pendidikan telah menjadikan proses pengajaran dan pembelajaran (PdP) di institusi pendidikan semakin moden dan canggih.

Youtube Virtual Tour Guide Kuantan

Tankovska (2021) menyatakan bahawa Youtube adalah laman sosial kedua tertinggi menjadi pilihan pengguna untuk mencari maklumat. Umum mengetahui bahawa youtube merupakan salah satu saluran media teknologi digital selain google, instagram, tiktok dan lain-lain lagi. Pada tahun 2005, Youtube telah dimulakan oleh Chad Hurley, Steven Chen dan Jawed Karim (Burgess & Green, 2009). Sehubungan dengan itu saluran youtube dipilih untuk menjadi platform alternative PdP DTM30114 dan youtube VTGK telah dihasilkan. Youtube VTGK ini mengandungi beberapa elemen penting seperti latihan amal komentar meet & greet, on-site komentar dan komentar penutup. Elemen istimewa yang dimuatkan di dalam youtube VTGK ini adalah bahasa isyarat bagi membantu golongan orang kelainan upaya memahami dan merasai pengalaman menjalankan komentar tarikan pelancongan. Pembangunan VTGK ini merupakan satu kerjasama dengan Persatuan Orang Pekak & Bisu di Kuantan Pahang.

Penggunaan Teknologi di dalam Pengurusan dan Industri Pelancongan

Kelebihan menggunakan IT dalam pendidikan hospitaliti adalah sangat meluas dimana ia akan meningkatkan persekitaran pelajaran dan pembelajaran, meningkat kualiti pendidikan, meningkatkan penglibatan pelajar seterusnya ia akan meningkatkan motivasi pelajar. Kelebihan yang pertama adalah meningkatkan persekitaran pelajaran dan pembelajaran (PdP) merupakan salah satu cara pendidikan baru ia dikenali sebagai aktif pendidikan (Wheeler, 2001). Selain itu, ia dapat membantu institusi yang sebelum ini menggunakan konsep tradisi (secara bersemuka) kepada cara atas talian. Kedua adalah meningkatkan kualiti pendidikan dengan adanya bahan pembelajaran secara digital ia mampu menolak halangan komunikasi yang berlaku contohnya seperti masa dan tempat. Ketiga, IT mampu meningkatkan penglibatan pelajar dengan menyesuaikan kandungan pembelajaran mengikut keupayaan dan keperluan pelajar (Jonassen Et al. 1999; Mooji, 2007) dan dengan meningkatkan pengalaman pendidik dan pelajar. Seterusnya It mampu meningkatkan motivasi pelajar dengan beberapa cara. Diantara nya adalah pelajar dapat perolehan kemahiran asas IT, dan It juga mampu mewujudkan persekitaran yang berpusatkan pelajar.

Virtual Realiti

Realiti Maya atau Virtual Reality (VR) membenarkan pengguna berkomunikasi bersama komputer melalui model

tiga dimensi atau persekitaran maya. Persekitaran maya ini adalah sangat jelas dan realistik, dalam kata lain ia menggambarkan dunia fizikal. Menurut Peter Tan and Yee Sook Eng (2016), istilah realiti maya (Virtual Reality, VR) dicipta oleh Jaron Lanier pada tahun 1989. Lanier merupakan salah seorang peneroka dalam bidang ini, menubuhkan syarikat VPL Research (daripada “Virtual Programming Languages”) yang mencipta sebahagian sistem pertama pada tahun 1980. Istilah berkait realiti buatan telah digunakan semenjak 1970 dan alam siber semenjak tahun 19. Definisi VR dalam buku *The Silicon Mirage* yang ditulis oleh Steve Aukstakalnis dan David Blatner (1992), adalah seperti berikut. “Virtual Reality” (VR) ialah kaedah dimana manusia menggambarkan (visualize), berimaginasi dan berinteraksi dengan komputer dan data kompleks.”

Virtual Tour Guide

Virtual tour merupakan satu aktiviti tour atau lawatan yang dijalankan secara atas talian samada ianya dirakam atau dijalankan secara langsung dari lokasi tarikan pelancongan dan pelancong boleh menyertai lawatan tersebut. Virtual tour yang dirakam terlebih dahulu akan dimuat naik ke dalam saluran sosial media sedia ada seperti youtube, Instagram, tiktok dan facebook. Manakala virtual tour yang dijalankan secara langsung boleh disertai oleh pelancong melalui saluran yang disediakan dan biasanya akan ada bayaran penyertaan yang dikenakan kepada penonton kerana mereka akan dibawa melancong secara langsung ke tempat menarik dan boleh bertanya soalan kepada pemandu pelancong profesional yang bertugas. VTGK menggunakan teknik rakaman dan dimuatnaik ke saluran youtube agar boleh ditonton berulang kali secara percuma dan tiada bayaran dikenakan. Menurut Liu et al., (2020), menerusi teknologi yang semakin maju, gabungan industri pelancongan, universiti dan penyelidikan akan dapat meningkatkan pengetahuan, kemahiran dan pembelajaran cara baharu.

Bahasa Isyarat

Element bahasa isyarat turut dimuatkan ke dalam VTGK ini. Objektif memasukkan elemen bahasa isyarat ke dalam VTGK ini adalah untuk membantu golongan kelainan upaya pekak dan bisu untuk memahami penyampaian isi kandungan VTGK tersebut. Penyampaian bahasa isyarat itu telah dilakukan oleh pegawai dari Persatuan Pekak dan Bisu Pahang. Disebabkan penghasilan VTGK ini berlangsung ketika wabak Covid 19 berlangsung, segala perbincangan dilakukan melalui atas talian sahaja. Namun begitu dengan penerapan elemen bahasa isyarat ini, ia dapat membezakan virtual tour guide Kuantan yang berbeza daripada virtual tour guide yang ada di youtube.

Metodologi

Kajian ini menggunakan kaedah kuantitatif yang berbentuk kajian tinjauan untuk mengumpulkan data. Instrumen soal selidik digunakan di dalam kajian ini bagi mendapatkan maklumat daripada responden. Menurut Tuckmen (1978) instrumen soal selidik lebih berkesan untuk mendapatkan maklumat yang diperlukan. Data primer digunakan untuk mengkaji tahap pengetahuan, sikap dan kesediaan pelajar terhadap penggunaan persekitaran pembelajaran VTGK adalah melalui borang soal selidik yang diedarkan secara atas talian. Manakala sumber daripada buku-buku rujukan dan bacaan daripada capaian akses internet digunakan untuk memperoleh data sekunder. Soal selidik ini menggunakan pengukuran *Skala Likert 5* iaitu Sangat Tidak Setuju, Tidak Setuju, Kurang Pasti, Setuju dan Sangat Setuju untuk melihat penerimaan pelajar terhadap penggunaan VTGK di dalam PdP.

Lokasi, Populasi dan Sampel Kajian

Kajian ini telah dijalankan Politeknik Muadzam, Jabatan Pelancongan & Hospitaliti. Populasi kajian ialah pelajar *DTM30114 Tourist Guiding Techniques* unit Pengurusan Pelancongan dan Pelancongan Rekreasi. Seramai 60 orang pelajar kursus DTM 30114 dipilih sebagai sampel kajian ini. Saiz sampel ditentukan dengan merujuk kepada jadual penentuan saiz sampel Krejcie dan Morgan (1970).

Instrumen Kajian

Kajian ini menggunakan instrumen kaji selidik hasil adaptasi kajian terdahulu dan di petik daripada Model Penerimaan Teknologi oleh Davis (1989). Seperti yang digunakan dalam kajian Ika Destiana et al. (2013), Saiful et al. (2014) dalam kajian ini penyelidik membina soal selidik berdasarkan kajian-kajian lepas. Selain itu, soal selidik dalam kajian ini juga diubahsuai serta ditambah baik mengikut kesesuaian selaras dengan kehendak kajian. Dalam kajian ini, borang soal selidik yang diklasikan dua bahagian iaitu demografi responden dan Tahap Pengetahuan, Sikap dan Kesediaan Pelajar Terhadap Penggunaan VTGK.

Analisis Data

Maklumat yang diperoleh dari borang soal selidik dianalisis dengan menggunakan perisian *Statistical Package for the Science (SPSS)* versi 22.0. Tahap Pengetahuan, Sikap dan Kesediaan Pelajar Terhadap Penggunaan VTGK yang dikaji adalah menggunakan kekerapan, peritus, min seterusnya analisis tahap interpretasi diambil kira daripada nilai 5.00 mata nilai tertinggi dibahagikan kepada tiga tahap, iaitu rendah (min = 1.00-2.33), sederhana (min = 2.34-3.67) dan tinggi (min = 3.68-5.00). Jadual 1 menunjukkan interpretasi min yang digunakan dalam

kajian (Jamil, 2002).

Jadual 1 : Interpretasi Min

Julat min	Interpretasi
1.00-2.33	Rendah
2.34-3.67	Sederhana
3.68-5.00	Tinggi

Demografi Responden

Statistik deskriptif digunakan untuk menghuraikan secara menyeluruh tentang maklumat demografi responden. Demografi responden menerangkan taburan kekerapan dan peratus responden berdasarkan aspek kategori pekerjaan umur dan latar belakang pendidikan.

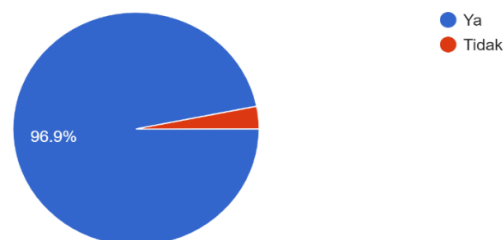
Sebanyak 70 telah diedarkan, namun hanya 64 yang telah diisi dan boleh digunakan untuk tujuan kajian ini. Dapatan berdasarkan kategori responden menunjukkan responden tertinggi adalah pelajar dengan 59 responden (92.19%). Untuk aspek umur pula, majoriti daripada responden berada di dalam lingkungan umur 21-30 tahun dengan 58 responden (90.63%). Berdasarkan Jadual 1, didapati bagi aspek tahap pendidikan pula, responden paling tinggi adalah untuk Diploma dengan 55 responden (85.9%). Jadual 2 yang berikut meringkaskan profil responden bagi kajian ini.

Jadual 2. Demografi Responden - Keseluruhan

Demografi	Perincian	Frekuensi	Peratusan
Kategori	Pelajar	59	92.19
	Pensyarah	4	6.25
	Lain-lain	1	1.56
Umur	21-30 tahun	58	90.63
	31-40 tahun	2	3.13
	41-50 tahun	4	6.25
	50 tahun ke atas	0	0.00
Pendidikan	Diploma	55	85.9
	Degree	5	7.80
	Master	2	3.10
	PhD	2	3.10

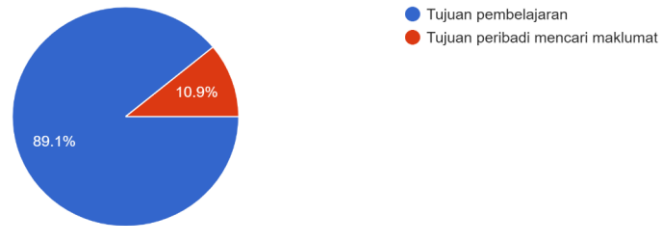
Seterusnya, berdasarkan Rajah 1 di bawah, daripada 62 responden (96.90%) telah menonton Youtube Virtual Tour Guide Kuantan (VTGK). Rajah 2, menunjukkan bahawa hampir keseluruhan responden menggunakan Youtube untuk tujuan pembelajaran.

Adakah anda menonton Youtube Virtual Tour Guide Kuantan?
64 responses



Rajah 1. Menonton Youtube Virtual Tour Guide Kuantan

Jika Ya, nyatakan tujuan tontonan youtube tersebut
64 responses



Rajah 2. Tujuan menonton Youtube

Seterusnya, pengkaji menguji dapatan yang diperoleh menggunakan *Alpha Cronbach* untuk menguji kesahan dan kebolehpercayaan. Sekaran (2000) menyatakan sekiranya nilai *Alpha Cronbach* menghampiri nilai 1.0, kebolehpercayaan item adalah tinggi, baik dan Mohd Majid Konting (2004) menyarankan nilai *Alpha Cronbach* pada aras 0.70 ke atas, sebagai nilai Alpha yang mempunyai kebolehpercayaan yang tinggi. Dalam kajian ini, pengkaji menggunakan nilai *Alpha Cronbach* yang disarankan tersebut, iaitu 0.70 sebagai nilai kebolehpercayaan yang diterima.

Jadual 3 menunjukkan bahawa setiap pemboleh ubah yang dikaji mempunyai kebolehpercayaan yang tinggi dan layak digunakan dalam kajian sebenar. Nilai *alpha Cronbach* bagi setiap pemboleh ubah tersebut iaitu Perceived Usefulness (penggunaan) (0.895), Perceived Ease of Use (memudahkan) (0.889), tingkah laku (0.874) dan kandungan VTGK (0.881). Secara keseluruhannya nilai *Alpha Cronbach* bagi instrumen kajian ialah tinggi (0.957) dan ianya kukuh untuk digunakan untuk kajian akan datang.

Jadual 3. Kebolehpercayaan Instrumen

Konstruk	Nilai Alpha Cronbach	Nombor Soalan	Alpha Cronbach keseluruhan
Perceived Usefulness (Penggunaan)	0.895	3	0.957
Perceived Ease of Use (memudahkan)	0.889	3	
Tingkah laku	0.874	3	
Kandungan VTGK	0.881	3	

Analisis seterusnya, adalah untuk melihat taburan min bagi setiap soalan di dalam soal selidik. Skala bagi setiap item di dalam soal selidik ini dianalisis mengikut tafsiran skor min.

Tahap Pengetahuan, Sikap dan Tingakahlaku dan Kandungan VTGK terhadap Penggunaan VTGK

Kajian ini memfokuskan kepada empat bahagian *Perceived Usefulness*, *Perceived Ease of use*, tingkah laku dan kandungan VGTK. Jadual 4 menunjukan data terperinci.

Jadual 4. Taburan Min Keseluruhan Soalan Soal Selidik

Item (Pembolehubah)	Pernyataan		Min	Tahap
<i>Perceived Usefulness</i> (penggunaan)	1	Saya menggunakan youtube VTGK untuk belajar teknik-teknik komentar meet & greet.	4.19	Tinggi
	2	Penggunaan youtube VTGK dapat meningkatkan keupayaan pelajar mempelajari teknik-teknik pemandu pelancong secara maya.	4.34	Tinggi
	3	Penggunaan youtube VTGK dapat meningkatkan keupayaan pelajar mempelajari teknik-teknik pemandu dengan lebih berkesan dan memudahkan.	4.33	Tinggi

<i>Perceived Ease of Use</i> (memudahkan)	4	Melalui penggunaan youtube VTGK, ia akan membantu pelajar dalam proses pembelajaran dan pengajaran (PdP)	4.17	Tinggi
	5	Memahami dan jelas dengan paparan maklumat dalam VTGK.	4.28	Tinggi
	6	Penggunaan VTGK, membantu memudahkan pelaksanaan aktiviti PdP.	3.75	Tinggi
Tingkah laku	7	Kerap menggunakan video VTGK untuk proses PdP	3.92	Tinggi
	8	Video VTGK selalu digunakan untuk menyelesaikan masalah PdP	4.05	Tinggi
	9	Video VTGK mengikuti perkembangan semasa	4.25	Tinggi
Kandungan VTGK	10	Paparan slot meet & greet di VTGK membantu pelajar dalam proses menjalankan komentar	4.30	Tinggi
	11	Paparan slot komentar di lokasi tarikan (Onsite Comentar) membantu pelajar memahami proses menjalankan komentar	4.33	Tinggi
	12	Paparan Bahasa isyarat yang dimasukkan ke dalam VTGK membantu golongan kelainan upaya untuk memahami proses komentar	4.35	Tinggi
Min keseluruhan			4.19	Tinggi

Dapatan Kajian

Jadual 4 menunjukkan skor min bagi tahap Pengetahuan, Sikap dan Kesiediaan Pelajar Terhadap Penggunaan VTGK. Daripada jadual didapati semua item berada pada tahap tinggi dan pada nilai min keseluruhan tahap tinggi iaitu **4.19**. Item no 12 (Paparan Bahasa isyarat yang dimasukkan ke dalam VTGK membantu golongan kelainan upaya untuk memahami proses komentar) memperoleh min tertinggi sebanyak **4.35**. Item min no 6 (Penggunaan VTGK, membantu memudahkan pelaksanaan aktiviti PdP) yang paling rendah adalah sebanyak **3.75** tetapi masih berada pada tahap tinggi. Daripada kajian yang dijalankan dapat di rumuskan bahawa pendekatan pengajaran menggunakan video YouTube telah membantu meningkatkan pencapaian pelajar, dimana penggunaan youtube VTGK sangat membantu untuk teknik-teknik komentar.

Perceived usefulness (penggunaan)

Dari segi penggunaannya, responden bersetuju bahawa penggunaan youtube VTGK dapat meningkatkan keupayaan pelajar mempelajari teknik-teknik pemandu pelancong secara maya dengan nilai tertinggi 4.34. Seterusnya nilai min kedua tertinggi adalah 4.33 iaitu dari segi Penggunaan youtube VTGK dapat meningkatkan keupayaan pelajar mempelajari teknik-teknik pemandu dengan lebih berkesan dan memudahkan. Dan min yang paling rendah iaitu 4.19, saya menggunakan youtube VTGK untuk belajar teknik-teknik komentar meet & greet.

Perceived Ease of Use (memudahkan)

Dari segi memudahkannya, Nilai min yang tertinggi adalah 4.28 responden bersetuju bahawa memahami dan jelas dengan paparan maklumat dalam VTGK. Nilai min yang kedua adalah 4.05 adalah video VTGK selalu digunakan untuk menyelesaikan masalah PdP dan yang terakhir adalah 3.75 penggunaan VTGK, membantu memudahkan pelaksanaan aktiviti PdP.

Tingkah Laku

Dari segi tingkah laku, min tertinggi adalah 4.25 iaitu Video VTGK mengikuti perkembangan semasa. Seterusnya min kedua tertinggi adalah 4.05 iaitu video VTGK selalu digunakan untuk menyelesaikan masalah PdP, dan yang paling rendah adalah 3.92 iaitu kerap menggunakan video VTGK untuk proses PdP.

Kandungan VTGK

Dari segi kandungan VTGK, min tertinggi adalah 4.35 iaitu Paparan Bahasa isyarat yang dimasukkan ke dalam VTGK membantu golongan kelainan upaya untuk memahami proses komentar, manakala min ke dua tertinggi adalah 4.33 iaitu paparan slot komentar di lokasi tarikan (Onsite Commentary) membantu pelajar memahami proses menjalankan komentar. Dan min yang terakhir ialah 4.30 adalah paparan slot meet & greet di VTGK membantu pelajar dalam proses menjalankan komentar. Kandungan VTGK adalah yang paling tinggi secara puratanya kerana kandungan yang menepati keadaan semasa dan memudahkan pelajar mempelajari teknik meet

& greet secara atas talian.

Kesimpulan

Fenomena terhadap pembelajaran alam maya, telah menukarkan cara pelaksanaan penyampaian dalam sistem pendidikan semasa. Perubahan daripada penggunaan papan tulis kepada dunia di hujung jari. VTGK merupakan satu alat yang boleh digunakan untuk membantu kesediaan pelajar di dalam Pembelajaran dan Pengajaran (PdP).

Berdasarkan dapatan kajian yang dijalankan, VGTK merupakan salah satu medium alternatif untuk PdP di musim wabak corona dan juga selepas wabak berakhir. Namun begitu penggunaan VGTK sejajar dengan kemajuan teknologi yang memudahkan manusia mendapatkan maklumat di hujung jari. Jadi VTGK ini dapat membantu pelajar dan pengguna yang mempunyai kekangan dari segi sumber kewangan, masa dan ruang. Selain itu, VGTK ini, boleh dicapai melalui gajet oleh semua pihak terutamanya pelajar. Menurut Lapammu & Mahamod, 2018, Teknologi Maklumat dan Komunikasi perlu digunakan oleh pelajar dalam sesi pembelajaran yang lebih dinamik.

Selain itu, VTGK juga boleh dijadikan alat mempromosikan destinasi tarikan pelancongan di Pahang secara amnya dan Kuantan secara khususnya. Dengan adanya VTGK ia mampu menjadi penggalak kepada pelancong luar daripada Pahang untuk melawati kawasan tarikan yang ada di Kuantan. Dicapai agar penggunaan VTGK ini dapat diluaskan penghasilannya ke kawasan tarikan pelancongan yang lain di Pahang seperti Pulau Tioman, Taman Negara Pahang dan Kuala Gandah. Hasil dapatan Kajian VTGK ini juga, turut membuktikan paparan Bahasa isyarat yang dimasukkan dalam video tersebut membantu golongan kelainan upaya memahami proses komentar dijalankan.

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EARNING ORTHOPHOTO MAPS USING UNGUIDED AIRCRAFT

PENGHASILAN PETA ORTOFOTO MENGGUNAKAN PESAWAT UDARA TANPA PEMANDU

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Abstract

The production of Orthophoto Maps is usually time-consuming and depends on the purpose of the project, scale and accuracy. However, with the rapid development of technology in recent times, unmanned aerial vehicles (UAVs) have been used in the field of photogrammetry to produce maps that have high-precision data and can produce maps in a short period of time. This study was conducted with the aim of evaluating the height accuracy of the photogrammetry method using a UAV equipped with a GNSS RTK receivers (UAV-RTK) at the Kuching Sarawak Polytechnic campus. The final result of the height points from the Orthophoto Map produced is compared with 30 height points through GNSS observations using the Real Time Kinematic (RTK) technique. The results of the study show that the use of UAVs can produce Orthophoto Map with high accuracy.

Keywords: Orthophoto Map, Unmanned Aerial Vehicle (UAV), Real Time Kinematik (RTK)

Abstrak

Penghasilan Peta Ortofoto biasanya memakan masa yang lama dan bergantung pada tujuan projek, skala dan ketepatan. Namun, dengan kemajuan teknologi yang semakin berkembang pesat sejak kebelakangan ini, pesawat udara tanpa pemandu (UAV) telah digunakan dalam bidang fotogrametri bagi menghasilkan peta yang mempunyai data berketepatan tinggi dan dapat menghasilkan peta dalam tempoh masa yang singkat. Kajian ini dijalankan adalah bertujuan untuk menilai ketepatan ketinggian kaedah fotogrametri menggunakan UAV yang dilengkapi dengan penerima GNSS RTK (UAV-RTK) di kampus Politeknik Kuching Sarawak. Hasil akhir titik ketinggian daripada Peta Ortofoto yang dihasilkan dibandingkan dengan 30 titik ketinggian melalui cerapan GNSS kaedah Real Time Kinematik (RTK). Hasil kajian menunjukkan penggunaan UAV dapat menghasilkan Peta Ortofoto dengan berketepatan yang tinggi.

Kata kunci: Peta Ortofoto. Pesawat Udara Tanpa Pemandu (UAV), Real Time Kinematik (RTK)

Pengenalan

Sejak dekat lalu teknologi UAV digunakan secara meluas bagi tujuan seperti mencari dan menyelamatkan, pengawasan, pemantauan trafik dan cuaca, bantuan memadamkan kebakaran, agrikultur, peribadi dan untuk penggambaran (Ahmed et al., 2022; Chen et al., 2023; Laghari et al., 2023). Teknologi UAV menjadi lebih relevan dan menjadi alat yang sangat penting pada masa kini kerana penggunaan teknologi UAV dapat menghasilkan imej beresolusi tinggi (GÜNGÖR et al., 2022; S Sai et al., 2019) dan permintaan terhadap teknologi UAV semakin berkembang dalam bidang ukur dan pemetaan kerana penggunaannya yang fleksibel membolehkan imej beresolusi tinggi dapat dihasilkan dan menghampiri masa hakiki (Ahmed et al., 2022; Laghari et al., 2023). Kebaikan penggunaan teknologi UAV ini adalah ianya dapat menjimatkan masa dan kosnya lebih efektif dari segi operasi dan penyelenggaraan, serta ianya lebih mudah untuk digunakan dan dikawal. (Štroner et al., 2021).

Teknologi UAV boleh dilengkapi dengan pelbagai penderia seperti kamera, haba, LIDAR dan penderia lain untuk tujuan pengumpulan dan pemantauan data (Laghari et al., 2023) Ia boleh digunakan untuk mengumpul data dari ketinggian yang sukar dicapai oleh manusia atau kenderaan lain. Data ini kemudiannya boleh digunakan untuk tujuan pemantauan alam sekitar, pemetaan, pemantauan infrastruktur, pertanian dan pemantauan bencana. (Ahmed et al., 2022). Penggunaan teknologi UAV dapat mengakses kawasan sukar dimana UAV boleh diterbangkan ke kawasan yang sukar diakses oleh manusia atau kenderaan lain seperti kawasan terpencil, gunung, hutan tebal atau kawasan yang terjejas oleh bencana alam. Dalam industri seperti pertanian, UAV boleh digunakan untuk mengumpul data tentang tanaman, seperti kadar pertumbuhan, kelembapan tanah dan lain-lain. Justeru, petani dapat mengoptimalkan penggunaan sumber dan meningkatkan hasil tanaman. Peta Ortofoto ialah peta yang terhasil daripada proses ortorektifikasi iaitu pembetulan imej udara secara geometri dimana Peta Ortofoto menggambarkan permukaan bumi tanpa herotan perspektif dan boleh digunakan untuk pengukuran dan analisis

dengan tepat. Peta Ortofoto sangat penting dalam pemetaan topografi kerana ianya memaparkan butiran topografi dengan tahap ketepatan yang tinggi. (Korumaz & Yildiz, 2021)

Unmanned Aerial Vehicles UAV ialah pesawat yang mampu terbang tanpa juruterbang di dalamnya. UAV boleh dikawal dari jauh oleh operator melalui komputer atau pengawal radio. UAV boleh dilengkapi dengan pelbagai sensor dan peranti, seperti kamera, LIDAR, termal, sensor gas, dan lain-lain, yang membolehkan UAV menjalankan pelbagai misi (Laghari et al., 2023). UAV terbahagi kepada 2 kategori iaitu *Fixed Wing UAV* dan *Rotatory wing UAV*. *Fixed Wings* sangat popular dalam aplikasi ketenteraan dan pertahanan, dan *Fixed Wings* mempunyai kelajuan tinggi dan boleh membawa muatan berat manakala *Rotatory wing UAV* mempunyai sayap berputar. UAV ini mempunyai keupayaan untuk berlepas dan mendarat secara menegak, serta bergerak dan berlegar di udara. Terdapat kajian penggunaan UAV dapat menghasilkan model rupa bumi berdigit (DTM) yang berketepatan tinggi. (Czyza et al., 2023; Elkhachy, 2021; Martínez-Carricondo et al., 2023; Udin & Ahmad, 2014). Manakala kajian menunjukkan penggunaan UAV dapat menghasilkan peta berbagai jenis permukaan dengan berketepatan yang tinggi (Eker et al., 2021) dan juga kajian menilai kedudukan Peta Ortophoto (Akar & Konakoglu, 2021; GÜNGÖR et al., 2022; Korumaz & Yildiz, 2021; Mesas-Carrascosa et al., 2014; Popescu et al., 2016; S Sai et al., 2019).

UAV RTK yang merujuk kepada gabungan teknologi UAV dan Cerapan Masa Hakiki (Rajah 1). Cerapan RTK adalah dengan menggunakan Stesen *Base* dimana maklumat kedudukan yang telah diketahui dan Stesen *Base* ini menerima isyarat daripada satelit GNSS bagi menentukan kedudukannya dan kemudian mengira selisih isyarat satelit yang disebabkan oleh keadaan atmosfera dan faktor-faktor lain dan menghantar data pembetulan tersebut kepada Penerima *Rover*. Penerima *Rover* yang dipasang di UAV ini menggunakan data pembetulan dari Stesen *Base* untuk meningkatkan ketepatan kedudukan planimetrik dan ketinggian dalam masa hakiki. Dengan membandingkan isyarat satelit GNSS yang telah diperbetulkan dengan isyarat satelit yang diterimanya, UAV boleh mengira kedudukannya dengan lebih tepat. Imej yang diperolehi dalam mod UAV RTK ini mempunyai maklumat lokasi kamera (latitud, longitud, ketinggian dan ketepatan) Ini bermakna pesawat udara tanpa pemandu (UAV) dilengkapi dengan modul RTK membolehkan *Georeferencing* projek fotogrametri dilaksanakan tanpa menggunakan titik kawalan (Martínez-Carricondo et al., 2023).



Rajah 1. *UAV Rover GNSS for RTK*. (Famiglietti et al., 2021)

Pada masa kini perkembangan teknologi UAV semakin berkembang, peralatan UAV telah semakin canggih dimana ianya dilengkapi dengan teknologi GNSS RTK. (Czyza et al., 2023). *Direct georeferencing* ialah kaedah pemetaan dan menentukan koordinat bumi terus daripada penerima yang dipasang pada UAV tanpa memerlukan penggunaan Titik Kawalan Bumi (TKB). (Martínez-Carricondo et al., 2023). Dalam *Direct Georeferencing*, data kedudukan dan orientasi penerbangan diambil terus daripada Sistem Navigasi Inersia (INS) yang disepadukan dengan sistem sensor lain. Kelebihan utama *Direct Georeferencing* ialah kelajuan dan kecekapan dalam pemetaan, kerana tidak perlu memasang dan menentukan TKB. Ini membolehkan pengumpulan data yang lebih pantas dan mengurangkan kos untuk tinjauan dan pemetaan (Rabah et al., 2018; Štroner et al., 2021; Xiu et al., 2021)

Bahan dan Kaedah

Kawasan kajian adalah di kawasan sekitar kampus Politeknik Kuching Sarawak seperti Rajah 2.



Rajah 2. Kawasan Kajian

Penerbangan UAV dan pemerolehan data adalah sangat penting dalam kajian ini. Penderia berkualiti rendah boleh menghasilkan data yang tidak tepat. Kualiti penderia yang dipasang pada UAV, seperti kamera, mesti mempunyai resolusi dan kualiti yang tinggi. Oleh yang demikian dalam kajian ini peralatan UAV yang digunakan adalah jenis DJI Mavic 3 Enterprise seperti Rajah 3 untuk mengambil imej udara digital bagi kawasan kampus Politeknik Kuching Sarawak untuk tujuan pemetaan secara fotogrametri dengan menggunakan kamera 20 MP dengan 4/3 inci sensor CMOS yang dipasang pada bahagian UAV. Teknologi canggih seperti *True Terrain Following* yang terdapat dalam peralatan UAV ini amat penting kerana teknologi yang digunakan dalam penerbangan UAV ini membolehkan peralatan UAV mengikuti dan menyesuaikan ketinggian penerbangan mengikut kontur permukaan bumi dengan ketepatan yang tinggi. Fungsi utamanya adalah untuk mengekalkan jarak yang berterusan antara peralatan UAV dan permukaan bumi dan juga untuk tujuan keselamatan dimana untuk mengelakkan sebarang perlanggaran dengan objek semasa penerbangan. Dalam kajian ini untuk cerapan GNSS kaedah RTK menggunakan peralatan GNSS CHCNAV seperti Rajah 4. Dalam kajian ini titik kawalan untuk pemetaan fotogrametri menggunakan penerima GNSS RTK yang di pasang dibahagian UAV. Ini bermaksud penentuan kedudukan koordinat bumi dapat ditentukan secara masa hakiki daripada penerima GNSS RTK yang dipasang dibahagian pada UAV tanpa memerlukan penggunaan Titik Kawalan Bumi (TKB).



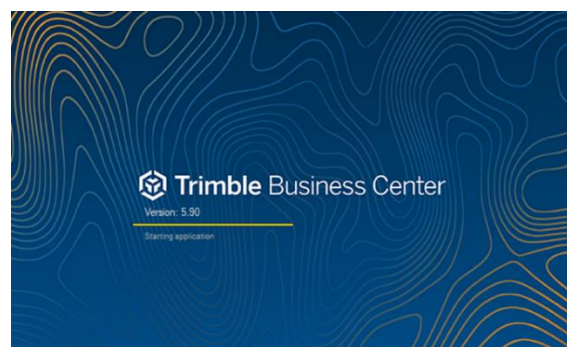
Rajah 3. UAV DJI Mavic 3 Enterprise Rajah 4. Alat Penerima GNSS CHCNAV

Metodologi kajian ini disusun untuk mendapatkan maklumat dan data untuk mencapai objektif kajian. Rajah 5 adalah carta aliran kerja yang dijalankan merangkumi enam fasa. Fasa pertama adalah operasi perancangan adalah melalui tinjauan di kawasan kajian. Fasa kedua untuk misi perancangan kajian ini menggunakan perisian DJI Pilot 2 untuk menentukan arah penerbangan. Manakala dalam fasa tiga UAV yang digunakan adalah jenis DJI Mavic 3 Enterprise untuk perolehan data dari udara.

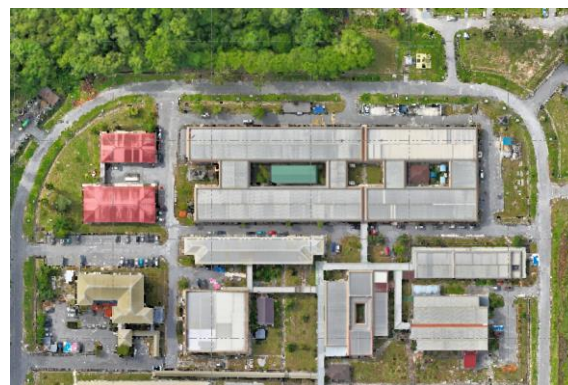


Rajah 5. Metodologi kajian

Di dalam fasa pemprosesan data mentah imej udara digital UAV iaitu fasa keempat, imej udara yang dikumpul mesti diproses untuk menghilangkan herotan dan pembetulan perspektif yang disebabkan oleh pergerakan UAV dan sudut kamera, termasuk juga pembetulan kesan anjakan lensa dan pelarasan kepada warna dan kontras untuk mencapai konsistensi dalam imej. Dalam kajian ini imej udara digital yang dikumpul oleh UAV akan di proses menggunakan perisian Trimble Business Center (TBC) versi 5.80 dalam modul pemprosesan *Photogrammetry* seperti Rajah 6. Dalam modul ini pengguna boleh memasukkan sistem koordinat, membuat *Relative Adjustment* dan *Absolute Adjustment*, ini termasuk peningkatan kualiti imej, pembetulan warna, *Ortomosaic* seperti Rajah 7 dan penghasilan *Point Cloud* seperti Rajah 8 bagi penjanaaan model rupa bumi berdigit (DTM) dan penjanaaan kontur. Perisian ini membolehkan pengguna menghasilkan Peta Ortofoto Digital, Model Topografi dan Model 3D daripada imej udara digital yang dikumpul oleh UAV. Kemudian pada fasa kelima Peta Ortofoto akan dianalisa dan seterusnya kesimpulan kajian akan dilaksanakan pada fasa terakhir iaitu fasa keenam,



Rajah 6. Perisian Trimble Business Center versi 5.80

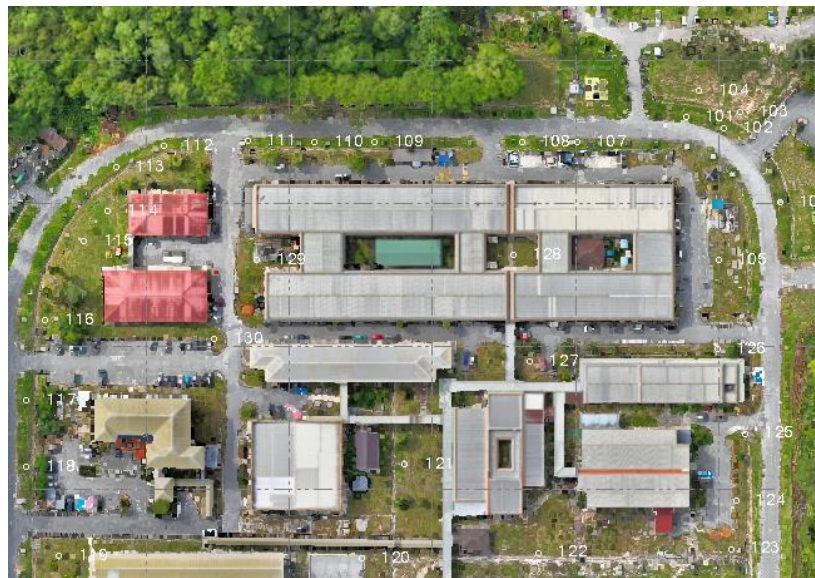


Rajah 7. Orthomosaic



Rajah 8. Point Cloud

Di dalam fasa analisa titik semakan iaitu *Check point* digunakan untuk mengesahkan ketepatan ukuran ketinggian pada Peta Ortofoto. Bagi kajian ini pengumpulan data-data ukur dilapangan bagi titik *check point* tersebut adalah menggunakan cerapan GNSS kaedah *Real Time Kinematik* (RTK). Sebanyak 30 titik *checkpoint* ditubuhkan di kawasan kajian di sekitar kampus Politeknik Kuching Sarawak seperti Rajah 9. Titik checkpoint ini dipilih sebagai titik rujukan ketinggian di lapangan.



Rajah 9. Titik *Check Point*

Hasil dan Perbincangan

Setelah semua kerja cerapan dilapangan iaitu 30 titik *check point* menggunakan cerapan GNSS menggunakan kaedah RTK selesai dilakukan dilapangan. Analisa terhadap data dibuat dengan membandingkan data ketinggian dari Peta Ortofoto yang dihasilkan dan juga dengan cerapan GNSS kaedah RTK. Ketinggian muktamad bagi cerapan yang dijalankan di sekitar kampus Politeknik Kuching adalah seperti berikut:

Jadual 1. Pebezaan ketinggian diantara data ketinggian Peta Ortofoto dengan cerapan GNSS kaedah Real Time Kinematic (RTK)

Titik	Ketinggian	Ketinggian	Perbezaan	
	GNSS	TBC	ΔH	ΔH^2
101	33.893	33.963	0.07	0.0049
102	34.356	34.276	-0.08	0.0064
103	35.2	35.23	0.03	0.0009
104	35.628	35.678	0.05	0.0025
105	34.414	34.344	-0.07	0.0049
106	33.989	34.039	0.05	0.0025
107	33.863	33.923	0.06	0.0036

108	34.244	34.164	-0.08	0.0064
109	33.91	34.01	0.1	0.01
110	33.823	33.953	0.13	0.0169
111	33.899	33.779	-0.12	0.0144
112	33.424	33.534	0.11	0.0176
113	33.767	33.887	0.12	0.0144
114	34.221	34.321	0.1	0.01
115	34.149	34.239	0.09	0.0081
116	34.11	34.19	0.08	0.0064
117	35.559	35.489	-0.07	0.0049
118	35.323	35.383	0.06	0.0036
119	34.983	34.903	-0.08	0.0064
120	34.503	34.553	0.05	0.0025
121	33.498	33.568	0.07	0.0049
122	32.342	32.412	0.07	0.0049
123	31.741	31.681	-0.06	0.0036
124	32.416	32.506	0.09	0.0081
125	32.616	32.576	-0.04	0.0016
126	33.52	33.61	0.09	0.0081
127	34.456	34.516	0.06	0.0036
128	34.437	34.367	-0.07	0.0049
129	34.604	34.694	0.09	0.0081
130	34.516	34.596	0.08	0.0064
Jumlah				0.2015
				0.00672
RMSE Ketinggian				0.08196

Merujuk kepada Jadual 1, dapat dilihat bahawa beza ketinggian paling kecil adalah 3cm di titik checkpoint 103 manakala beza ketinggian paling besar adalah 13cm di titik checkpoint 110. RMSE ketinggian untuk kajian ini adalah 8 cm.

Kesimpulan

Kesimpulan Dalam kajian, kaedah fotogrametri UAV dapat digunakan sebagai alternatif kepada fotogrametri udara. Hasil kajian mendapati, ketepatan menegak adalah ± 8 cm. Mengikut keputusan kajian ini, dapat disimpulkan bahawa kaedah fotogrametri UAV menggunakan menggunakan peralatan UAV-RTK dapat menghasilkan Peta Ortofoto dengan berketepatan yang tinggi.

Penghargaan

Penulis ingin merakamkan penghargaan kepada Jabatan Kejuruteraan Awam, Politeknik Kuching Sarawak dalam menayakan kajian ini.

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REVOLUSI FOTOGRAFI DIGITAL DAN KESAN KEPADA FOTOGRAFI ANALOG: SATU PERCUBAAN MENGGUNAKAN FOTOGRAFI ANALOG UNTUK INTERVENSI KESELAMATAN JALAN RAYA

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ABSTRAK

Umumnya, manuskrip ini membicarakan mengenai revolusi dalam seni fotografi dengan melihat kepada sejarah dan perkembangan teknologi dan budaya fotografi. Ia membincangkan mengenai sejarah fotografi dari seawal abad ke 19 sehingga ke tempoh transisi dan perubahan teknologi daripada era analog yang menggunakan filem kepada era fotografi digital. Perkembangan teknologi fotografi digital dipergiatkan lagi dengan kehadiran teknologi telefon bimbit yang dilengkapi dengan kamera, sehingga dengan pantas mematikan fotografi analog. ‘Kematian’ fotografi analog yang menggunakan filem boleh dilihat dari kejatuhan bilangan kamera yang dijual dan peningkatan penjualan kamera telefon bimbit. Antara yang terkesan ialah syarikat pengeluar kamera dan filem berjenama Kodak serta apa saja aktiviti fotografi yang dikendalikan secara analog termasuk akhbar dan majalah. Bagaimanapun, gerakan ‘film is not dead’ yang muncul di seluruh dunia telah menyelamatkan fotografi analog daripada terus lenyap. Fotografi yang menggunakan filem menjadi kegemaran anak-anak muda yang lahir pada zaman digital. Memahami minat anak muda, Institut Penyelidikan Keselamatan Jalan Raya Malaysia telah menggunakan teknik fotografi analog dalam menghasilkan dokumentari berkaitan mangsa kemalangan motosikal. Kajian MIROS membuktikan bahawa gambar hitam putih cetakan tradisional mampu menarik minat golongan muda serta berkesan dalam memberi kesedaran mengenai keselamatan jalan raya. Malahan, penggunaan filem dan cetakan tradisional hitam putih dilihat sebagai seni yang bernilai tinggi.

Kata Kunci: Fotografi, Analog, Digital, Filem Hitam Putih, Keselamatan Jalan Raya.

Pengenalan

Sejarah fotografi moden direkodkan sekitar 1826 apabila Joseph Nicéphore Niépce menghasilkan imej kekal buat pertama kali dengan menggunakan kamera obskura. Kejayaan Niepce ini mendorong Louis-Jacques-Mandé Daguerre untuk menghasilkan teknik fotografi yang lebih baik sehingga terhasilnya daguerreotype yang menggunakan plat salutan perak. Seterusnya, William Henri Fox Talbot mencipta teknik ‘calotype’ dan ‘wet plate collodion’ yang membolehkan imej negatif dihasilkan pada kertas dan cetakan berulang kali boleh dilakukan. Bagaimanapun, fotografi pada peringkat awal ini melibatkan proses yang rumit, mengambil masa untuk merakam gambar dan melibatkan kos yang tinggi. Hanya golongan bangsawan yang mampu berada di hadapan kamera, satu peralatan yang amat jarang dimiliki pada masa itu. Dunia fotografi menemui cahaya apabila George Eastman menubuhkan Syarikat George Eastman di Rochester, New York yang terkenal dengan jenama ‘Kodak’. Pada tahun 1884, Eastman memperkenalkan filem gulung untuk digunakan pada kamera yang dihasilkan oleh syarikat beliau sendiri. Seterusnya Eastman memperkenalkan kamera kotak yang dinamakan sebagai Brownie. Sekitar 1900, kamera dan filem dijual dengan harga mampu milik dan amat popular terutamanya di Amerika Syarikat dan mampu dimiliki oleh orang kebanyakan. Perkembangan fotografi menjadi semakin rancak apabila seorang jurutera Jerman, Oscar Barnack, buat pertama kalinya mencipta 35mm kamera pada 1913. Kamera ini menggunakan filem yang berkonsepkan filem wayang gambar yang mempunyai ‘lubang sproket’, sesuai untuk kegunaan filem 135 atau dikenali sebagai filem 35mm. Kamera ciptaan Barnack ini dinamakan sebagai Leica, singkatan daripada ‘Leitz Camera’. Sehingga kini, iaitu pada zaman kamera digital, model kamera Leica masih menjadi penanda aras kualiti untuk kamera. Walaupun semua syarikat pengeluar kamera telah menghentikan penghasilan kamera filem akibat penangan kamera digital, Leitz Camera masih mengeluarkan beberapa model yang diterbitkan semula seperti Leica MA, Leica MP dan juga Leica M6 kerana permintaan yang memberangsangkan sehingga kini.

Revolusi filem digital

Dunia fotografi pada masa ini boleh dikatakan sinonim dengan digital. Sebenarnya, percubaan untuk menghasilkan kamera digital bagi menghasilkan gambar tanpa menggunakan filem telah bermula seawal 1978 apabila jurutera muda Eastman Kodak yang bernama Steven Sasson berjaya mencipta kamera digital yang pertama (gambar 1). Bagaimanapun, kamera ini kekal pada peringkat prototaip dan tidak direalisasikan untuk jualan.



Gambar 1: Kamera digital pertama

Kodak sekali lagi berusaha untuk menghasilkan kamera digital pada 1991 dengan menghasilkan Kamera DCS atau Kodak Digital System. Kamera ini menggunakan platform kamera 35mm professional yang popular pada masa itu iaitu kamera Nikon F3 dengan keupayaan 1.3 megapixel. Sebanyak 987 unit telah terjual daripada 1991-1994 dengan harga pada masa itu ialah antara USD20,000 hingga USD25,000. Harga ini adalah kira-kira 20 kali lebih tinggi berbanding kamera professional 35mm pada masa itu.

Menjelang tahun 2000, kamera digital menjadi popular dan hampir setiap jenama utama seperti Nikon, Canon, Pentax, Fuji dan Sony (dahulunya Minolta) masing-masing menghasilkan kamera digital untuk kegunaan professional dan amatir. Kamera digital ini dihasilkan dalam bentuk digital single lens reflex atau DSLR dan juga dalam bentuk kompak.



Gambar 2: Kamera digital Nikon pada 1991

Secara umumnya, kamera digital adalah sama dengan kamera filem (yang juga dikenali sebagai kamera analog). Perbezaan paling ketara ialah kamera ini merakamkan imej pada sensor digital yang menggantikan filem. Imej dirakamkan dalam bentuk 'data' yang disimpan dalam pelbagai format seperti JPEG, RAW atau TIFF dan disimpan pada kad memori. Oleh kerana kad memori boleh dipakai semula setelah data dipindahkan untuk

simpanan (seperti ke dalam HDD atau cloud) dan juga terdapat dalam kapasiti saiz yang besar, maka pengguna kamera digital tidak lagi dikekang dengan had bilangan gambar untuk dirakamkan. Ada kad memori yang boleh merakamkan lebih dari 1,000 keping gambar bagi setiap satu kad bergantung dengan saiz imej dipilih.

Sebagai perbandingan, negatif atau filem yang digunakan pada 35mm kamera adalah terhad, sama ada 24 atau 36 dedahan sahaja. Bagi kamera format 120 yang menggunakan filem gulung pula, kebiasaannya hanya 8, 12 atau 15 gambar sahaja yang dapat dirakamkan mengikut format kamera. Selain itu, pengguna kamera digital juga boleh memeriksa imej yang dirakamkan pada skrin digital yang disediakan pada belakang kamera. Gambar yang tersilap dihasilkan kerana dedahan yang tidak betul, tidak fokus dan tidak baik biasanya boleh dipadamkan dengan serta merta. Seterusnya, object boleh dirakamkan semula untuk memenuhi citarasa jurufoto.

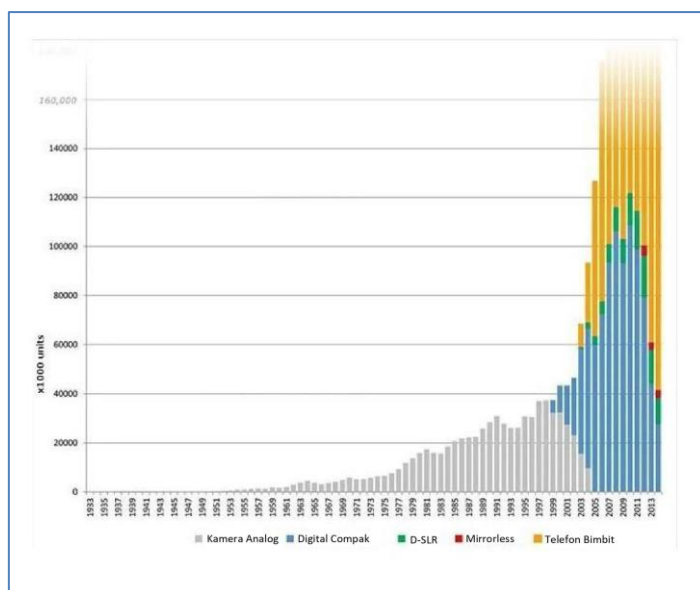
Ini berbeza dengan kamera yang menggunakan filem yang mana proses merakamkan gambar memerlukan pengetahuan mengenai fotografi kerana kamera SLR automatik dan autofokus hanya dihasilkan selepas 1985, iaitu Minolta Maxxum / Dynax 7000. Bagi kamera yang beroperasi sepenuhnya secara manual, cahaya yang memasuki filem perlu ditentukan dengan mengawal dedahan pada fungsi 'aperture' dan 'shutter speed' berdasarkan kepada sensitiviti filem yang digunakan.

Seterusnya, filem yang telah dirakamkan gambar perlu dihantar ke makmal untuk diproses dan dicetak dengan kos tertentu dan hanya boleh diperolehi semula dalam tempoh tertentu yang ditetapkan oleh pekedai (atau makmal) yang memproses dan mencetak gambar. Ini boleh jadi dalam tempoh 24 jam atau seminggu. Suatu masa dahulu, terdapat sejenis filem keluaran Kodak yang dipanggil Kodachrome, iaitu filem slaid atau positif, yang hanya boleh diproses di beberapa makmal di seluruh dunia. Contohnya, pengguna Kodachrome di Malaysia perlu menghantar filem ke makmal di Melbourne melalui agent di Malaysia dan hanya akan diperolehi semula dalam tempoh dua minggu. Walaupun begitu, filem Kodachrome amat digemari oleh jurugambar profesional kerana kualiti yang tinggi.

Digital Membunuh Fotografi Analog

Secara umum, masyarakat amat teruja dengan kemampuan kamera digital (termasuklah kamera telefon bimbit) bagi menghasilkan gambar yang berkualiti dengan secara serta-merta pada saat rakaman. Ini boleh diukur dengan melihat pada bilangan jualan kamera di seluruh dunia. Bagi kamera filem 35mm, rekod jualan paling tinggi dicatatkan pada 1998 (Petapixel) dengan hampir 4 juta unit terjual pada tahun tersebut. Bagaimanapun, trend penurunan jualan kamera filem bermula sebaik sahaja kamera digital memasuki pasaran pada tahun seterusnya. Selepas mencapai kemuncak jualan dan kemunculan kepada kamera digital, kamera filem tidak lagi mampu bersaing pada pasaran kamera. Kamera digital yang dihasilkan oleh pembuat kamera bukan sahaja menjadi semakin berkualiti, malahan semakin murah. Setiap tahun jualan kamera digital naik mencanak sehingga mencecah jualan lebih dari 120 juta di seluruh dunia pada 2009 (Gambarajah 1).

Kedudukan kamera analog terus menyorot dan tidak lagi signifikan apabila pengeluaran telefon bimbit turut memasukkan kamera sebagai ciri utama pada telefon. Oleh kerana telefon kamera mudah digunakan; iaitu tanpa memerlukan pengetahuan teknikal dan mudah dibawa kemana sahaja, ia dengan cepat menjadi pilihan utama pengguna. Pada 2013, daripada hampir 1.3 billion unit kamera digital yang terjual, hanya 4 juta adalah bukan kamera telefon, iaitu kamera digital SLR. Pada masa ini, hampir keseluruhan pengeluaran kamera tidak lagi mengeluarkan kamera analog, kecuali Leica yang menerbitkan semula beberapa model kamera filem yang dianggap klasik dan mempunyai permintaan dari kalangan penggemar dan pengumpul kamera filem.



Gambarajah 1: Perbandingan jualan kamera mengikut jenis dan tahun

Kesan Daripada Fotografi Digital

1. Gaya hidup

Adalah dianggarkan pada tahun 2023, sebanyak 5 billion gambar dirakamkan setiap hari dan menjelang 2030 sebanyak 2.3 trillion gambar dirakamkan setiap tahun. Adalah dianggarkan bahawa bilangan gambar yang dirakamkan dalam dua tahun terakhir ini mengatasi keseluruhan bilangan gambar yang pernah dirakamkan dalam sejarah fotografi yang hampir mencecah dua abad lamanya.

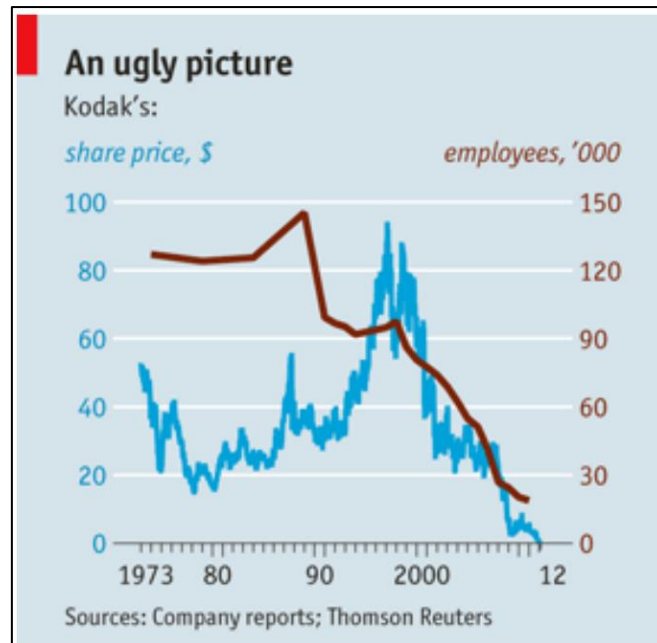
Kewujudan kamera digital yang menghasilkan gambar secara serta merta dengan kualiti yang sempurna secara automatik ini membuatkan kamera menjadi peralatan fotografi yang mesra pengguna. Ini berbeza dengan kamera pada zaman permulaan fotografi yang berat dan memerlukan kepakaran yang tinggi untuk digunakan.

Jika dahulu gambar hanya untuk simpanan album sendiri atau diterbitkan dalam akhbar, majalah atau penerbitan lain (khususnya dalam kalangan jurugambar professional), kewujudan media sosial seperti Instagram, Facebook, TikTok serta YouTube mengubah kegunaan gambar. Oleh kerana media sosial membenarkan perkongsian idea dan karya melalui gambar, video dan penulisan dengan cara yang mudah, maka berlakulah budaya penghasilan konten yang sengit. Malahan, akhbar dan majalah juga menggunakan platform media sosial bagi mendapat lebih banyak pembaca.

2. 'Kematian' fotografi filem

Dalam masa yang singkat sejak kamera digital diperkenalkan kepada pengguna, popularitinya melonjak naik. Menjelang tahun 2000 dan beberapa tahun berikutnya, kebanyakan pengguna beralih kepada kamera digital. Akibatnya, jualan kamera analog seperti kamera SLR atau kompak menjunam dengan teruk dan nasib yang sama turut melibatkan jualan filem, sama ada filem warna, filem slaid mahupun filem hitam putih. Syarikat seperti Kodak dan Fijifilm, Ilford dan Agfa serta beberapa pengeluar filem dan barangan berkaitan filem yang lain (contohnya kertas cetakan hitam putih, kertas cetakan warna, bahan kimia memproses filem) mengalami penurunan jualan yang ketara.

Syarikat Kodak contohnya, mengalami kemerosotan dari segi harga saham yang begitu teruk selepas berada pada kemuncak pada penghujung 1990an (Gambarajah 2). Pada tahun 2012, Kodak terpaksa memfailkan 'Chapter 11' atau bangkrups kerana tidak lagi dapat menanggung kos operasi serta membayar pemiutang.



Gambarajah 2: Kemerosotan harga saham Syarikat Kodak.

Kebengkrapan syarikat Kodak Eastman (Gambar 3) yang berusia kira-kira satu abad ini membuatkan sesetengah pihak menganggap fotografi filem sudah pun mati. Bagaimanapun, selepas tempoh 'bulan madu' bersama teknologi digital berjalan untuk beberapa tahun, tiba-tiba muncul Gerakan 'film is not dead' (fotografi filem tidak mati) dalam rangkaian media sosial. Tidak diketahui siapa yang memulakannya, tetapi gerakan 'film is not dead' ini menular di seluruh dunia, khususnya di sosial media. Dalam temubual blog fotografi terkenal The Phoblographer dengan Pengarah Pemasaran Richard Photo Lab, Colleen Taylor, beliau memberitahu berlaku kemunculan semula peminat fotografi filem terutamanya dalam kalangan seniman seni halus, jurugambar jalanan dan juga peminat fotografi filem. Mereka ini terdiri dari golongan berusia dan juga anak muda yang baru mengenali keunikan filem. Taylor menjelaskan kebangkitan fotografi filem ini akan terus berpanjangan seiring dengan fotografi digital.

Di Malaysia juga terdapat kumpulan di Facebook yang menjenamakan diri mereka sebagai 'Film is Not Dead in Malaysia' dengan lebih 13,600 orang ahli. Ahli kumpulan ini aktif dalam mempamerkan hasil fotografi mereka yang menggunakan filem serta membincangkan isu-isu berkaitan.



Gambar 3: Kebangkrapan syarikat Kodak digambarkan dalam kartun

Selain daripada kemerosotan jualan kamera filem yang baru, kegilaan pengguna terhadap kamera digital juga menyebabkan berlakunya lambakan kamera filem di pasaran kamera terpakai. Di sekitar tahun 2000 - 2010, kamera filem terpakai hampir tidak mempunyai nilai dan kehilangan sehingga 80% daripada harga belian. Contohnya, kamera popular seperti Nikon FM2 yang berharga kira-kira RM1,500 pada awal 1990an hanya dijual dengan harga terpakai sekitar RM200 sahaja pada waktu itu.

Bagaimanapun, gerakan ‘film is not dead’ memberi sedikit injeksi kepada harga kamera terpakai. Menjelang 2015, harga kamera terpakai kembali melonjak separuh kepada harga asal. Contohnya, harga kamera terpakai Nikon FM2 dijual pada harga antara RM700-RM1000, dan pada tahun 2023, kamera yang sama dijual pada harga RM1,200 atau RM1,500 kerana permintaan yang semakin tinggi.

3. ‘Kematian’ Bilik Gelap

Bilik gelap atau ‘darkroom’ yang menjadi tempat memproses dan mencetak filem, terutamanya filem hitam putih, filem berwarna C41 dan filem slaid E6 sebenarnya telah lama hilang populariti sejak mesin memproses gambar digunakan secara meluas sejak 1980an. Bagaimanapun, masih terdapat segolongan peminat fotografi seperti artis dan anak muda yang baru mengetahui tentang ‘keajaiban’ bilik gelap ingin kembali kepada teknik memproses filem dan mencetak gambar secara tradisional. Seperti kata Steve Anchell yang merupakan penulis buku ‘The Darkroom Cookbook’, memproses dan mencetak gambar sendiri di bilik gelap ‘menyempurnakan fotografi anda’ kerana mencipta gambar dengan sepenuhnya dari mula sehingga akhir.

Di Amerika Syarikat, kebanyakan bilik gelap di bilik berita yang menerbitkan akhbar di sekolah menengah dan universiti yang dikendalikan pelajar juga ditutup selepas kehadiran kamera digital. Nasib yang sama dihadapi oleh bilik gelap yang digunakan untuk pendidikan fotografi pada peringkat sekolah menengah dan universiti di seluruh Amerika. Majoriti pengendali bilik gelap persendirian juga turut menyisihkan bilik gelap kerana lebih berminat dengan kamera digital yang bukan sahaja mampu menghasilkan gambar segera dan mudah, malah amat berkualiti. Ini berlaku antara lima hingga 10 tahun pertama selepas revolusi kamera digital.

Walaupun penangan kamera digital turut membunuh bilik gelap, gerakan ‘film is not dead’, turut mengembalikan bilik gelap. Apa yang berlaku di Amerika ini turut berlaku di seluruh dunia termasuk di Malaysia. Dalam satu video di YouTube mengenai fotografi filem di Singapura yang diterbitkan sekitar 2015, diceritakan hanya satu sahaja bilik gelap yang beroperasi pada masa itu. Ini berbeza dengan zaman kegemilangan filem pada 1990an kerana hampir setiap kedai gambar dan setiap bandar di dunia turut mengendalikan bilik gelap kerana masih ada permintaan untuk gambar hitam putih dan warna dengan cetakan tersuai (custom print) pada saiz tertentu.

Mengembalikan Kegemilangan Fotografi Analog

Memandangkan fotografi yang menggunakan filem atau fotografi analog hampir dilihat sebagai ‘keajaiban’ bagi anak-anak milenial yang membesar pada fotografi digital, penggunaan fotografi filem boleh dipromosikan bagi menarik kumpulan ini dalam menyasarkan sesuatu idea. Sebagai contoh, bagi mempromosikan isu keselamatan jalan raya, terutamanya yang berkaitan dengan bahaya penyalahgunaan motosikal, Institut Penyelidikan Keselamatan Jalan Raya Malaysia (MIROS) telah menggunakan fotografi filem dan juga cetakan bilik gelap bagi berkarya (Gambar 4) untuk tujuan mempromosikan kesedaran keselamatan jalan raya. Seramai 30 orang mangsa kemalangan motosikal telah didokumentasikan kisah dan gambar mereka dalam bentuk gambar hitam putih yang menggunakan filem dan cetakan bilik gelap. Siri gambar yang dihasilkan telah dipamerkan secara fizikal dan dalam talian kepada golongan sasaran, termasuk melalui penggunaan media sosial.



Gambar 4: Gambar analog MIROS

Berdasarkan kajian oleh MIROS, eksperimen ini telah mendapat sambutan yang baik dari kalangan peminat fotografi dan mereka mencadangkan agar usaha ini dikembangkan untuk memberikan lebih kesedaran kepada pengguna jalan raya.

Kesimpulan

Secara umumnya bolehlah dirumuskan bahawa kehadiran fotografi digital hampir membunuh fotografi tradisional yang menggunakan filem, termasuk proses mencetak gambar di bilik gelap. Sejak kamera digital memasuki pasaran pada 1999, penjualan kamera digital terus meningkat manakala kamera filem pula mengalami penyusutan. Jualan kamera filem mengalami penurunan setiap tahun dan menjadi semakin teruk apabila telefon bimbit juga mula dilengkapi dengan kamera. Apabila telefon bimbit menjadi sinonim dengan kamera digital dan sosial media seperti Facebook dan Instagram mengubah gaya hidup di mana setiap orang mampu menjadi jurugambar serta menerbitkan karya mereka, dunia fotografi filem dan bilik gelap hampir lenyap. Kesan daripada kehadiran kamera digital ini amat dirasai dengan kebangkrutan syarikat pengeluar kamera dan filem terbesar iaitu Eastman Kodak. Bagaimanapun, penggunaan filem kembali tidak lama selepas itu dengan gerakan 'film is not dead' (filem tidak mati), terutamanya di kalangan anak muda yang mengenali filem buat kali pertama. Gerakan 'film is not dead' di seluruh dunia ini sedikit sebanyak menghidupkan kembali dunia fotografi filem.

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THE IMPACT OF USING THE METAVERSE IN ADVERTISING DESIGN :AN APPLIED STUDY OF THE SPACE JOURNEY POSTER EXHIBITION IN "METATUT" - THE FIRST PHARAONIC CITY

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Abstract

Ads and posters are potent marketing tools, using creative design to captivate and engage. Modern visual techniques, including the Metaverse, push design boundaries, enhancing viewer experiences. This study explores the Metaverse's impact on advertising, aiming to inspire innovative strategies for better creative communication and marketing success. Objective: Evaluate the Metaverse's impact on the exhibition's attractiveness and the user's utilization of the technology. Direct designers in applying best practices to utilize the Metaverse for enhancing advertising design. Provide new ideas and innovative design directions for designers and decision-makers in the advertising field. Methodology: We conducted an applied study using surveys for participating designers and visitors, observing participation and interaction within the exhibition, and employing data analysis methods like observation, questionnaires, and personal interviews. This research falls under the category of applied technological developmental research, focusing on creativity and innovation. The research has yielded several significant findings. Current Metaverse platforms have achieved substantial advancements within the original virtual world. Their psychological impact liberates the virtual world from the constraints of physical space, enabling designers to fully harness their thinking and creativity, thus unlocking boundless innovation. The Metaverse has successfully integrated with various social media platforms, allowing advertisers to employ new strategies seamlessly across diverse virtual environments. The real world has become an integral part of the Metaverse, with all elements in the mirrored virtual world being replicas of real-world components. The strength of the Metaverse lies in its interaction with the real world. This convergence and interaction signify that the Metaverse surpasses both the real and virtual worlds, aligning with the original meaning of "meta," signifying above or beyond. This is a crucial criterion in assessing the value of the Metaverse, enhancing efficiency and productivity in design.

Keywords: Metaverse - Interactive Advertising - Virtual Reality - Augmented Reality - Digital Balance Technology - Interactive Media.

Introduction

Advertising and advertising posters are powerful tools in the world of marketing and promotion, as they reflect the magnificence of design and innovation in communicating with the target audience. Attracting attention, excitement, and creativity are among the main goals of successful advertising, and achieving these goals requires the adoption of innovative design techniques and methods.

In recent decades, modern visual technologies have gained tremendous importance in the field of advertising design, and visual and graphic means of expression have diversified to attract interest and interact with the audience. Among these innovative and effective technologies lies the philosophy of design in the metaverse, which represents a paradigm shift in advertising design and viewer experience.

Considering the rapid technological development and the spread of virtual platforms, the metaverse is one of the most prominent technical innovations that constitute a new shift in the world of design and advertising. It opens the door to immense artistic possibilities that help create realistic interactive experiences that transcend the boundaries of traditional design. By allowing designers to use virtual reality and new dimensions in designing posters and advertisements, the metaverse contributes to making viewers part of the story on display, enhancing interaction. and the emotional impact they have.

Through this study, we expect to highlight the importance of metaverse in the field of advertising design and analyze their impact on the attractiveness of the exhibition and the experience of viewers and participants. The

research will also contribute to providing the advertising industry with valuable information and innovative design guidance for the future, as the metaverse can be used as a strategic tool in promoting cultural and entertainment products and events.

With the findings and recommendations of this study, designers and event organizers can benefit from the innovative and effective use of metaverse in the design of advertisements and posters, enhancing audience engagement and increasing the impact of advertising campaigns. Cultural and artistic institutions can also take advantage of these results to create unique and distinctive experiences that attract visitors and increase the satisfaction of their cultural and artistic interests.

In conclusion, this study hopes to be a distinctive and useful contribution to understanding the impact of metaverse in advertising design and guiding the use of this new technology in the future. She aspires that these results will be the beginning of other future research and applications in the world of design and advertising, a constructive contribution to improving creative communication and achieving strategic successes in the field of marketing and promotion.

Research Problem

The scarcity of applied studies on analyzing the impact of using metaverse in advertising design, especially in the field of poster design, and the need to understand the impact of this advanced technology on the attractiveness of the recipient and the interaction of the audience, so the research problem can be formulated in the following questions:

1. What is the impact of metaverse on exhibition appeal and user experience?
2. How can designers apply best practices in using metaverse to enhance ad creatives?
3. How responsive are designers as users of modern technologies?
4. Does the use of metaverse create new trends for designers and decision-makers in the field of advertising?

The Importance Of Research

The research, in turn, contributes as an applied study in clarifying and analyzing the impact of metaverse on ad design and the attractiveness of ad design. It provides applied design recommendations and guidance to effectively utilize the metaverse in the field of advertising design and improve audience interaction with advertising posters.

Research Objective

An applied analysis of the actual use of the metaverse in designing advertisements at the poster exhibition for space journey with the aim of:

1. Evaluate the impact of the metaverse on the attractiveness of the exhibition and the user's benefit from the technology.
2. Directing designers to apply best practices in the use of metaverse to enhance ad creatives.
3. Describe the user experience and response to interactive advertisements and modern technologies in the exhibition.
4. Provide new ideas and innovative design guidance to designers and decision-makers in the field of advertising.

Research limits

Spatial boundaries: Analysis of the poster design exhibition experience of space journey in the first pharaonic city on the metaverse. Conducting the study during the exhibition period, collecting data related to the designs and surveying the opinions of participants and visitors.

Time limits: April 1 to August 8, 2023, is the period from the start of preparation for the exhibition until the completion of the study.

Research Hypotheses

The research assumes that:

1. The use of metaverse in ad design will increase the attractiveness of advertisements and audience engagement.
2. The international designers who will participate in the exhibition will present creative and innovative designs that effectively use metaverse techniques.
3. Visitors interact positively with interactive advertisements and modern technologies used in the exhibition open new horizons for creativity.
4. The use of metaverse in advertising creates new horizons for innovation in the field of advertising.

Study sample: For the study to achieve its goals in reaching accurate and structured results, the research targets the designers participating as a sample of the study, which are 125 designers from 46 different countries around the world.

First: Definition of Metaverse and Its Role in Advertising Design

The concept of metaverses

Based on the original meaning of the word "meta + universe", he defined the future of the metaverse as "a world that converges the outer and the inner." This definition consists of four main aspects: a virtual world that simulates reality, an innovative virtual world that is unique from reality, reality itself as part of the set of worlds in the metaverse, and a collaboration and interaction between the real and virtual worlds while transcending borders... (The Metaverse Overview: Vision, Technology, and Tactics, 2022).

The metaverse is a shared virtual space that embodies hyper-realism, mystery, and interactivity, designed primarily to be the embodiment of our actual world, allowing individuals to do anything thanks to its immense potential. Simply put, the metaverse represents a mix of the real world and the virtual world.) Hijab e Zainab and others (November 2022)

This idea combines a variety of existing technologies such as¹ Blockchain, Augmented Reality (AR), Virtual Reality (VR), and Artificial Intelligence, to create what is known as the "virtual world". This world allows users to own avatars, digital lands, digital clothing, and other items in the proposed metaverse, and they can transfer these items to other platforms using digital wallets. In addition, the metaverse It will not only bring tech giants together in one place, but will also open up new economic opportunities for users and creators, whether by selling videos as NFTs², or developing games and places that users can explore and enjoy for a fee.) .Hijab e Zainab and others (November 2022).

Another definition of metaverse describes a universe that transcends reality, as it is a continuous environment for many users that combines physical reality and digital virtual reality. The metaverse relies on technology that enables multisensory interactions with virtual environments, digital elements, and people, such as virtual reality (VR) and augmented reality (AR).). As a result, the metaverse is an interconnected network of social environments on continuous platforms for many users, where it is possible to communicate seamlessly and in real-time and

¹ Blockchain: Blockchain is a technology that creates a permanent record of transactions, usually in the form of a distributed and public ledger. Blockchain is the underlying technology that supports cryptocurrencies such as Bitcoin, Ether, and Dogecoin. Every use of cryptocurrencies is recorded on the blockchain, spreading the record on thousands of computers around the world.

Blockchain is an essential part of the metaverse as it ensures transparency and immutability of every business process without the intervention of a central organization. For example, transactions between users can occur directly without resorting to any central financial organization. These transactions become part of the ecosystem, and legitimate user ownership cannot be overturned even if any user exits the virtual world.

² The metaverse is driven by NFTs the metaverse has its own ecosystem where users can buy and own virtual lands (shopping malls, landmarks), goods (vehicles, paintings, music, artifacts), and even designer accessories (bags, sneakers, clothes) via NFTs.

interact dynamically with digital elements.

The introduction of the first metaverse was a network of virtual worlds that the Avatar could navigate between. The latest version of the metaverse includes immersive virtual reality social platforms that blend in with multiple online video games dramatically, open worlds, and collaborative augmented reality spaces. (Mystakidis, February 2022).

Second: Metaverse Applications in The Field of Advertising Design Used in The Study

The idea for the metaverse originated from Neil Stevenson's book in 1992. His sci-fi novel "Snow Crash" imagined an online world where people could use digital characters to explore the world and escape the real world. Decades later, large tech companies began building their versions of the future metaverse.) Academy 'Jun 15, 2023.(

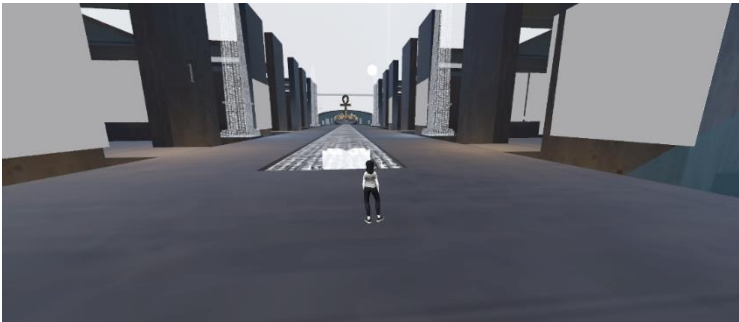
Through the city of Metatut, the exhibition presented exciting opportunities in the field of advertising design, as it transformed the way the target audience interacts with the identity of the city, the following are images of these applications:

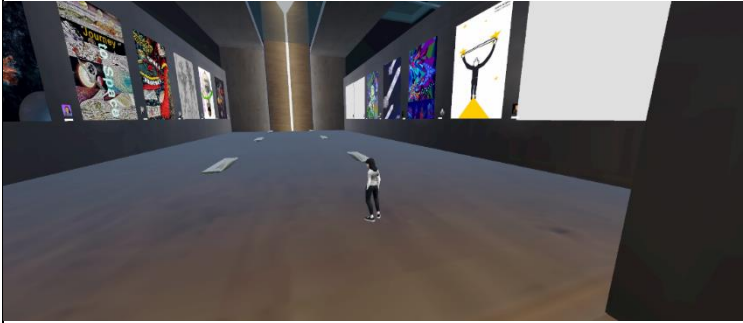
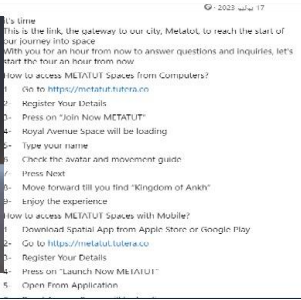
1. **Immersive Brand Experiences:** In Metatut City, we were able to create immersive and interactive experiences that go beyond traditional advertising formats. It has enabled users to interact with the virtual worlds of Egyptian civilization and the space environment, experience tourism virtually in both worlds and interact with identity symbols, enhancing awareness of them and the act of emotional attachment.
- 2.

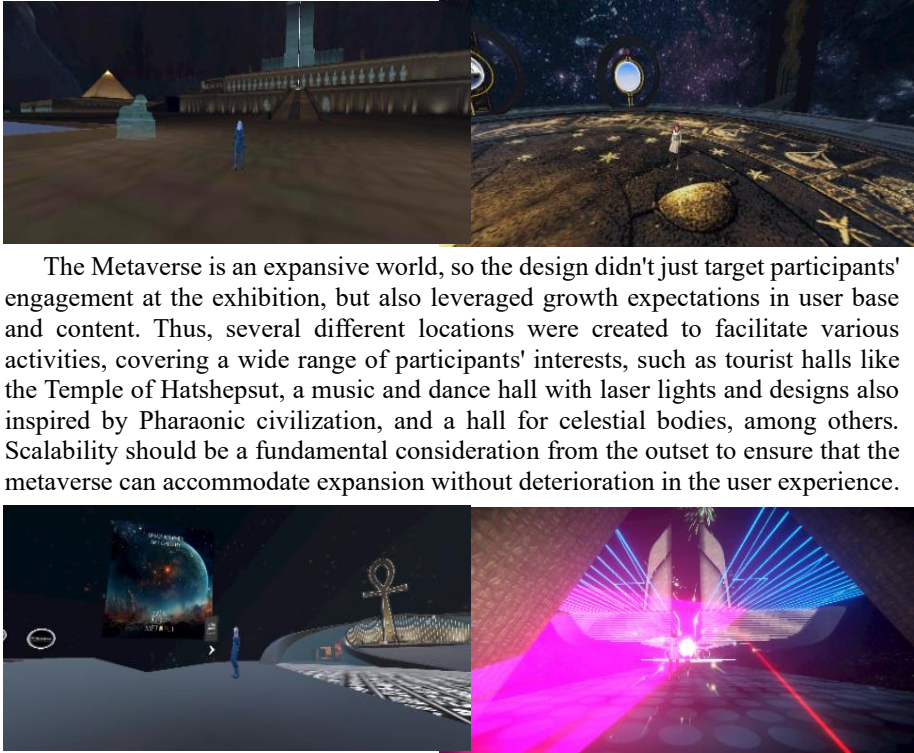


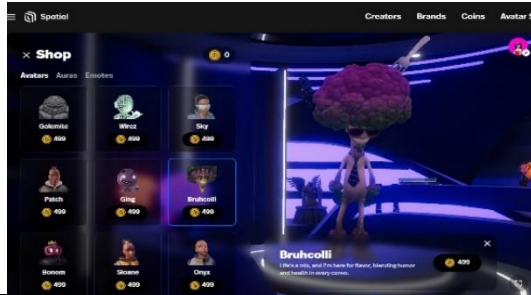
Figure (1) Users' interaction with ID codes.

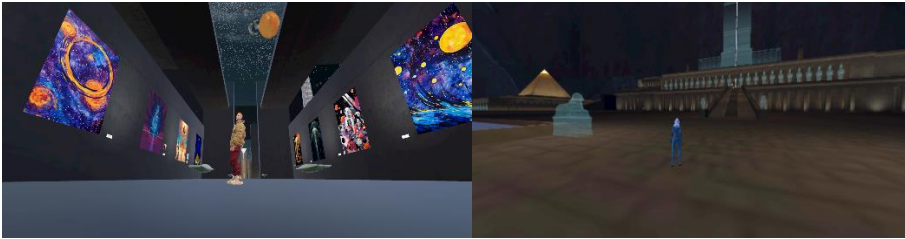
Options available to the user during the trial	1. <u>Embed avatars:</u> Creating digital avatars to uniquely express an individual's emotions is one of the basic concepts of metaverses, each person has their own digital identity, which can be fixed or animated and distinct to them. Digital avatars are a unique means of self-expression as they can be an accurate re-enactment of your actual form, a re-enactment of your favorite celebrities, wearing a traditional costume that reflects a certain cultural identity, or something else entirely. 2. <u>Immersive experiences (augmented reality and virtual reality):</u> Participants in the exhibition were able to obtain immersive experiences that combine
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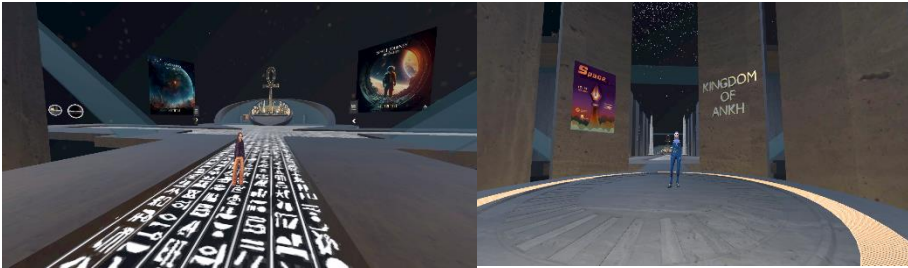
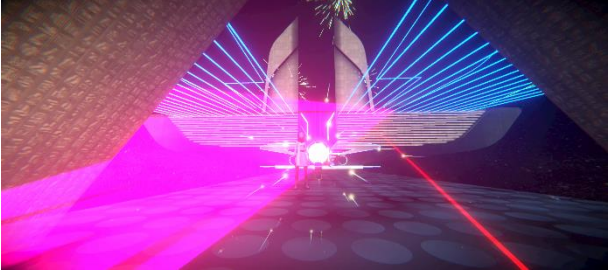
	reality and the virtual world using mixed reality, augmented reality and virtual reality technologies, and some participants were able to meet their friends from other countries and were able to talk via "chat" and also by voice and were able to practice joint activities, take photographs and record videos, and perform movements such as jumping and dancing among others.  <i>Figure (2) Choice of shape and identity.</i> 3. <u>Focus on social interactions:</u> Participants interacted and communicated inside the exhibition halls, the city and the visual representations of the user, users can interact and talk with the virus and with other users, so the virtual space acted as an environment for these exchanges, as it represented an alternative to the real world. 4. <u>The disappearance of economic and physical constraints of physical locations:</u> the participant was able to imagine his physical experiences in the real world and integrate them into a single virtual environment and was able to navigate this infinite world with the help of this comprehensive experience that combined all these disparate experiences. 5. <u>Web3 support:</u> The idea behind Web3 is to achieve a new era of online design, so Web3 and metaverse technologies worked in perfect harmony with each other, as Web3 provided the basis for communication in the metaverse because the Metaverse is a virtual environment and better supports the decentralized web.
UI issues during experimentation	1. Some participants were unable to log in at the same time due to low internet speed or the efficiency of the devices used due to the inappropriate use of Browser, and some of them were able to repeat the attempt. 2. The site needs a few minutes to load the images and add elements to appear in the form of a white space as in the following figure. 

	 <i>Figure (3) The appearance of white areas instead of elements during the loading period.</i>
Design basics applied in the exhibition under study (Studio, 2023)	
Seamlessness	The transition between different areas at the Metatut Space Journey Exhibition in the metaverse was as smooth and continuous as possible, participants needed to achieve communication and consistency in the user experience across the platform and from different devices, this was achieved using consistent design elements and seamless transition interfaces.
Safety and Privacy	Because the metaverse erases the line between the digital and physical worlds, one of the priorities of the experiment was to ensure the safety and privacy of participants, the designs needed to include features that protect user data and provide secure environments for interactions, and user consent was at the forefront of any data collection or sharing, and provides users with control over their data, and to show or hide it.
Be Mindful of Cognitive Overload	In the adventurous environment of the metaverse, participants were cautioned to be mindful of cognitive load, ensuring that the abundance of information, interactions, and insights does not overwhelm users and lead to a poor user experience. Designs aimed to strike a balance between coverage and complexity, in addition to some written contributions.  <i>Figure (5) Placing indicative signs and a list of designers in each hall.</i>  <i>Figure (4) Some written instructions to respect cognitive</i>
Prioritize Interactivity and Collaboration	Metaverse is not a passive environment; participants want to interact, create, and collaborate, therefore, interaction and collaboration have been encouraged through design, providing tools that enable participants to modify and interact with their surroundings and each other, so that there is flexibility and adaptability to the content created.

Design for Scale  QR Code 1) videos of different places within the study site	 The Metaverse is an expansive world, so the design didn't just target participants' engagement at the exhibition, but also leveraged growth expectations in user base and content. Thus, several different locations were created to facilitate various activities, covering a wide range of participants' interests, such as tourist halls like the Temple of Hatshepsut, a music and dance hall with laser lights and designs also inspired by Pharaonic civilization, and a hall for celestial bodies, among others. Scalability should be a fundamental consideration from the outset to ensure that the metaverse can accommodate expansion without deterioration in the user experience. <i>Figure (6) Moving in different parts of the city such as the temple of Hatshepsut, the hall of space and celestial bodies, as well as the modern celebration hall through transfer gates.</i>
Open Standards	To ensure compatibility and operation between different parts of the experiment, the designs adhered to open standards, to encourage inclusion and inclusiveness using: 1. <u>Open-source formats for images and videos:</u> such as PNG and JPEG for images, MP4 and WebMD for videos, to facilitate data exchange and media playback across devices. 2. <u>Open-source development techniques:</u> such as the use of open-source programming languages such as HTML, CSS, and JavaScript, which ensured their compatibility with different web browsers and facilitated their improvement and integration with content management systems. 3. <u>Open-source machine learning techniques:</u> Using open-source machine learning libraries and tools such as TensorFlow and Py Torch to develop techniques to analyze data and generate innovative design angles, to support the advertising message. 4. <u>Open-source design platforms:</u> The use of various programs such as GIMP and Inkscape in the creation and editing of images and graphics, allowing editing without the need for high licensing costs. Using these open standards, designers and developers were able to work more effectively and integrated, ensuring compatibility and stability in the design process, enhancing the quality of the final user experience, and contributing to the success of the poster advertising message.
Narrative and World-Building	The experiment relied on the narratives of the Egyptian civilization "its details and elements of obelisks, hieroglyphics, temples and monuments" and airtightly crafted worlds of space worlds, to provide context and purpose for the immersion of users and facilitate participation.
Mechanical design	Design mechanics in the metaverse enhance participant engagement and enrich their experience. Challenges, progression systems, and interactive exploration, such as searching for unique and animated elements like a cat, archaeological sites, as well as features like alien objects and climbing stairs to reach the surface and view

	exhibition halls from above through glass ceilings, have been implemented.  <i>Figure (7) Interaction with symbols.</i> <i>Figure (8) The moving cat can interact with it.</i>
Avatars and Personalization	The avatar is a fundamental element in the Metaverse, allowing participants to represent themselves in the virtual world, simulating the real world. Participants have been able to create and customize their digital selves, encompassing not only the appearance of the avatar but also its abilities, physical features, and cultural characteristics. 
Environmental Design	The study site environment was designed based on the principles of metaverse design and pharaonic experience standards to ensure effective interaction and integration of participants with the content, the environment design was implemented using 3D design methods and advanced digital editing tools, which contributed to the creation of a realistic and lively environment. A design style based on Pharaonic culture and history was adopted, where design elements were included that reflect the aesthetics of the ancient Egyptian civilization, which enhanced the cultural identity of the place, aroused the curiosity of the participants, and increased the extent of integration with the environment.
Procedural Content Generation	The Pharaonic cities are of large size and many details, so the generation of procedural content was used to create huge worlds that can explore their features, in addition to the vast space world with its amazing details of planets and space movements and a variety of sizes and colors, which achieved a unique experience for participants such as international tourism, and even outside the borders of the planet to outer space.
Ethics in Design	The metaverse industry faces issues such as bounty funds, addiction, and online harassment, so our designers have taken these ethical considerations to promote healthy and positive interactions, promote awareness of the importance of avoiding stereotypes and cultural prejudices, and direct participants to design advertising messages about space exploration depending on their cultural environment and identity and not to impose restrictions on ideas.
UX laws that are applied by the study (Studio, 10 Psychological Triggers to Boost Your UX Design, 2023)	
Creating an exceptional user experience requires more than just visually appealing design; it is about understanding human psychology, by integrating psychological effects into designs, it enables to attract participants more effectively, enhances the process of understanding designs and understanding the visual and informational elements in the design, and 10 psychological effects enhance the design of the user experience of the metaverse, making it more attractive and fun for users! Some of them were used within the study such as:	

Jakob's Law <i>Comfort in Familiarity.</i>	The human brain can typically handle seven elements in short-term memory to adapt, so designs have been simplified and menus kept with less than seven to avoid cognitive overload. Gradually reveal details to prevent users from being overwhelmed with excess information, especially at the beginning, in addition to simplifying navigation and making it simple and intuitive, reducing the number of items to seven or less, and using clear visual labels and connotations to help users understand their options.  <i>Figure (10) Model for the application of the law of the power of seven.</i>
Hick's Law <i>The Beauty of Simplicity.</i>	This principle is based on the simple idea that users prefer interacting with designs that follow familiar patterns and behaviors, providing a sense of comfort and harmony. Since participants are designers themselves, the exhibition hall was designed to mimic real-world exhibitions. Designers adhered to globally recognized industry standards and principles for art exhibitions while anticipating participant  <i>Figure (11) Realization of the law of comfort and acquaintance.</i> behavior within the site.
Fitts's Law <i>Accessibility Matters.</i>	The presence of many options can lead to paralysis of the decision, so the options were reduced to facilitate the decision-making process for the participants, and attention was paid to organizing the options into specific classifications and logical categories to make it easier for participants to understand the available options.  <i>Figure (12) Simple and consistent options.</i>
Aesthetic-Usability Effect <i>Form and Function.</i>	Which is considered an important part of designing the user experience in the metaverse, hence making larger and closer goals easier to click on, such as click buttons to display images and data of participating designers.

	 <i>Figure (13) Click buttons to show the images and data of the participating designers.</i>
Serial Position Effect <i>Memorable Beginnings and Endings.</i>	Metatut is designed as a digital pharaonic city that combines aesthetics and function, by applying the following steps: 1. The design was inspired by pharaonic elements such as pyramids, statues, temples, obelisks, and writings in the design of the digital city. 2. The use of colors, so that the colors are inspired by looking to the future (silver, black, gold, and glass materials in the implementation of temples) and decorations and inscriptions inspired by the Pharaonic civilization to decorate the design elements inside the exhibition halls.
Peak-End Rule <i>Crafting Lasting Impressions.</i>  <i>QR Code (2) Video shows the way and reach the peak of the end.</i>	Also known as "primacy and recency effects", participants tend to remember the first and last elements in a series better, so essential information and calls to action were placed at the beginning or end of each location.  <i>Figure (14) The beginning and the end.</i>
Law of Proximity <i>Grouping and Separation.</i>	It is very important to create moments in the end, as this supports the advertising message, so the experiment was keen to create unforgettable moments in the design and always end with a positive moment that leaves a strong and lasting impression, so the participants showed a sense of satisfaction and happiness at the end of the experience, as this made them tend to remember that experience positively and feel satisfied with it in general, so that some of them continued to talk about it three months after its end.  <i>Figure (15) End Peak</i>
Social Proof <i>Strength in Numbers.</i>	By applying this law in the design, designers could improve the organization of the elements and provide a smoother and more effective user experience, all the

elements that are connected close to each other show the relationship between them, for example, the distinctive statues of the temple can be placed close to each other.



Figure (16) Statues of the Temple of Hatshepsut

Using the space between them to distinguish the content made the design clearer, easier for users to understand the overall look, and avoided overcrowding.

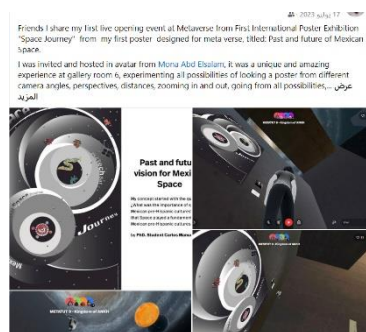
Floor points and guidelines, obelisks, and gates were also used to connect the elements and direct the user's eye to the correct organization.



Figure (17) Using lines and dots for orientation.

Miller's Law The Power of Seven.

Users trust designs that have been positively appreciated by others, and 109 participants provided feedback and testimonials on the content created, building trust, and prompting many later to experiment.



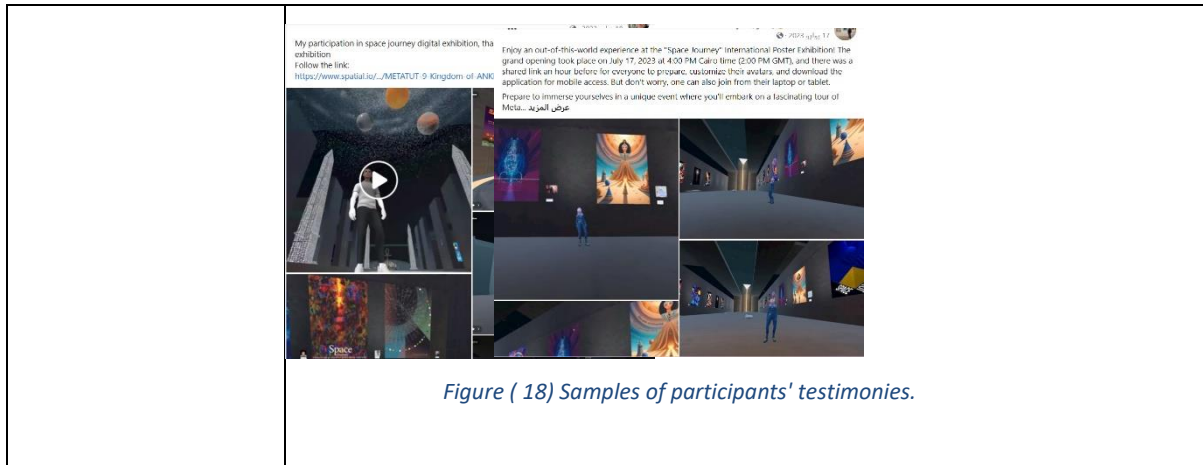
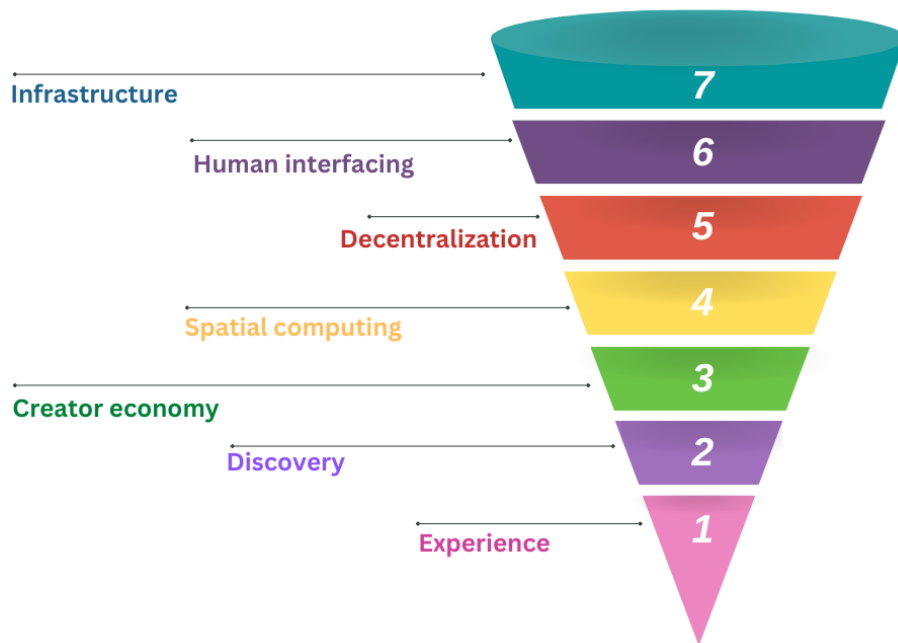


Figure (18) Samples of participants' testimonies.

Application of the theory of the seven layers of the metaverse to the experience of the international exhibition "Space Journey "

Entrepreneur and author John Radoff has suggested that interconnected virtual worlds consist of seven distinct layers, with each layer impacting one aspect of the user experience. (BasuMallick, October 10, 2022) We will review the application of the experiment for the seven layers:



Seven-layer diagram for the application of the metaverse

First layer: (Experience): In the city of Metatut, a unique experience was designed for participants to create a digital environment that embodies aspects of the pharaonic civilization in a simulating and exciting way, such as including elements such as pyramids, temples, and pharaonic monuments in the design to create an exciting and interesting atmosphere for exploration.

The second layer: (Discovery): Using movement and discovery tools available in the metaverse, the process of discovering the city of Metatut was facilitated for participants, and applications and websites were used that display attractive content about the city such as virtual tours and interaction with historical monuments.

The third layer: (Creator economy): is where designers and developers were able to create unique and innovative digital content related to the city of Metatut, such as games, educational halls, short films, taking

pictures, and creating content by providing simple and easy-to-use design tools.

Fourth layer: (Spatial computing): The virtual Metatut environment is designed using technologies that combine mixed reality and virtual reality to provide an interactive and realistic experience for visitors, in addition to three-dimensional details and visual effects to achieve this experience.

Fifth layer: (Decentralization): The virtual world architecture of Metatut is designed decentralized, so that roles are distributed between the work team such as developers, exhibition organizer, appropriate application, designers, and participants as well, so we were able to provide easy and convenient means to exchange experiences and content openly.

Sixth layer: (Human interfacing): where the design of interactive interfaces allows visitors to interact with the environment of the city of Metatut easily, such as using physical movements to move within the virtual world and interact with visual and auditory elements.

Seventh layer: (Infrastructure): Designing a strong and advanced infrastructure for the city of Metatut in the metaverse, but unfortunately it was not possible to provide stable and effective network systems to ensure a smooth experience for participants around the world, as not all participants had powerful servers to host data and digital content effectively, and take advantage of modern wireless network technologies such as the fifth generation (5G) to provide fast and stable connections to participants while roaming in the virtual city.

Sample Questionnaire

Thank you for participating in this survey. We would like to hear your opinions and experiences regarding using the Metaverse in advertising design and your satisfaction with working with it. This survey will take approximately 10 minutes to complete. Please answer all questions honestly and accurately. The data will be anonymized and used for scientific research purposes only.

Part 1: Personal Information

Name:

Age:

Gender:

☐ Male

☐ Female

☐ Other

Nationality:

Educational Qualifications:

Part 2: Your Experience in Using the Metaverse in Advertising Design

Have you participated in the Space Journey Poster Exhibition and collaborated with global designers?

☐ Yes

☐ No

Have you used Metaverse technology in advertising design during the exhibition?

☐ Yes

☐ No

If you have used Metaverse technology, please describe your experience and its effectiveness in enhancing advertising design:

Did you face any challenges or issues while using the Metaverse in advertising design? If yes, please elaborate:

Part 3: Evaluating Your Satisfaction with the Metaverse in Advertising Design

Were you satisfied with using the Metaverse in advertising design?

☐ Completely satisfied.

☐ Somewhat satisfied

☐ Not satisfied

☐ Not satisfied at all

Do you believe that using the Metaverse added value to advertising design and made it more appealing to the audience?

☐ Yes

☐ No

oNot sure

Do you intend to use the Metaverse in advertising design in the future?

oYes

oNo

oMaybe

Part 4: Additional Notes

Do you have any additional comments or feedback you would like to share about using the Metaverse in advertising design?

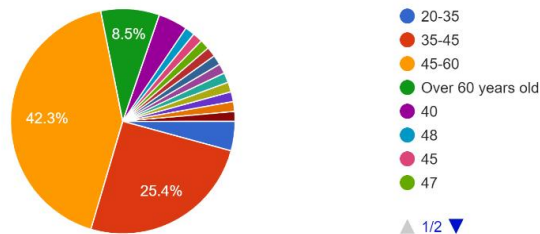
Thank you for participating in this survey. We appreciate your interest in contributing to this study and providing your valuable opinions and experiences to achieve the research objectives.

Survey Results

Part1:

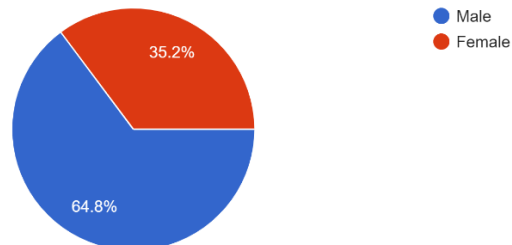
Age:

71 responses



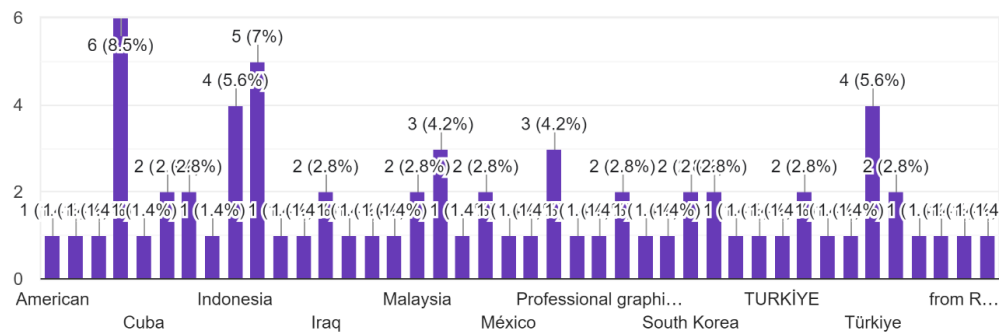
Gender:

71 responses



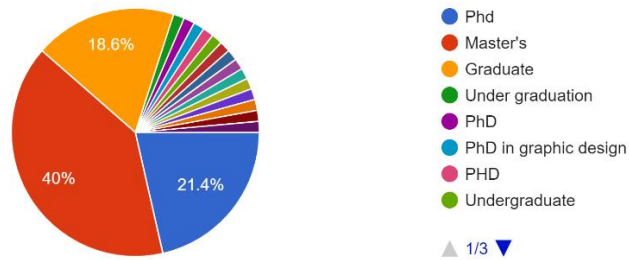
Nationality:

71 responses



Educational Qualifications

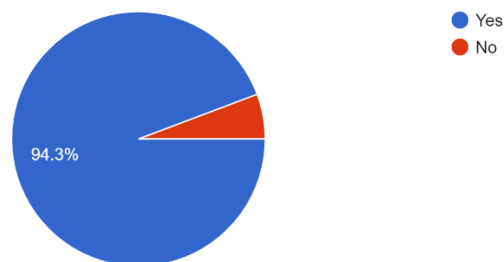
70 responses



Part2:

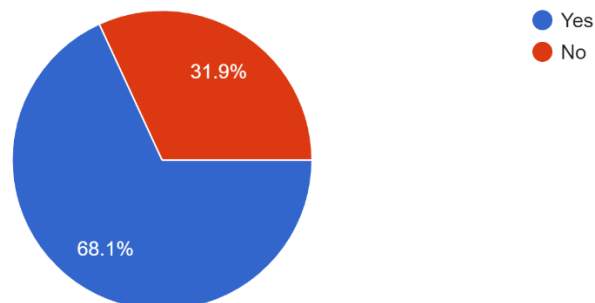
Have you participated in the Space Journey Poster Exhibition and collaborated with global designers?

70 responses



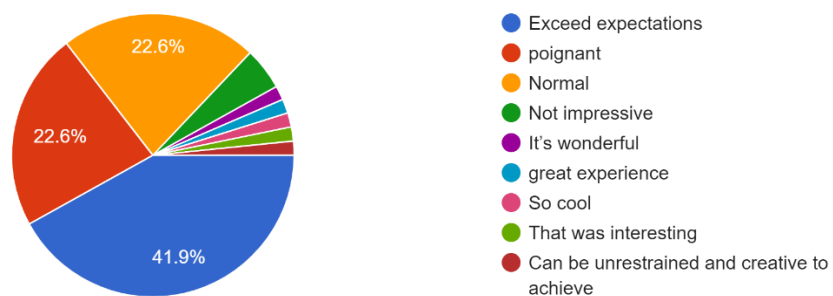
Have you used Metaverse technology in advertising design during the exhibition?

69 responses



If you have used Metaverse technology, please describe your experience and its effectiveness in enhancing advertising design:

62 responses



Did you face any challenges or issues while using the Metaverse in advertising design? If yes, please elaborate : Based on the responses provided by participants, there are several main challenges and problems that users have faced while using the metaverse in ad creative:

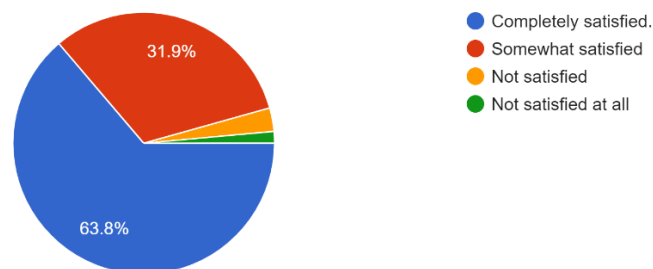
1. Internet connection: The most common problems mentioned are related to the Internet connection, as participants reported problems with Internet speed, download problems, and difficulties accessing the metaverse due to slow or unstable connections, and this highlights the importance of a stable and high-speed Internet connection for a smooth experience in the metaverse.
2. Technical issues: Some participants faced technical problems such as compatibility issues with browsers, and the age of the devices used, and these problems significantly affected the user experience and hindered their ability to interact with the content of the advertisement effectively.
3. Mobility and accessibility: Navigate the metaverse virtual space was a challenge for some participants, especially those who were not used to technology, as problems were mentioned in adjusting the direction of movement, understanding the indicative signs, and difficulty in navigating within the virtual environment, indicating the need for better navigation tools and accessibility features.
4. Communication: Effective communication within the metaverse is challenging, with some participants pointing to the need for clear and innovative means of delivering advertising messages, with the need to balance text, sounds, and visual indicators to ensure that the advertising message is communicated and remembered.
5. Privacy and data security: Concerns about privacy and data security were also raised, highlighting the need for strong data protection measures and responsible handling in metaverse advertising campaigns, and participants were assured that the trial in question was fully secure.

Despite these challenges, most respondents expressed excitement and interest in the potential of metaverse in ad design, praising its innovative nature and the unique opportunities it offers for immersive experiences and engagement with audiences, however, addressing specific challenges is critical to harnessing the full potential of the metaverse in ad design and ensuring a positive experience for all participants.

Part3:

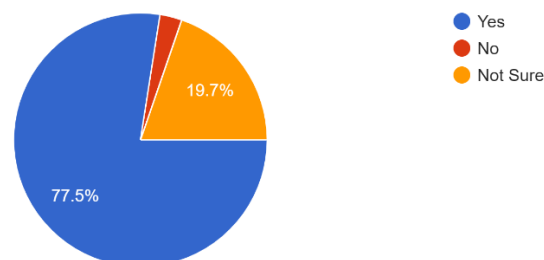
Were you satisfied with using the Metaverse in advertising design?

69 responses



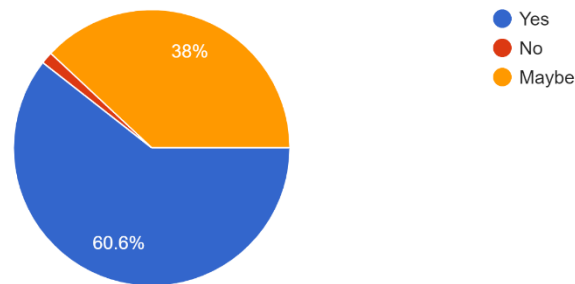
Do you believe that using the Metaverse added value to advertising design and made it more appealing to the audience?

71 responses



Do you intend to use the Metaverse in advertising design in the future?

71 responses



Part4:

Do you have any additional comments or feedback you would like to share about using the Metaverse in advertising design?

1. Analysis of responses to the additional question about the experience of using metaverse in advertising design reveals a variety of opinions and comments:
2. Pros and suggested improvements: Some participants expressed a positive outlook towards their metaverse experience, thanked them for the opportunity given, and wished the project success, and some made suggestions to improve the experience, such as adding personalized audio to guide users.
3. Challenges and difficulties: Some comments referred to challenges faced by users, such as internet connection problems, difficulty navigating in virtual space, and initial uptake of technology, and some stressed the importance of improving the user interface to make the experience easier and more friendly.
4. Future visions: Many participants expressed optimism about the future of the metaverse in the field of advertising design, pointing to the great opportunities that this technology can offer in the future, and some pointed to the importance of continuous learning and adaptation to technological developments.
5. Cultural and technical challenges: Some concerns were raised about the availability and acceptance of metaverse technology in certain societies, the need to educate young people about its potential benefits and uses, and the importance of communicating with the international community and promoting understanding about this technology.
6. Future expectations: Most respondents believe that the metaverse will have an important role in the field of advertising design and will contribute to changing the way ads are displayed and the audience interacts with them, and some voices are reserved about the impact of excessive use of metaverse on the effectiveness of advertising in the future.

Reactions to the experience of using metaverse in ad design have emerged with a set of pros and cons, with optimism about the potential of this technology in the future and the need for continuous learning and adaptation to technological developments.

Survey Results

1. An analysis of the results of the question about age shows the following: 35.2% of respondents are between the ages of 35 and 45, indicating a strong representation of this age group in the sample, where they have extensive experience in the fields of design and advertising, 9.8% of respondents are between the ages of 20 and 35, reflecting an average representation of the younger age group in the sample, which may have active potential to participate in the fields of design and advertising, 45.1% of respondents are between the ages of 45 and 60 years, this indicates that there is a strong representation of this age group in the sample, which already has extensive experience in the design and advertising industry, 9.9% of respondents are over 60 years old, reflecting a small representation of this age group in the sample, but still have an important contribution and valuable experience in the field.
2. Analysis of the results of the question about gender shows the following, 64.8% of the participants are men, which indicates a strong male representation in the sample, this may reflect the high percentage of men in the fields of design and technology, 35.2% of the participants are women, although this percentage is lower than males, it shows female representation in the sample, this can be an indicator of gender disparity in the fields of design and technology, but it can also be the result of a variety of interests and skills among participants.
3. Analysis of the results of the question of their educational qualifications, only 2.8% of the participants are undergraduate students, this small number can reflect a trend towards participating in research or

practical experiments in the field of design early in their academic career, 18.6% of the participants have a bachelor's degree, this indicates a representation of people who have obtained a bachelor's degree in design or related fields, about 32.2% of the participants have a master's degree, this indicates a strong representation For those who have completed graduate studies and may reflect interest and experience in design or related fields, 32.2% of respondents have a PhD, this indicates that there is a representation of people with advanced experience in the fields of design and research, and may be interested in participating in advanced design research and events.

4. Analysis of the results shows that a very high percentage of participants, 94.3%, participated in the exhibition of space journey paintings and collaborated with other international designers, this indicates a wide involvement in the virtual event and cooperation between participants of different languages, nationalities and cultural backgrounds, which reflects the great attractiveness of participating in metaverse experiences and networking opportunities with design professionals from around the world and breaking down geographical barriers, however, there is a small percentage of participants (5.7%) who did not participate in the exhibition, and this It can be due to lack of interest or inability to participate in the event.
5. Analysis of the results shows that a large percentage of participants, amounting to 68.1%, have used metaverse technology in designing advertisements during the exhibition, this indicates widespread use of technology in this context, which reflects a growing interest in taking advantage of virtual experiences to improve the attractiveness and effectiveness of advertising, however, there is a small percentage of participants (31.9%) who did not use metaverse technology in designing ads during the exhibition, and this can reflect the inability to access technology or lack of interest in it in this Private context.
6. Analysis of the results shows that a large percentage of participants (49.9%) found that the metaverse technology exceeded their expectations in enhancing ad design, which indicates the high effectiveness of using this technology in improving the user experience and ad attractiveness, and it is also remarkable that 22.6% of the participants described their experience as "poignant", which indicates that the use of metaverse had a strong and influential impact in improving ad design in an emotional or influential way, and it is worth noting that there is a similar percentage of participants (22.6%) They found that their experience was "normal", suggesting that using the metaverse did not have a significant or noticeable effect in improving ad creative for them, and in the end, a small percentage of respondents (4.8%) found their experience to be "unimpressive", suggesting that the use of technology did not meet their expectations and was not effective enough in improving ad design for them.
7. Analysis of the results shows that a large percentage of participants were completely satisfied with the use of metaverse in ad design, where 63.8% answered complete satisfaction, moreover, 31.9% answered that they were satisfied with their experience, this indicates that most of the participants enjoyed and felt satisfied with the use of technology in the ad design process, however, there is a small percentage of people, 2.9%, expressed dissatisfaction with their experience, indicating that there are some problems or challenges they faced while using The metaverse in the design process, it is also noticeable that there is a small percentage of participants who were not interested in the topic, and who needed more awareness or experience to understand the benefits and added value of using metaverse in ad design.
8. Analysis of the results indicates a clear optimism by the participants about adding value to the metaverse to the design of ads in the future and making them more attractive to the audience, 77.5% of the answer "yes" reflects the belief that the use of the new technology has added significant value to the design process and made the ads more attractive and effective, and although 19.7% answered "not sure", the presence of a large percentage of positive answers indicates that there is general optimism about the effectiveness of using the metaverse in improving the user experience and attractiveness Advertising, however, the presence of some uncertain can be due to insufficient expertise or the need for more data or experimentation to assess the added value of using metaverse in ad design.
9. Analysis of the results shows that a large percentage of respondents are interested in taking advantage of the metaverse in designing ads in the future, as 60.6% of them answered yes, this indicates a positive trend towards the use of new technology in the field of advertising in the future, and while 38% answered maybe, this could reflect the trend towards taking advantage of the metaverse with the upgrade and technical development in the future, but there are some concerns or the need for more knowledge before making the final decision, despite this, The results show that there is great potential for increased use of metaverse in ad design in the future.

Results

As advertised in the title, the goal of this research as an applied study is to understand and analyze the impact of using metaverse in advertising design from the point of view of the advertising designer, so the study focused on understanding how designers can benefit from this advanced technology in improving advertising design and achieving advertising goals more effectively, and in this context, the research results revolve around the following main points:

1. The metaverse integrates social media platforms, enabling advertiser companies to leverage their existing social media strategies and seamlessly engage users across various virtual environments.
2. The use of metaverse in advertising needs to redefine advertising design and related advertising messages, mediums, tools, and others.
3. One of the challenges for the metaverse is to create a digital environment that appears as close as possible to our real world, using three-dimensional reconstruction, to create realistic and seemingly natural spaces, and in doing so moving our world online by creating accurate and realistic three-dimensional models of buildings, actual locations and objects, and these virtual versions of actual objects in the world can be referred to as digital twinning.
4. Integrating avatars into the experience allowed visitors to create their digital avatars, representing pharaonic personalities, future space travelers, or other identities This feature allowed participants to express themselves uniquely and engage more deeply with the content.
5. The metaverse world provided a highly innovative platform, through which full virtual representations of pharaonic elements, futuristic space stations, and other elements that have no equivalent in the real world were created, opening new creative possibilities in design and narration for participants.
6. When we break free from the constraints of physical space, humans can fully invest their thinking and creativity, opening the door to limitless innovation.
7. The real world is an essential part of the metaverse, all elements in the virtual world are mirrors that simulate the elements of the real world, so the value of the virtual world is the interaction between it and the real world, and shortly a virtual world and a real world will be formed that converge and interact closely.
8. The convergence and interaction between the virtual world and reality will transcend each, and the original meaning of the word "meta", a crucial criterion in assessing the value of the metaverse, will be reverted.
9. The metaverse can facilitate global collaborative learning initiatives, allowing students from around the world to collaborate on projects, attend virtual classes, and seamlessly share knowledge, AI can play a role in language translation, content tuning, and group dynamics improving efficiency and productivity in many areas.
10. Although some traditional design roles may shift, new jobs and disciplines may emerge, such as virtual world engineers, virtual experience designers, and AI-powered content creators, like any other technological advancement, some roles may become disrupted that may become autonomous or lose their relevance, however, new jobs and new opportunities will appear to offset the balance.
11. The use of the virtual world raises ethical questions regarding data privacy, content ownership, and the possibility of bias in the content that arises, and designers and industry decision-makers will have a responsibility to deal with these issues.

Research Recommendations

Provide recommendations to designers on using metaverse in effective ad design:

1. Develop new skills for designers, including knowledge of virtual environments, artificial intelligence tools, and data analysis, to stay informed in this changing landscape.
2. Study the effect of integration between metaverse advertising and social media in increasing user interaction to enhance the effectiveness of ads.
3. Analyze the impact of design elements such as acoustics, visual effects, and interactions in metaverse ad design, and use quality analysis techniques and theoretical examination to assess the impact of these elements on the viewers' experience and interaction with the advertising message.

Guide Advertised Companies

1. Using metaverse to stimulate social interaction and collaboration between users, contributing to building integrated online communities that support their products and services.
2. Companies should explore the possibility of creating their advertising games in the metaverse to interact with the audience in an innovative and fun way, to stimulate the emotional connection.
3. Using customization in private virtual spaces in a more professional way, where elements or accessories can be used for brands, and offering customization options that enable the creation of a sense of ownership between the user and the product or service, which creates the motivation to turn this feeling into reality.
4. The metaverse is a dynamic, rapidly evolving space, so it's essential to keep constantly evolving with emerging trends and innovate new strategies accordingly, by integrating these effective strategies, you can succeed in the world of the metaverse and connect with digital audiences in new and exciting ways and target a new audience.

Conclusion

Blending the virtual and real worlds, Metaverse is revolutionizing digital interaction through technologies such as AR, VR, and AI. In ad design, advertisers can offer immersive experiences and personalized ads, taking advantage of virtual galleries and events on platforms like Metatut City. Avatars enable personal expression, while immersive experiences promote social interaction and engagement, transcending physical boundaries and limitations.

Ethical considerations address the challenges of the metaverse industry and promote positive interactions and cultural awareness. User experience laws improve the user experience, simplify designs, and organize options logically, which contributes to the arrival of advertising message perception, so Metatut City was designed with designs inspired by ancient Egyptian aesthetics, coupled with psychological effects, to leave lasting impressions.

The application of John Radoff's seven-layer theory in the exhibition "Space Flight" reveals a holistic approach. From immersive experiences to spatial computing, each layer creates a unique digital environment. Despite infrastructure challenges, respondents' feedback via the sample survey enriches scientific research into ad design with in the metaverse.

Acknowledgement

I am grateful to all the participating designers for their wonderful contributions to the research with their design. Additionally, I am thankful to everyone who took the time to respond to the questionnaire. Special thanks to **Tute ra** company and its Vice Chairman, Dr. Somaya Bayh Eldin, for their outstanding execution and invaluable support in conducting this study. I also extend my sincere thanks and appreciation to Professor Ahmed Tarmizi Azizian for his support of the research

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e ISBN 978-967-2762-90-4



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