INSTITUT BISNIS DAN INFORMATIKA stikom SURABAYA

ICITAS

CALL FOR PAPER

International Conference on Information Technology Applications and Systems (ICITAS)

"Managing Digital Development for Sustainable Economy"

FEBRUARY 3, 2018

Institut Bisnis dan Informatika Stikom Surabaya

Organized and Supported by:

INSTITUT BISNIS DAN INFORMATIKA stikom SURABAYA

AEU asiaeuniversity

Proceedings Of International Conference on Information Technology Applications and Systems (ICITAS) 2018

EDITORIAL BOARD

 ISBN : 978 – 602 -51367 – 0 – 2

DIGITAL MEDIA TECHNOLOGY IN ARTS DESIGN :

Prof. Othman Yatim
University of Malaya, Malaysia
Karsam, MA., Ph.D
Institut Bisnis dan Informatika Stikom Surabaya
Dr. Bramantyo
Sekolah Tinggi Kesenian Wilwatikta
Dr. Listia Natadjaja, S.T., M.T., M.Des
Universitas Kristen Petra

BUSINESS AND ECONOMICS APPLICATIONS :

Dr. Antok Supriyanto, M.MT
Institut Bisnis dan Informatika Stikom Surabaya
Dr. Haryanto Tanuwijaya, S.Kom., M.MT
Institut Bisnis dan Informatika Stikom Surabaya
Dr. Januar Wibowo, MM
Institut Bisnis dan Informatika Stikom Surabaya
Dr. Achmad Yanu Alifianto, MBA
Institut Bisnis dan Informatika Stikom Surabaya
Prof. Dr. Mohammad Tajudin
STMIK Bumigora Mataram
Dr. Hary Susanto
Universitas Dipenogoro
Dr. Rian Johnly Pio
Universitas Sam Ratulangi
Prof. Dr. Ryananto Sarno, M.Sc
Institut Teknologi Sepuluh Nopember

ISBN : 978 – 602 -51367 – 0 – 2
Content of paper beyond the responsibility of editors and publishers.
Publisher : **Institut Bisnis dan Informatika Stikom Surabaya**
Office : Gedung Institut Bisnis dan Informatika Stikom Surabaya
Jl. Raya Kedung Baruk 98, Surabaya 60298
Telp. 031 - 8721731, Fax. 031 - 8710218
Website: http://icitas.stikom.edu
First Print, *February 2018*

International Conference on Information Technology Applications and Systems (ICITAS) 2018

Steering Committee :

Rector Institut Bisnis dan Informatika Stikom Surabaya
Prof. Dr. Budi Jatmiko, M.Pd
Deputy General Manager Commercial AeU
Dr. Rahimie Ibrahim
Vice Rector for Academic Affairs Institut Bisnis dan Informatika Stikom Surabaya
Pantjawati Sudarmaningtyas, S.Kom., M.Eng

Organizing Committee :

General Chair	: Dr. Jusak
General Co-Chair I	: Dr. Bambang Hariadi, M.Pd
General Co-Chair II	: Dr. Drs. Antok Supriyanto, M.MT.
General Secretary	: Dr. M.J. Dewiyani Sunarto
Secretary I	: Norma Ningsih, S.ST., M.T.
Secretary II	: Marya Mujayana, S.S., M.M.
Secretary III	: Valentinus Roby Hananto, S.Kom., M.Sc.
Treasurer I	: Lilis Binawati, S.E., M.Ak
Treasurer II	: Yuvita, SE
Treasurer III	: Yuli Setiyo Suryo Andari, AP., S.Kom
Event Organizer I	: Dr. Haryanto Tanuwijaya, S.Kom., M.MT.
Event Organizer II	: Dr. Anjik Sukmaaji, S.Kom., M.Eng
Technical Comitee I	: Tutut Wurijanto, M.Kom.
Technical Comitee II	: Dr. Achmad Yanu Alif Fianto, S.T., MBA.
Technical Comitee III	: Tri Sagirani, S.Kom., M.MT.
Technical Comitee IV	: Karsam, M.A.,Ph.D.
Documentation	: Novan Andrianto, M.I.Kom
Publication I	: Sugiharto Adhi Cahyono, S.Ds.
Publication II	: Julianto Lemantara, S.Kom., M.Eng.
Infrastructure I	: Dr. Susijanto Tri Rasmana, S.Kom., MT.
Infrastructure II	: Dr. Januar Wibowo, S.T., M.M.
Infrastructure III	: Indra Gunawan, S.T.

 ISBN : 978 – 602 -51367 – 0 – 2

TOPIC

Track 1. Information and Communication Technology

- Computer Network and Architecture
- Computer Security and Digital Forensic
- Data Mining and Big Data and Analysis
- Distributed System
- E-health Services and Biomedical/Bioinformatics Applications
- Electronic Learning Model and Applications
- Enterprise Information System
- Emerging Wireless and Mobile Applications
- Geographic Information System (GIS)
- High Performance Computing
- Human-Computer Interaction
- Image Processing
- Industrial Computer Control
- Information Security and Risk Management
- Information Technology Services and Management
- Intelligent System
- Knowledge Data Discovery
- Modelling and Simulation
- Multimedia QoS and Traffic Management
- Parallel Programming
- Pattern Recognition
- Remote Sensing
- Ubiquitous System
- Web Analytics
- Wireless Sensor Networks

Track 2. Applications of Digital Media Technology in Arts Design

- Computer Graphics and Design
- Digital Animation
- Digital Media Technology
- Digital Game Design
- Film and Video
- Multimedia Applications on Arts and Design
- Visual Communication Design and Knowledge Media

Track 3. Business and Economics Applications

- Business and Public Administration Information System
- Business and Information Technology Allignment
- Business Intelligence
- Business Process Management

 ISBN : 978 – 602 -51367 – 0 – 2

- E-Business
- Integration of Data and Processes
- Management Information System
- Supply Chain Processes

 ISBN : 978 – 602 -51367 – 0 – 2

FOREWORD

We welcome you to the First International Conference on Information Technology Applications and Systems (ICITAS) held February 3, 2018 in Surabaya, East Java, Indonesia. ICITAS 2018 provides a highly competitive forum for global exploration of the latest developments in Information Technology and their direct impact on the economic sustainability. Therefore, we carefully chose and embraced the theme of this conference as "Managing Digital Development for Sustainable Economy".

We are pleased to present the proceedings of the conference as its published record. In overall, the technical committee has selected 40 papers to be published, which comprises authors from various countries and regions. The topics may include, but not limited to the following: Information and Communication Technology, Business and Economics Applications, and Applications of Digital Media Technology in Arts Design.

We want to express our gratitude to the members of the Program Committee and the Technical Committee, as well as the external reviewers for their hard work in reviewing all the submission papers. We also thank the three invited speakers, Prof Nai-Wei Lo (National Taiwan University of Science and Technology), Prof. Kamarul Hawari bin Ghazali (Universiti Malaysia Pahang), and Mr. Kresnayana Yahya, for sharing their insights with us. Finally, the conference would not be possible without the excellent papers contributed by authors. We thank to all the authors for their contributions and their participation in ICITAS 2018! We hope that this program will further stimulate research in Information Technology systems and their applications in the present time and in the future, and provide practitioners with better techniques, algorithms, and tools for deployment.

Dr. Jusak

General Chair of the ICITAS 2018

 ISBN : 978 – 602 -51367 – 0 – 2

KEYNOTE SPEAKER

Keynote Speaker 1

PERSONAL IDENTITY

Name : Kamarul Hawari bin Ghazali

Sex : Male

Place/Date of Birth : Batang Kali/ September 9, 1973

Office Address : Faculty of Electrical and Electronics Engineering, Universiti Malaysia Pahang, Pekan, 25200

Phone : +6017 7712224

CAREER HISTORY

• 1995 - 1998: Engineer,Time Cel Sdn. Bhd (subsidiary of TIME Engineering)

• 1998 - 2001: Lecturer, Institut Teknkologi Perindustrian, Kumpulan Pendidikan Yayasan Pelajaran Johor (IPTS)

• 2001 - 2002: Lecturer, Politeknik Johor Bahru, Jalan Kongkong Masai, Johor

• 2002 - 2009: Lecturer at Faculty of Electrical and Electronics Engineering, Universiti Malaysia Pahang

• 2010 – 2012: Deputy Dean Research and Postgraduate Studies, Faculty of Electrical and Electronics Engineering,
Universiti Malaysia Pahang

• Feb 2014 till present:
Dean of Faculty of Electrical and Electronics Engineering, Universiti Malaysia Pahang

• 1 March 2017 till present:
Professor at Faculty of Electrical and Electronic Engineering, UMP

CURRENT POSITION

• **Professor and Dean** - Faculty of Electrical and Electronics Engineering

 ISBN : 978 – 602 -51367 – 0 – 2

FIELD OF SPECIALIZATION

• Machine Vision System, Image Processing, Signal Processing, Intelligent System, Vison Control, Computer Control System, Thermal Imaging Analysis (in all related applications - Electrical, Medical, Environment) and Computer Engineering.

THERMAL IMAGING APPLICATION: THERMAL - VISIBLE FUSION FOR HUMAN DETECTION

Abstract - An increased interest in detecting human beings in video surveillance system has emerged in recent years. Multisensory image fusion deserves more research attention due to the capability to improve the visual interpretability of an image. This study proposed fusion techniques for human detection based on multiscale transform using grayscale visual light and infrared images. The samples for this study were taken from online dataset. Both images captured by the two sensors were decomposed into high and low frequency coefficients using Stationary Wavelet Transform (SWT). Hence, the appropriate fusion rule was used to merge. The coefficients and finally, the final fused image was obtained by using inverse SWT. From the qualitative and quantitative results, the proposed method is more superior than the two other methods in terms of enhancement of the target region and preservation of details information of the image.

 ISBN : 978 – 602 -51367 – 0 – 2

Keynote Speaker 2

Dr. Nai-Wei Lo got his Ph.D. degree in Electrical Engineering from State University of New York at Stony Brook, USA, in 1998. He worked as research assistant at TNT Information Systems Inc. in 1997 to 1998. From 1998 to 2000, he worked at H&L Technique Inc. as a software consultant for AT& T Business and Global Services. From 2000 to 2002, he worked at Lucent Technologies as member of technical staff.

Dr. Nai-Wei Lo joined the Department of Information Management in National Taiwan University of Science and Technology in 2003, and he has become professor from 2015. In addition, he has been the director of Taiwan Information Security Center, National Taiwan University of Science and Technology (TWISC@NTUST) since 2014. His research interests include smart grid security, IoT/IoV security, web technology, and cloud security.

Keynote Speech Title: Indoor Positioning-based Mobile Payment System Using BLE Technology

Abstract – The development of information technology has paved the way for faster and convenient payment process flows and new methodology of design and implementation for next generation payment system. The usage growth of smartphones in nowadays has fostered a new and popular mobile payment environment. Most of the current generation smartphones support BLE technology to communicate with nearby BLE-enabled devices. It is plausible to construct an Over-the-Air BLE-based mobile payment system as one of the payment methods for people living in modern societies. In order to secure the BLE-based mobile payment system, a secure indoor positioning-based mobile payment authentication protocol and corresponding mobile payment system is designed. The authentication protocol consists of three phases: initialization phase, session key construction phase, and authentication phase. A prototype is implemented to assess the performance of the designed mobile payment system.

Keynote Speaker 3

Krenayana Yahya is a Director of Enciety Business Consult and also aLecturer at Department of Statistics ITS. Not only served as Director of Enciety Business Consult, this Jakarta-born man is also listed as a Commissioner of PT Petrokimia Gresik. In addition he is also a Board of Trustees LEAD Indonesia (one of the program The Foundation of Sustainable Development or Foundation for Sustainable Development of the UK). Not only that, a number of important positions in several organizations such as the Chairman of the Association of Indonesia Manager Surabaya Branch, President of the Association of Indonesian Marketing area of East Java, and various other important positions in the field of statistics, environment, marketing to democracy. Mr. Yahya who holds a master's degree at the University of Wisconsin, USA is known to actively fill interactive dialogue in various mass media such as Suara Surabaya and JTV radio. His writing was often appeared in print media Java Post and Kompas Daily.

Keynote Speech Title : Digital development for sustainable economy

Abstract - The development issues today is strongly related to the developments of Technology. Technology introduction to a society is mainly a choice and related to the readiness to accept and utilized for the good of the improvement of welfare. Digitalization becomes a mean and a purpose to achieve sustainable development. Educating the young and bridging the digital divide becomes the most important aspect before to decide what and which technology should be implemented in a society, in a public sector and overall for business development. Disruptions will come and replacing, renewing, through innovation and developing application to reduce time, increasing speed and integrating most activities that reduce the impact on the degradation of the earth.

The role of development should define and prioritize the steps toward improving quality of life through managing the digital policy in the stages of development. Consideration the impact and the negative side of the use of IT should be anticipated through

policy developments. Technology by itself is neutral, but preparing the infrastructure to used, to be used by whom and for what purposes will the main cause to regulate. The digital divide should be considered as a real concern not to widen the welfare gaps and the increase of economic disparity.

Currently in Indonesia the IT Index of developments showed that Jakarta has the most advanced IT usage, Infrastructure and supported for business, while most villages and outer Island like Papua has very poor access for internet

Indonesian archipelago has its problems in disparity of level support for mostly several infrastructure. Better and more justice in prioritizing is on the way to make it even and more welfare instruments will cover.

On the other hand better access for communication and improving connectivity will improve the chances to integrate IT with most public sectors like transportation, online courses, retail, and public utility access. The future of IT will certainly a great help for human development in general. The improvement of policy development will be a real support for most development instrument. Specifically policy development for digitalization will be most valuable through the better understanding and the right implementation of sustainable development

 ISBN : 978 – 602 -51367 – 0 – 2

TABLE OF CONTENT

 ISBN : 978 – 602 -51367 – 0 – 2

III. BUSINESS AND ECONOMICS APPLICATIONS

 ISBN : 978 – 602 -51367 – 0 – 2

Environmental Graphic Design of Ecotourism Mangrove Surabaya as Efforts to Provide Information to Visitors

Hardman Budiardjo[1], Dhika Yuan Yurisma[2], Darwin Yuwono R.[3]
Graphic Design
Institut Bisnis dan Informatika Stikom Surabaya
Surabaya, Indonesia
hardman@stikom.edu[1], dhika@stikom.edu[2], darwin@stikom.edu[3]

***Abstract*—Pamurbaya area has a very good tourism potential, considering the area of mangrove conservation has a diverse wealthy flora and fauna, so it has the potential as an educational tour for the people of Surabaya. The mangrove conservation area has become a new tourist destination. The presence of tourists can give a positive and negative impact to existing biota. Sign system with the concept of ecogreen is a necessity as well as hope in directing and educating the community towards the sustainability of the conservation area of mangrove forest. Research Methodology used is qualitative approach. While the methods of collecting data are through interviews, observations, literature studies, and study competitors. Data analysis techniques include data reduction, data presentation and conclusions. This is followed by the exposure of design ideas, design alternatives, and design decisions. From the research results obtained key message "informative and green" with Airfly typeface. The colors used and corresponding to the key message include dark green (C: 79, M: 52, Y: 82, K: 66), the light green color (C: 81, M: 35, Y: 93, K: 27), and the light brown color (C: 23, M: 39, Y: 66, K: 0). While the basic form of EGD is designed in a form which can be interpreted as a tree. The dimension of EGD has a height of 180 cm and a width of 80 cm. The sign system has been designed to provide easiness and convenience for tourists in getting information.**

Keywords: Mangrove conservation area, unfriendly signs system, EGD model

I. INTRODUCTION

Mangrove Wonorejo is a protected area which is located on the East Coast of Surabaya (Pamurbaya) and it extends from the coast of Kenjeran to the mouth of the Dadapan River. Dadapan River itself is adjacent to Sidoarjo city. East Coast Surabaya geographically has a coastal length of 26.5 km. Pamurbaya area has a land area of 2500 hectares functioning as a region of *Ruang Terbuka Hijau* (RTH) which is left and it is also as the last bastion protecting Surabaya from the threat of abrasion, sea water intrusion and decline in the ground surface. The rivers around this area, such as; Wonokromo River, Wonorejo River, Dadapan River and Keputih River are contributing to the sedimentation at the river estuary as well as of course the influence of the region's position on the sea. Where the area is located in the narrow area of Madura strait. The rivers themselves have a tilt 0-30 dengan pasang surut 1,67 metres. Pamurbaya area is located on 07 16’ 03 ‘’ LS-112 50’ 31’’ BT, east coast of Surabaya is a fertile estuary area, breeding ground of various biota due to supply of nutrients that continually brought waves. The soil condition of this area is homogeneous (Sandyclay) with a root penetrating at about 90 cm. This condition is very suitable for the growth of mangroves, so that in sanamangrove encountered can grow well [1].

Based on data of Environment status of Surabaya area in 2011, Wonorejo mangrove ecosystem has a potential wealth with total area of 51.38 hectares. Mangrove Wonorejo has 15 Mangrove species, 7 primate species of primates, 83 bird species and 53 insect pecies of insects. Mangrove Wonorejo has the most complete mangrove species compared to mangrove areas in ASEAN even in the world [2].

Fig. 1. The Available Signs

With a complete wealthy flora and fauna, then Mangrove Wonorejo has a potential to become the center of education and conservation area of mangrove. Apart from traveling in the ecosystem forest and enjoying the atmosphere, visitors can also learn the various types of flora and fauna that extend from the entrance to the beach. Conventional information boards, appeals and vandalism restrictions and disposing of rubbish in public places are parts of the ecogreen tour.

Nowdays, the beauty and the eco-tourism forest become less comfortable due to the existing unfriendly signs which do not unite with the beautiful comfortably environment. Environment Graphic Design is a way to solve problems, so that information boards and signs can integrate with nature and have aesthetic value. Geographically and ecologically, Pamurbaya area has a very important function for. One of them is to prevent the threat of sea water intrusion. The existence of mangrove forests in Pamurbaya also has the

function of neutralizing waste, especially heavy metals which enter the sea.

As a form of providing information, environmental graphic design has a very important position in the development of an ecotourism. Besides, it can be useful to keep natural values and aesthetic values balanced. Therefore, the design of environmental graphic design is necessary in every ecotourism.

Formulation of the Problem

Referring to the above background, it can be described that the problem formulation in this study is how to design environmental graphic design eko tourism Mangrove Surabaya as an effort to provide information to visitors?

II. RESEARCH METHODOLOGY

This research methodology used is qualitative. This is because researchers want to get information in depth about the importance of the role of environmental graphic design in ecotourism. The informants were chosen purposively from the ecotourism and visitors. The results of the interview will be analyzed and directed to an environmental design graphic design.

Data collection was taken from interview with informant. The researcher interviewed three informants consisting of one manager from ecotourism Mangrove Surabaya and two visitors. Interviews are focused on knowledge of the importance of a design or a piece of information presented visually to visitors and about the ecotourism of the mangrove itself. Interviews with visitors are used to support researchers in complementing information of interest in the design of information which are available in Ecotourism Magrove Surabaya. Besides, researchers also made observations to find the data in depth about the background of the problem so as to form the mindset and behavior of informants. This research is equipped with supporting data that is bibliographically to strengthen the data generated in the field.

Data analysis technique is done by mapping the result of interview according to background and social condition of informant. Based on Miles and Huberman's data analysis techniques based on data reduction, data presentation and data verification or conclusion. From these results are expected to give birth to the concept of environmental graphic design design in accordance with segmentation, target, and positioning. These results will support the effectiveness of environmental graphic design as a means to inform ecotourism related information on mangroves.

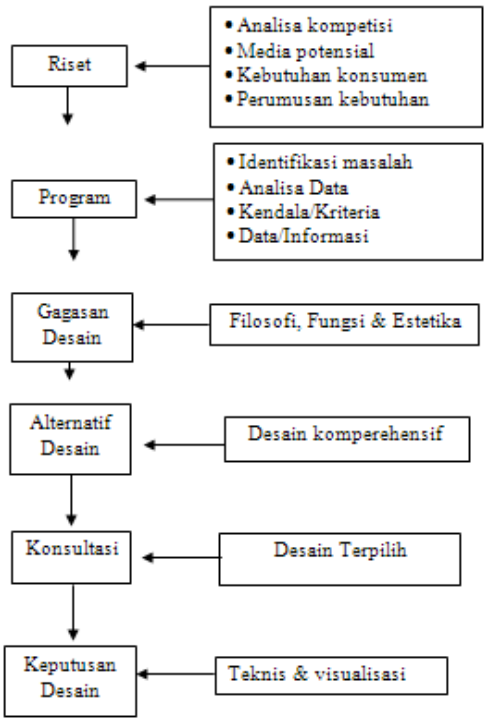


Fig. 2. The Design Procedure

III. RESULTS AND DISCUSSION

A. Data Finding

This research uses qualitative approach in collecting data by using observation method, interview, literature study and competitor analysis. The data collected can be seen in the following explanation below.

1) Interview

Based on interviews conducted to Fatoni as the head of the Mangrove farmer group on the condition of mangrove forest, the information obtained is about the beginning of mangrove forest before being functioned as ecotourism, and support Pamurbaya ecosystem. This region was initially damaged by illegal logging, shipment from residents along the river, loss of biota and birds, and the threat of eroding coastlines entering deeper into the land (± 200 m). After experiencing the conservation of mangrove forests and opening mangrove forest area as ecotourism, other problems arise involving visitors. This problem involves the behavior of visitors littering the litter that adds to the natural damage caused by shipping waste along the stream.

Visitors do not appreciate the work of local people in rescuing the ecosystem. In addition, the direction board and instructions that there are even make the mangrove forest looks less comfortable to see. Visitors also lack of knowledge about the biota and the benefits of mangroves and others.

Interviews with visitors who do not want to be named informed that the garbage either shipment at the edge of the river flow and waste due to undisciplined visitors in throwing garbage, the smell of garbage smells sting, signs of information that looks uncomfortable seen and not merged with nature, there is no shelter, the ecotourism location is closed during the rainy season, the ecotourism guard is very limited, the absence of tour guides for the general public who visit individually, and the lack of shelter in the jogging track area.

2) Observation

Observations held in the ecotourism area of Wonorejo mangrove forest towards the natural environment of mangrove forest and visitor's behavior. The results of the observation include: The chaos of signs and information boards, no linking between the signs and the environment, the garbage with various types littered under mangrove trees, there are various types of birds and river biota, many mangrove trees are collapsed, information signs that disturb visitors, visitors feel uncomfortable with the presence of garbage, although there is a trash but visitors are still littering grabages at any places, there are mangrove planting activities by students, fishing activities by some people who do it routinely every day, some boats perched on the edge of the pier and the availability of canteen on the dock.

3) Literature Study

Based on data on the Environment Status of Surabaya City in 2011, the mangrove ecosystem in Wonorejo had a total area of 51.38 ha. From that area, mangrove conservation area suffered damage at about 14,006 ha or about 27%. Besides, the heavy metal content in the mud substrate at the bottom of the waters and biota on the East Coast of Surabaya have also exceeded the FAO / WHO thresholds who specify the accumulative and chronic heavy metals content for marine biota. Rubbish carried over the river also contributes to the destruction of mangrove forests in the east coast of Surabaya.

Fig. 3. Shenzhen Bay Checkpoint
source:https://www.tripadvisor.com/LocationPhotoDirectLink-g297415-d2630813-i229518669-

In addition, mangrove forest serves as a coastal protector of abrasion and erosion, keeping the shoreline stable, treating toxic waste, producing oxygen and absorbing CO2, into a buffer zone of the ecosystem from infiltration of seawater into groundwater, holding the mud to in order to provide the possibility of building new land.

Conserved ecosystems provide possibility for breeding of marine biota and birds, fish, shellfish and crabs, as well as a natural habitat of various types of biota.

4) Competitor Study

Mangrove Ecological Park at *Shenzhen Bay Checkpoint* which is located in the west of Shenzhen, China (see figure 4). Signage Mangrove Shenzhen_Bay_Park-Shenzhen_Guangdong.htmlEcological Park dominated by brown color and white color. Readibility and legability fonts are pretty good. The design is pretty good, but less united with the environment. This can be understood by observing from the concept of signage used instead of green concept (friendly environment).

B. Data Analysis

Data analysis uses three stages which include data reduction, data presentation and conclusion.

1) Data Reduction

Data reduction aims to focus data and reduce data that is inconsistent with research objectives.

a) Interview

Based on interviews obtained data that support the purpose of the study include: the number of waste shipment or behavior of visitors who are not discipline, signs less information integrated with nature, visitors less gain knowledge about marine biota and mangrove.

b) Observation

From the results of observation and after data reduction, the data obtained include: Signs are less clear and impressed chaotic, no harmony between signs and nature, the presence of garbage that interfere with the visitors' comfortness.

c) Literature Study

Based on the literature study, the data collected are: river flow that brings the family waste which potentially destroys the natural beauty of mangrove forest, mangrove forest is potential to be a breeding ground for marine biota, birds, fish, shell and crab.

2) Data Presentation

From the results of data reduction, then the data is presented in the form of domains. Domain data includes: visitors are less informed as well as natural education of mangrove forests, garbage carried by the river as well as garbage tourists, signs of information that is less clear.

3) Conclusion

With some improvement from the side of the signs in the ecotourism area of Wonorejo mangrove forest and the problems found in the presentation of the above data, then the area can be developed as an alternative tourist attraction to

increase tourists interest. The beauty and mangrove forest as the mainstay ecotourism of Surabaya city government become the mainstay in satisfying and providing comfort to the tourists.

C. Creative Brief

1) Issues

Mangrove Wonorejo is a protected area located on the East Coast of Surabaya (Pamurbaya) and stretches from the coast of Kenjeran to the mouth of the Dadapan River. Wonorejo mangrove forest area of Surabaya is developed as an alternative tourism object to attract tourists with different nuance in the middle of dense urban life. However, the beauty and eco-tourism forest become less comfortable with the following problems:

- Lots of garbages
- Information signs *(signage dan wayfinding)*
- Sign *(signage dan wayfinding)* are not clear
- Visitors get less information about ecotourism

2) Objective

Environmental Graphic Design is a way to solve problems, so that information boards and signs can align with nature and have aesthetic value.

3) Consumer Insight

The needs of tourists who visit the ecotourism mangrove Wonorejo, can enjoy nature with comfortable and affordable natural trip (price and location)

4) Consumer Benefit

Tourists can get information related to Mangrove forest tourism

5) Target Audience:

a) Demographic

Social Economics Status (SES):
SES B : 2.000.001 – 3.000.000
SES C : 1.000.001 – 2.000.000
SES D : 700.001 – 1.000.000
Age: 15-30
Teenage, adult, family

b) Psychographic

They live in urban areas and in general, people who want to travel nearby to unwind or release the stress after working or doing other activities.

6) Tone and Manner

Informative, persuasive, factual, natural

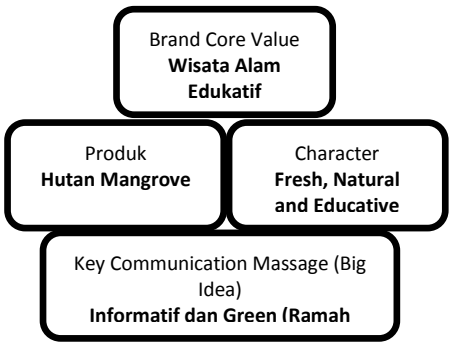
7) Desire Response

Providing the right information so that visitors can enjoy useful educational tours. Use of materials that are friendly environment and align with nature.

8) Key Message

From the findings of the data obtained in the field either through observation, interview, literature study, and after searching the key message (see Figure 4), then it is obtained the key message "Informative and Green (Environment Friendly)". A friendly Environmental not only saves the environment, but also makes life healthier and more comfortable [3].

This concept is used to create the design of the signs in the mangrove Wonorejo, so the signs that will be created more informative and more friendly to the environment.



Source: Result of researcher (2017)

Fig. 4. Key Message

D. Creative Strategy

Based on the key message "Informative and Green", the message translated as a friendly informative environment, the creative strategies of each element include: typography, color.

1) Typography

The selection and determination strategy of the typeface is based on the selected key message. From the results of selection and search through literature study found Airfly font (see figure 5)

Fig. 5. Typeface Airfly

Source: https://freedesignresources.net/airfly-typeface-free-demo/

2) Color

Color has a psychological role to the visitor. The right color composition will give a strong impression and character to the environment in which the colors are applied [4] The concept of green is always associated with back to nature [5] According to Jacci Howard Bear [6], green is a symbolic color of foliage and forest, so it has the meaning of renewal, growth, balance, harmony, and environment. Accoding to Anda

Rahayu RetnoWulan also states that the green color has a psychological meaning of natural beauty, freshness, purity, eternity and a new life which is included in pastel colors (see figure 6). The pastel color leads to a light color of a bright color. The green color with white color combination will produce a lighter color and look brighter. Pastel colors give a comfort to visitors.

Color selection is based on natural tone and manner. Nature is represented by those colors. The dark green color (C: 79, M: 52, Y: 82, K: 66) is used as the base color of the sign board. the light green color (C: 81, M: 35, Y: 93, K: 27), is used as the base color for sebagai the basic colors of tourist attractions and icons. The lightest green color (C: 78, M: 22, Y: 96, K: 11), is used as the leaf color and the light brown color (C: 23, M: 39, Y: 66, K: 0), is used as the mangrove iconic wood color

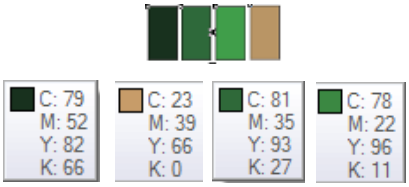


Fig. 6. Chosen Color dan CMYK Percentage

3) Material

The material chosen is in the form of acrylic plastic as the main material and finishing. Acrylic plastic material has a lighter weight than other materials, the transport process is easier. In addition. it is more robust and stronger and has a longer age. This material is used for all sign systems, ranging from sign system location area, sign system entrance, sign system toilet, sign system exit, sign system on street lighting and others.

E. Communication Strategy

The selection of information and visual placement in the overall design affects to the target audience's response. Communication strategy is based on tone and manner and desire response. Tone and manner chosen are informative, persuasive, factual and natural. While the desire response from the creative brief gives clues, that a proper inormasi expected visitors can enjoy educational tours and take advantage.

F. EGD Implementation

Based on the creative briefs and creative strategies that have been compiled, then the implementation of EGD Ecowisata Mangrove Wonorejo was prepared. Informative is visualized by the size of sign system that has high readybility and legibility. The basic form of EGD design has the meaning of a tree, so it is expected to blend with nature

Fig. 7. Icon-forming elements

1) Icon Sketch

From the findings of the data through interviews and observations and literature studies, drawing up the design of icons based on leaf, fruit, and root elements.

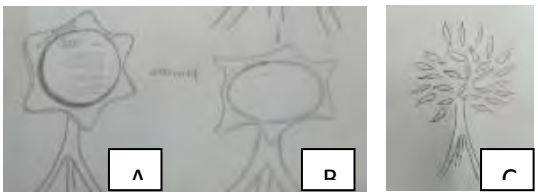


Fig. 8. Alternative Icon Result

Through a simple survey conducted by showing to fellow researchers and lecturers, the more representative icon is an alternative icon C. Selected icons will be applied in all Sign Systems that relate to Wonorejo mangrove ecotourism. Sign System that will use the selected icon, include: Dock Page Area, Tour Type, Tour Area Location, Lighting Light, Entrance gate, Exit gate. While other sign system, such as information on the type of mangrove, or animals that inhabit the mangrove area to stay adjust the design. All sign systems use a dark green base color ((C: 79, M: 52, Y: 82, K: 66).

2) Dock Yard Sign System

All sign systems (except sign systems on street lights) have a form of freestanding with pylon type (monolith). Sign system on street light using freestanding with lollipop type. The Sign System dock yard is located around the location where boats are ready to take visitors to the Wonorejo mangrove ecotourism site. This sign system form can be seen in Figure 10, with a height of approximately 180 cm with a width of approximately 80 cm made of acrylic plastic material.

Fig. 9. Dock Yard Sign System

3) Tour Type Sign System

Types of tourism in the ecosystems in the mangrove forest Wonorejo has three types of tourism, which include: fishing area, jogging trackhutan mangrove and boat trip to mangrove gasebo at the edge of the coastline. This sign system is placed between boat ticket location with jogging track area.

Fig. 10. Sign system of Tour Type

4) Sign System of Facilities and Infrastructure eco-tourism

Sign system of facilities and infrastructure Mangrove Ecotourism Wonorejo are placed in the visitor arrival area. With an approximate height 180 cm and a width of 100 cm, it will provide comfortness towards visitors in getting information, even from a considerable distance. The dimension of the system sign of ecotourism facilities and infrastructure is different from the dimensions of the sign system of the dock yard and the sign of the type of tourism system.

Fig. 11. Sign System of Facilities and Infrastructure eco-tourism

5) Street Light Sign System

The design of sign system design towards the location of ecotourism mangrove Wonorejo using zone mounting overhead zone (above eye zone). Installation of sign system at the height above 4 m on street lights. Sign system is placed towards the location of ecotourism mangrove Wonorejo which is also used as a campaign media starting from the intersection of MERR Jl.Soekarno Hatta to the location of Ecotourism Mangrove Wonorejo. With the installation of directional signboards on street lights, it becomes an informative tool for visitors.

Fig.12. Street Light Sign System

6) Entrance Gate Sign System

From the ticketing area to the jogging track which is also used as the location of Wonorejo mangrove natural education, there are two roads that direct toward the ponds and the other toward jogging track area. Although it has been already distinguished by the road conditions that paving blocks, but the entrance gate is still less informative.With the dimension of height 180 cm and width 80 cm, sign entrance system

Fig. 13. Entrance Gate Sign

7) Exit Gate Sign System

The Exit Gate Sign system has the same design as the Entrance Gate Sign system design. The same design gives easiness and convenience to the visitor when going out from the location by looking at the sign-out door system from a considerable distance. Exit Sign System signature offered can be seen in Figure 15. This sign system has dimensions with a height of 180 cm and width of 80 cm

Fig. 14. Exit Gate Sign System

CONCLUSION AND SUGGESTION

A. *Conclusion*

From the results and discussion that has been done, it can be concluded:

1. Concept finding is based on the key message in the form of "Informative and Green"
2. Typeface Airfly has a green concept.
3. The designed sign system educate people, especially visitors of Ecotourism Mangrove Wonorejo
4. *Sthe available Sign system* provides easiness for the people in getting the information
5. Tthe basic shape design of EGD has a tree interpretation.

B. *Suggestion*

From the results of this study, researcher suggests the development of research in terms of:

1. Development of sign system design on boat media and ecotourism area in Wonorejo mangrove gaseboo
2. Hold the same research with different ecotourism objects like in Anyar Wonorejo Tourism
3. Can be developed into EGD with infographic concept

REFERENCES

[1] Arisandi, P, 2004, Mangrove Pantai Timur Surabaya Terancam Punah, URL:http://www.terranet.or.id

[2] Kartawinata, K., S. Adisoemarto, S. Soemodihardjo, dan I. G. M. Tantra. 1979. Status Pengetahuan Hutan Bakau di Indonesia. Prosiding Seminar Ekosistem Mangrove. LIPI-MAB: 21- 39., Jakarta.

[3] Edupaint.com (2016). Membuat Rumah Dengan Konsep Ramah Lingkungan. Diunduh dari http://edupaint.com/warna/ragam-warna/9240-membuat-rumah-dengan-konsep-ramah-lingkungan.html pada tanggal 4 Desember 2017, pukul 18:00.

[4] A Syoufa, 2012.Tinjauan Pengaruh Warna Terhadap Kesan Dan Psikis Penghuni Pada Bangunan Rumah Tinggal. Jurnal Ilmiah Desain dan Konstruksi, 2012 - syoufa.staff.gunadarma.ac.id

[5] Dika, 2014. Cantiknya Warna Alam Yang Ramah Lingkungan. Volume III. Edisi 29. Diunduh dari http://www.rumahjogjaindonesia.com/isi-majalah/cantiknya-warna-alam-yang-ramah-lingkungan.html pada tanggal 4 Desember 2017, pukul 17:00.

[6] Jacci Howard Bear. (2008). “Green”. http://dekstoppub.about.com/cs/colorselection/ p/blue.htm, About, Inc., the New York Times Company

ISBN 978-602-51367-0-2

http://icitas.stikom.edu icitas@stikom.edu +62 31 8721731 Raya Kedung Baruk 98 - Surabaya 60298