Committees: International Conference on Informatics, Technology, and Engineering 2021 (InCITE 2021)

View Online

Export Citation

Preface: International Conference on Informatics, Technology, and Engineering 2021 (InCITE 2021)

Welcome to the 3rd biannual International Conference on Informatics, Technology, and Engineering 2021 (InCITE 2021). This year, InCITE is organized from Surabaya, Indonesia and researchers from around the world discuss current challenges and technological solutions via an online platform on August 25-26, 2021.

InCITE 2021 presents "Leveraging Smart Engineering" as its central theme. In response to several world challenges, such as sustainable development, global convergence of information and communications technologies, along with smart systems as opportunities as well as challenges in developments for better industries, it is considered important to discover innovative approaches from science and engineering perspectives. Innovation suggests the introduction of novelty to create better solutions. Innovation in engineering and science requires contributions from multidisciplinary sectors, involving industries, practitioners, researchers, and academics.

WELCOME FROM InCITE 2021 STEERING COMMITTEE

It is a great pleasure to welcome all of you to the 3rd Bi-Annual International Conference on Informatics, Technology, and Engineering 2021 (InCITE 2021) held by the Faculty of Engineering, University of Surabaya (UBAYA). The first and second InCITE have been successfully held in Bali, Indonesia in 2017 and 2019. Hence, now we are delighted to host the third InCITE through online media due to the Covid-19 pandemic situation.

There are 37 papers that have been selected to be presented in InCITE 2021. The papers were written by experts not only from Indonesia, but also from different parts of the world. The main theme of this conference is Leveraging Smart Engineering in response to the current and future Industrial Revolution 4.0 that should be handled by every country in the world. We hope through this conference, all participants will be able to know each other and interact to develop future collaboration.

We would like to express our sincere gratitude to the Keynote speakers, International Scientific Committee, Steering Committee, and Organizing Committee for their huge efforts to make this conference successful.

Thank you all for your support and attendance at InCITE 2021. Please enjoy the conference!

Asst. Prof. Doddy Sutrisna, Ph.D.
Steering Committee

WELCOME FROM InCITE 2021 ORGANIZING COMMITTEE

Welcome to InCITE 2021! The third bi-annual international conference on engineering domain conducted by the Faculty of Engineering, The University of Surabaya (UBAYA). Due to the COVID-19 pandemic, InCITE 2021 is held as an online conference. Online conference opens the opportunity for many researchers around the globe to share their findings and learn from other global researchers with less restrictions.

InCITE 2021 invites three keynote speakers, well reputable global researchers in their research domain from Australia and Taiwan. Following each keynote session are two presentation sessions run in parallel.

This year, we received 66 papers submitted by researchers from four distinct countries (i.e., first author's country of origin): Indonesia, Australia, Taiwan, and Kazakhstan.

We employed a double-blind review to ensure a high standard and a minimum level of bias in the reviewing processes. This resulted in 56% of the submissions were accepted and will be published to the AIP Conference Proceedings.

Authors of all accepted papers are to disseminate their findings during InCITE 2021 conference between 25 to 26 of August 2021. This presents a great opportunity for everyone, including the researchers, to discuss and further improve current achievements.

We thank all keynote speakers, presenters, and reviewers/scientific committees for the generous supports. We thank the University of Surabaya, the Faculty of Engineering UBAYA, and all InCITE 2021 committees that enable InCITE 2021.

We wish you a very pleasant and rich conference experience in InCITE 2021 and look forward to seeing you again on InCITE 2023! Thank you.

Yours sincerely,
Asst. Prof. Dr. Jimmy
InCITE 2021 Organizing Committee

CONFERENCE ORGANIZER

The InCITE 2021 Organizing Comittee would like to thank the following names who has served as the:

SCIENTIFIC COMMITTEE

- Prof. Benny Tjahjono, Ph.D. (Coventry University, Coventry, England)
- Prof. Dr. Anton Satria Prabuwono (King Abdulaziz University, Jeddah, Saudi Arabia)
- Prof. Dr. Ing. Ir. I Made Londen Batan M.Eng. (Institut Teknologi Sepuluh Nopember (ITS), Surabaya, Indonesia)
- Prof. Dr. Ir. Joko Lianto Buliali (Institut Teknologi Sepuluh Nopember (ITS), Surabaya, Indonesia)
- Prof. Dr. Ir. Judy Retti B. Witono, M.App.Sc. (Universitas Katolik Parahyangan, Bandung, Indonesia)
- Prof. Dr. Ir. Wahyudi Sutopo, S.T., M.Si., IPM (Universitas Sebelas Maret, Solo, Indonesia)
- Prof. Ir. Arif Djunaidy, M.Sc., Ph.D. (Institut Teknologi Sepuluh Nopember (ITS), Surabaya, Indonesia)
- Prof. Ir. Djoko Budiyanto, M.Eng., Ph.D. (Universitas Atma Jaya, Yogyakarta, Indonesia)
- Prof. Ir. Joniarto Parung, M.M.B.A.T., Ph.D. (Universitas Surabaya, Surabaya, Indonesia)
- Prof. Ir. Lieke Riadi, Ph.D. (Universitas Surabaya, Surabaya, Indonesia)
- Prof. Itthisek Nilkhamhang, Ph.D. (Sirindhorn International Institute of Technology, Pathum Thani, Thailand)
- Prof. Dr. Pavel Albores (MIET, FHEA) (Aston University, Birmingham, England)
- Assoc. Prof. Bertha Maya Sopha, S.T., M.Sc., Ph.D. (Universitas Gadjah Mada (UGM), Yogyakarta, Indonesia)
- Assoc. Prof. Dina Natalia Prayogo, S.T., M.Sc. (Universitas Surabaya, Surabaya, Indonesia)
- Assoc. Prof. Dr-Ing. Amalia Suzianti, S.T., M.Sc. (Universitas Indonesia (UI), Jakarta, Indonesia)
- Assoc. Prof. Dr. A. F. M. Saifuddin Saif (American International University, Bangladesh)
- Assoc. Prof. Dr. Andi Cakravastia Arisaputra Raja, S.T., M.T. (Institut Teknologi Bandung (ITB), Bandung, Indonesia)
- Assoc. Prof. Dr. Benjawan Srisura (Assumption University of Thailand, Bangkok, Thailand)
- Assoc. Prof. Dr. Diana Purwitasari, S.Kom., M.Sc. (Institut Teknologi Sepuluh Nopember (ITS), Surabaya)
- Assoc. Prof. Dr. Dra. Amelia Santoso, M.T. (Universitas Surabaya, Surabaya, Indonesia)
- Assoc. Prof. Dr. Dra. Ir. Evy Herowati, M.T. (Universitas Surabaya, Surabaya, Indonesia)
- Assoc. Prof. Dr. Emma Savitri, S.T., M.Sc. (Universitas Surabaya, Surabaya, Indonesia)
- Assoc. Prof. Dr. Ir. Anas Ma'ruf, M.T. (Institut Teknologi Bandung (ITB), Bandung, Indonesia)

- Assoc. Prof. Dr. Ir. Puguh Setyopratomo, M.T. (Universitas Surabaya, Surabaya, Indonesia)
- Assoc. Prof. Dr. Ir. Susila Candra, M.T. (Universitas Surabaya, Surabaya, Indonesia)
- Assoc. Prof. Dr. Joko Siswantoro, S.Si., M.Si. (Universitas Surabaya, Surabaya, Indonesia)
- Assoc. Prof. Dr. Ludovic F. Dumee (Khalifa University, Uni Arab Emirates (UAE))
- Assoc. Prof. Dr. Mohd Sanusi Azmi (Universiti Teknikal Malaysia Melaka, Melaka)
- Assoc. Prof. Dr. Ridi Ferdiana, S.T., M.T. (Universitas Gadjah Mada (UGM), Yogyakarta, Indonesia)
- Assoc. Prof. Dr. Rosita Meitha Surjani, S.T., M.T. (Universitas Surabaya, Surabaya, Indonesia)
- Assoc. Prof. Dr.Eng. Wahyudiono (Nagoya University, Nagoya, Japan)
- Assoc. Prof. Elieser Tarigan, S.Si., M.Eng., Ph.D. (Universitas Surabaya, Surabaya, Indonesia)
- Assoc. Prof. Ir. Eric Wibisono, Ph.D., IPU. (Universitas Surabaya, Surabaya, Indonesia)
- Assoc. Prof. Ir. Hanung Adi Nugroho, Ph.D. (MIEEE, MACM) (Universitas Gadjah Mada (UGM), Yogyakarta, Indonesia)
- Assoc. Prof. Restu Kartiko Widi, S.Si., M.Si., Ph.D. (Universitas Surabaya, Surabaya, Indonesia)
- Assoc. Prof. Satvasheel Powar, Ph.D. (Dalarna University, Sweden)
- Assoc. Prof. Tan Kay Chuan, Ph.D. (National University of Singapore (NUS), Singapore)
- Assoc. Prof. Teguh Bharata Adji, S.T., M.T., M.Eng., Ph.D. (Universitas Gadjah Mada (UGM), Yogyakarta, Indonesia)
- Assoc. Prof. The, Jaya Suteja, S.T., M.Sc., Ph.D. (Universitas Surabaya, Surabaya, Indonesia)
- Assoc. Prof. Timotius Pasang, Ph.D. (Oregon Institute of Technology, USA)
- Alexander Yohan, S.Kom., M.I.M., Ph.D. (Universitas Surabaya, Surabaya, Indonesia)
- Djuwari, S.T., Ph.D. (Universitas Surabaya, Surabaya, Indonesia)
- Dr. Awang Hendrianto Pratomo (UPN "Veteran" Yogyakarta, Indonesia)
- Dr. Delta Ardy Prima, S.ST., M.T. (Universitas Surabaya, Surabaya, Indonesia)
- Dr. Drs. Muhammad Rosiawan, M.T. (Universitas Surabaya, Surabaya, Indonesia)
- Dr. Fredy Purnomo, S.Kom, M.Kom. (Universitas Bina Nusantara, Jakarta, Indonesia)
- Dr. Hazrul Iswadi, S.Si., M.Si. (Universitas Surabaya, Surabaya, Indonesia)
- Dr. Hendri Himawan Triharminto (Akademi Angkatan Udara, Yogyakarta, Indonesia)
- Dr. Indri Hapsari, S.T., M.T. (Universitas Surabaya, Surabaya, Indonesia)
- Dr. Jimmy, S.T., M.I.S. (Universitas Surabaya, Surabaya, Indonesia)
- Dr. Khoiruddin, S.T., M.T. (Institut Teknologi Bandung (ITB), Bandung, Indonesia)
- Dr. Mohamad Rezi bin Abdul Hamid (University Putra Malaysia, Seri Kembangan, Malaysia)
- Dr. Naniek Utami Handayani, S.Si., M.T. (Universitas Diponegoro, Semarang, Indonesia)

- Dr. Yenny Sari, S.T., M.Sc. (Universitas Surabaya, Surabaya, Indonesia)
- Firman Kurniawansyah, S.T., M.Eng.Sc., Ph.D. (Institut Teknologi Sepuluh Nopember (ITS), Surabaya)
- Nemuel Daniel Pah, S.T., M.Eng., Ph.D. (Universitas Surabaya, Surabaya, Indonesia)
- Ratna Surya Alwi, S.T., M.Si. Ph.D. (Universitas Fajar, Makassar, Indonesia)
- Drs. Heru Arwoko, M.T. (Universitas Surabaya, Surabaya, Indonesia)
- Hendi Wicaksono Agung Darminto, S.T., M.T. (Universitas Surabaya, Surabaya, Indonesia)
- Liliana, S.T., M.MSI. (Universitas Surabaya, Surabaya, Indonesia)
- Maya Hilda Lestari Louk, S.T., M.Sc. (Universitas Surabaya, Surabaya, Indonesia)
- Mohammad Farid Naufal, S.Kom., M.Kom. (Universitas Surabaya, Surabaya, Indonesia)
- Monica Widiasri, S.Kom., M.Kom. (Universitas Surabaya, Surabaya, Indonesia)
- Vincentius Riandaru Prasetyo, S.Kom., M.Cs. (Universitas Surabaya, Surabaya, Indonesia)
- Yuana Elly Agustin, S.T., M.Sc. (Universitas Surabaya, Surabaya, Indonesia)
- Yunus Fransiscus, S.T., M.Sc. (Universitas Surabaya, Surabaya, Indonesia)

STEERING COMMITTEE

Chair:	Asst. Prof. Putu Doddy Sutrisna, S.T., M.Sc., Ph.D.
Honorary Members:	Prof. Ir. Joniarto Parung, M.M.B.A.T., Ph.D. Prof. Ir. Lieke Riadi, Ph.D.
Members:	Assoc. Prof. Ir. Eric Wibisono, Ph.D., IPU Assoc. Prof. Ir. Markus Hartono, S.T., M.Sc., Ph.D. Assoc. Prof. Djuwari, S.T., Ph.D. Assoc. Prof. Dr. Dra. Amelia Santoso, M.T. Asst. Prof. Nemuel Daniel Pah, S.T., M.Eng., Ph.D. Assoc. Prof. Dr. Emma Savitri, S.T., M.Sc. Assoc. Prof. Elieser Tarigan, S.Si., M.Eng., Ph.D. Assoc. Prof. Jaya Suteja, S.T., M.Sc., Ph.D. Assoc. Prof. Ir. Hudiyo Firmanto, M.Sc., Ph.D. Assoc. Prof. Restu Kartiko Widi, S.Si., M.Si., Ph.D. Assoc. Prof. Dr. Joko Siswantoro, S.Si., M.Si. Assoc. Prof. Dr. Indri Hapsari, S.T., M.T. Asst. Prof. Susilo Wibowo, S.T., M.Eng. Asst. Prof. Arum Soesanti, S.T., M.T.

ORGANIZING COMMITTEE

Chair:	Asst. Prof. Dr. Jimmy, S.T., M.I.S
Vice Chair:	Asst. Prof. Yuwono Budi Pratiknyo, S.T., M.T.
Secretariat:	Ms. Liliana, S.T., M.MSI. Mr. Marcellinus Ferdinand Suciadi, S.T., M.Comp.
Treasurers:	Ms. Rafina Destiarti Ainul, S.ST., MT.
Program:	Ms. Maya Hilda Lestari Louk, S.T., M.Sc. Mr. Herman Susanto, S.T.,M.Sc.
Website:	Mr. Daniel Soesanto, S.T., M.M. Mr. Felix Handani, S.Kom., M.Kom.
Design:	Ms. Tryza Adelia, S.Sn., M.Inf.Tech.

InCITE 2021 ORGANIZING COMMITTEE:
FACULTY OF ENGINEERING, UNIVERSITAS SURABAYA
DEAN BUILDING TB 2, RAYA KALIRUNGKUT
SURABAYA, 60293, INDONESIA

PHONE: +62-31-2981150, FAX: +62-31-2981151

EMAIL: incite@unit.ubaya.ac.id

WEBSITE:
https://incite.ubaya.ac.id
http://teknik.ubaya.ac.id

AIP
Conference Proceedings

HOME   BROWSE   MORE ▼

. Table of Contents

INTERNATIONAL CONFERENCE ON INFORMATICS, TECHNOLOGY, AND ENGINEERING 2021 (InCITE 2021): Leveraging Smart Engineering

‹ PREV

DISPLAY : 20   50   100   all

PRELIMINARY

BROWSE VOLUMES

SMART DESIGN AND INNOVATION

BROWSE VOLUMES

Kansei engineering and product-service systems (KEPSS) integrative framework for customer-centered experience

Markus Hartono

SHOW ABSTRACT   ⋮

🔓 Free . April 2022

The role of supply chain performance factors to determine the firm performance

Yoni Kristiawan, Edi Purwanto and Rustono Farady Marta

SHOW ABSTRACT   ⋮

🔓 Free . April 2022

Real-time monitoring design for make-to-order industry

Senapati C. Adisasmito, Pradipta Deffinika Pamungkas and Anas Ma'ruf

SHOW ABSTRACT   ⋮

🔓 Free . April 2022

Reducing production process lead time using Value Stream Mapping and Kaizen approaches: A case study in the musical instrument industry

BROWSE VOLUMES

SHOW ABSTRACT   ⋮

🔓 Free . April 2022

Simple heuristics for scheduling apache airflow: A case study at PT. X

Hans Tanto, Indriati N. Bisono and Hanijanto Soewandi

SHOW ABSTRACT   ⋮

🔓 Free . April 2022

Quality improvement with PDCA approach and design of experiment method in single socks industry in Indonesia

Hibarkah Kurnia, Choesnul Jaqin and Humiras Hardi Purba

SHOW ABSTRACT   ⋮

🔓 Free . April 2022

Integration of corporate social responsibility for improved company performance: Evidence from the Indonesian manufacturing industry

Esti Dwi Rinawiyanti, Xueli Huang and Sharif As-Saber

SHOW ABSTRACT

Community mobility during Covid-19 pandemic and tourism performance: Data mining approach

Gunawan

AIP Conference Proceedings **2470**, 020009 (2022); https://doi.org/10.1063/5.0080170

SHOW ABSTRACT

Inventory system improvement for poultry

Noverta Brilly Leksana Putra, Indri Hapsari and Dina Natalia Prayogo

AIP Conference Proceedings **2470**, 020010 (2022); https://doi.org/10.1063/5.0080160

SHOW ABSTRACT

Users' perception of digital prototypes in Indonesian fashion industry: A qualitative study

Christabel Parung and Prayogo Waluyo

AIP Conference Proceedings **2470**, 020011 (2022); https://doi.org/10.1063/5.0080178

SHOW ABSTRACT

🔓 Free . April 2022

Dynamic study of batch milk cooling process at KUD SAE Pujon

Rudy Agustriyanto, Puguh Setyopratomo and Endang Srihari

SHOW ABSTRACT   ⋮

🔓 Free . April 2022

Recent advances and application of Selective Laser Melting (SLM) technology in the aerospace industry

Anel Yerubayeva, Essam Shehab and Md. Hazrat Ali

SHOW ABSTRACT   ⋮

POWER SYSTEM AND SMART ENERGY MANAGEMENT

🔓 Free . April 2022

Immobilization of xylanase on acid pretreatment bentonite as green biocatalyst

Lieke Riadi, Ruth Chrisnasari, Joshua Kristanto, Cahaya Caesar Bigravida and Meyta Sanoe

SHOW ABSTRACT   ⋮

BROWSE VOLUMES

Rheological behavior and antioxidant activity of carrageenan extracted from Green seaweed (*Eucheuma cottonii*) using alkaline solution at low temperature

Puguh Setyopratomo and Lanny Sapei

AIP Conference Proceedings **2470**, 040002 (2022); https://doi.org/10.1063/5.0080286

SHOW ABSTRACT

Simulation of impact azimuth angle on specific energy output of a fixed mounting rooftop PV system in Jakarta, Indonesia

Elieser Tarigan

AIP Conference Proceedings **2470**, 040003 (2022); https://doi.org/10.1063/5.0080228

SHOW ABSTRACT

Rice husk ash for the stabilization of the outer interfacial layer of W/O/W double emulsion

Lanny Sapei, Rudy Agustriyanto, Endang Wahyu Fitriani, Zerravym Levy and Cindy Sumampouw

AIP Conference Proceedings **2470**, 040004 (2022); https://doi.org/10.1063/5.0080285

SHOW ABSTRACT

natural dyes extraction

Putu Doddy Sutrisna, Meyta Sanoe, Rifando Gogo Adiyaksa, Kristina Wahyu Agustine, Hadiyatni Rita Priyantini, Prayogo Widyastoto Waluyo and I. Made Ronyastra

SHOW ABSTRACT ⋮

Carbon based sulfonated catalyst as an environment friendly material: A review

Putu Padmareka Deandra, Herry Santoso and Judy Retti B. Witono

SHOW ABSTRACT ⋮

A performance study of magnetite-lignin composites as photothermal materials in solar steam generation system

Marta Devega Yuharma, W. Widiyastuti, Ni Made Intan Putri Suari and Heru Setyawan

SHOW ABSTRACT ⋮

Organosolv lignin from coconut coir as potential biomaterials for sunscreen

Diana Novita Sari, Mahardika F. Rois, W. Widiyastuti and Heru Setyawan

SHOW ABSTRACT ⋮

🔓 Free . April 2022

One-step electrochemical synthesis of silica-coated magnetite nanofluids

Delyana Ratnasari, W. Widiyastuti and Heru Setyawan

SHOW ABSTRACT ⋮

🔓 Free . April 2022

Synthesis and characterization of chitosan-Allium sativum film

Emma Savitri, Maria Irine Tjahayani and Anastasia Apriyani Ngene Say

SHOW ABSTRACT ⋮

BROWSE VOLUMES

The effect of sodium lauryl sulfate on silica nanofluid stabilization using microbubble method

Ratri Sekaringgalih, I. Made Joni, W. Widiyastuti and Heru Setyawan

SHOW ABSTRACT ⋮

Textile wastewater purification using corona discharge method

Rezha Carina Rachmady, Ari Rahman and Wahyu Kunto Wibowo

SHOW ABSTRACT ⋮

THE ROLE OF IT IN INNOVATION ENHANCEMENT

Hate speech content detection system on Twitter using K-nearest neighbor method

Vincentius Riandaru Prasetyo and Anton Hendrik Samudra

SHOW ABSTRACT ⋮

BROWSE VOLUMES

School finder, intelligent recommendation system for elementary school selection

Susana Limanto, Endah Asmawati and Yusuf Wira Kencana Putra

SHOW ABSTRACT

Designing a recommender system based on the application of decision tree algorithm in data mining with KNIME (for recommending the topic of undergraduate's thesis)

Yenny Sari, Vincentius Riandaru Prasetyo and Kevin Liyansah

SHOW ABSTRACT

Weather image classification using convolutional neural network with transfer learning

Mohammad Farid Naufal and Selvia Ferdiana Kusuma

SHOW ABSTRACT

BROWSE VOLUMES

comprehensive review

Ellysa Tjandra, Sri Suning Kusumawardani and Ridi Ferdiana

SHOW ABSTRACT   ⋮

🔓 Free . April 2022

Sentiment analysis on feedback of higher education teaching conduct: An empirical evaluation of methods

Jimmy and Vincentius Riandaru Prasetyo

SHOW ABSTRACT   ⋮

🔓 Free . April 2022

Implementing directed pairwise judgement approach in web-based AHP survey application to reduce inconsistency ratio

Daniel Hary Prasetyo

SHOW ABSTRACT   ⋮

🔓 Free . April 2022

Leaf geometric properties measurement using computer vision system based on camera parameters

Joko Siswantoro, Ida Bagus Made Artadana and Muhammad Z. F. N. Siswantoro

BROWSE VOLUMES

SHOW ABSTRACT   ⋮

🔓 Free . April 2022

A design of secure supply chain management system with blockchain technology

Alexander Yohan, Nai-Wei Lo and Kevin Valentino

SHOW ABSTRACT   ⋮

🔓 Free . April 2022

Implementation of behavior tree for creating an in-game cut-scene

Delta Ardy Prima

SHOW ABSTRACT   ⋮

BROWSE VOLUMES

The online attendance system models for educational institutions

Andre and Marcellinus Ferdinand Suciadi

AIP Conference Proceedings **2470**, 050011 (2022); https://doi.org/10.1063/5.0080180

SHOW ABSTRACT   ⋮

Genetic algorithm with adaptive diversification and intensification for the vehicle routing problem

Eric Wibisono, Iris Martin and Dina Natalia Prayogo

AIP Conference Proceedings **2470**, 050012 (2022); https://doi.org/10.1063/5.0080197

SHOW ABSTRACT   ⋮

Resources

AUTHOR

LIBRARIAN

ADVERTISER

General Information

ABOUT

CONTACT

BROWSE VOLUMES

HELP

FOLLOW AIP PUBLISHING:

Scitation

BROWSE VOLUMES

School finder, intelligent recommendation system for elementary school selection

Susana Limanto, Endah Asmawati and Yusuf Wira Kencana Putra

View Online   Export Citation

ARTICLES YOU MAY BE INTERESTED IN

Preface: International Conference on Informatics, Technology, and Engineering 2021 (InCITE 2021)
AIP Conference Proceedings **2470**, 010001 (2022); https://doi.org/10.1063/12.0009021

Hate speech content detection system on Twitter using K-nearest neighbor method
AIP Conference Proceedings **2470**, 050001 (2022); https://doi.org/10.1063/5.0080185

Designing a recommender system based on the application of decision tree algorithm in data mining with KNIME (for recommending the topic of undergraduate's thesis)
AIP Conference Proceedings **2470**, 050003 (2022); https://doi.org/10.1063/5.0081214

School Finder, Intelligent Recommendation System for Elementary School Selection

Susana Limanto[a], Endah Asmawati[b], and Yusuf Wira Kencana Putra[c]

University of Surabaya, Surabaya 60293, Indonesia

[a] Corresponding author: susana@staff.ubaya.ac.id
[b] endah@staff.ubaya.ac.id
[c] s160416049@student.ubaya.ac.id

Abstract. Children aged 6-7 years cannot yet choose the right elementary school for themselves. Therefore, the role of parents is needed. Every parent usually has a lot of consideration (criteria) in determining the best elementary school for their child. In addition, the number of elementary schools in a city is also significant, and each offers interesting and different advantages and privileges. The number of elementary schools in a city makes it difficult for parents to choose the best elementary school for their children. Many applications have been developed to help parents overcome difficulties in selecting an elementary school. However, many inputs must make the application less attractive to use, especially since the available elementary school options are limited. "School Finder" was created to assist parents in choosing the best elementary school according to the given criteria with minimal input and dynamic elementary school presence. The recommendation is determined using the Analytical Hierarchy Process (AHP) method. Based on the validation results to parents of elementary school students, more than 96% of respondents stated that the School Finder application could provide detailed information about the school. The criteria given are by the parents' wishes. The application is easy to understand and use. Overall, the application helps parents to choose primary schools for their children.

Keywords: elementary school, recommendation, analytical hierarchy process, school finder, decision support system

INTRODUCTION

Children are the most valuable treasure for parents [1]. Therefore, parents always provide the best for their sons and daughters, especially in terms of education. Education is an effort to develop the knowledge, skills, and character of students [2]. Therefore, education must be given early and gradually, adjusted to the level of physical and mental maturity to produce strong and quality human resources [2, 3, 4, 5,6, 7].

Elementary school is a formal level of basic education required by the government of the Republic of Indonesia for all citizens aged seven years [2]. This effort is made to educate every citizen as the nation's next generation [2, 8]. In addition, children at elementary school age enter the final stages of physical development - motor, cognitive, socio-emotional, language, and religious morals to impact the child's future [5, 9, 10]. Meanwhile, cognitive development stimulates children's creative abilities to adapt to the demands of an ever-evolving environment [5]. Therefore, parents' and educators' active role and the environment will determine children's success [4, 5, 11, 1, 12, 13, 14]. Parents need to find quality elementary schools with professional educators [3, 15, 16, 17].

Parents finding the right elementary school for their children usually consider many criteria, such as school accreditation, location, and facilities provided [18, 16, 19, 17]. On the other hand, the number of elementary schools in a city can be many, such as in Surabaya. There are 815 elementary schools divided into 287 Public elementary schools and 528 Private elementary schools [20]. Many elementary schools in a city make these schools compete with each other with their respective advantages to be the best. This adds to the difficulty of parents in choosing the best elementary school for their children. The Intelligent Recommendation System, which is part of the Decision Support System (DSS), is one way that can be used to help parents find difficulties in choosing an elementary school.

There have been many studies conducted related to DSS to assist parents in choosing elementary schools. Ana Fitriani and Tri Widayani conducted research related to the DSS election of Islamic elementary schools in Pontianak. This study uses six criteria for choosing elementary schools: accreditation, learning process, teacher quality, school facilities, school environment, and the resulting output and achievement [18]. The alternatives used in the study were SD Muhammadiyah 2, SDIT Al-Mumtaz, SDI Mujahidin, and SDI Al-Azhar [18]. Kenti Yuliana and Ahmad Aini conducted similar research for the Jinnah River Cluster area, North Banjarmasin District. Research conducted by KentiYuliana and Ahmad Aini involved a maximum of 5 criteria: education, facilities, location, extracurricular, and spiritual [19]. There are three alternatives used in Kenti Yuliana and Ahmad Aini's research: SDN Sungai Jingah 5, SDN Sungai Jingah 1, and SDN-SN Surgi Mufti 1[19]. Fitri Indriyani also conducted a similar study, namely the DSS for the election of Islamic elementary schools in Jakarta. The criteria used in Fitri Indriyani's research are cost, graduates, distance, facilities and infrastructure, and curriculum [21]. While there are 4 alternatives used, namely: SDIT Miftahul Ulum, SDIT Al Hamidiyah, SDIT Darajatu Ulum and Sekolah Alam Indonesia [21]. All of the analyses above, using the AHP method. However, the DSS developed in these studies requires parents to input the paired priority comparison value between the criteria and the paired comparison value between alternatives for each criterion. This becomes a burden for parents if the number of alternative elementary schools and the criteria used is large enough. In addition, the number of elementary schools used as alternatives by previous researchers was fixed and in limited numbers. Meanwhile, the existence of elementary schools in a city can increase or decrease. In this research, an elementary school electoral system was built to overcome the existing limitations, with elementary schools being used as dynamic alternatives, and the input that parents need to do is only the priority weight of each selected criterion. The dynamic characteristic in question is the number of alternative elementary schools that can be added or reduced according to the existence of these elementary schools. Meanwhile, the pairwise comparison value between alternatives for each criterion that parents should input is omitted. It will be calculated automatically by the system based on elementary school data which is an alternative. The results of this study are expected to provide the best elementary school recommendations according to the criteria determined by the child's parents without burdening the parents with a lot of input.

METHODOLOGY

The research begins by collecting data on the criteria commonly used by parents to select an elementary school for their child. Data collection was carried out by distributing questionnaires to parents who currently have children attending kindergarten or elementary school. Questionnaires were distributed offline and online via a google form. Offline questionnaires were distributed using the cluster sampling method combined with the simple random sampling method. The schools used as places for distributing the questionnaires were Al-Azhar 13 Kindergarten and Elementary School, Al-Azhar Kelapa Gading Kindergarten and Elementary School, and Al-Muttaqien Elementary School. The questionnaire was responded to by 40 online respondents and ten offline respondents.

The criteria used by respondents to choose elementary schools can be seen in Table 1. Based on questionnaires and interviews with several schools, a system was built to assist parents in determining the right elementary schools for their children. The criteria used in the system being built are divided into the criteria for the initial screening process and the criteria for the main process. The criteria used for the initial screening are a type of school, testimony, and children's abilities. Based on the type of school inputted, elementary schools that meet the criteria will be displayed. The user can select elementary schools that are displayed according to the child's testimony and abilities. The selected elementary school will be used as an alternative in the main process. The main process is carried out using the Analytical Hierarchy Process (AHP) method. The criteria used for the main process are divided into 4, namely: academic, facilities, extracurricular activities, and the distance from home to school. This criterion will be divided into several sub-criteria. The hierarchy of the criteria to be used can be seen in Fig. 1.

The main process begins with inputting the criteria and sub-criteria that will be used to select elementary schools, determine the priority weight of each criterion, and determine the elementary school chosen as an alternative. Based on the input results, the calculation process is carried out using the AHP method. The calculation results will be displayed in the form of a ranking against elementary schools, chosen to be made an alternative according to the input weights and criteria. Details of the main process can be seen in Fig. 2.

TABLE 1. Elementary Schools Selection Criteria

Criteria	Respondent (%)
Infrastructure and facilities	54
School achievement (accreditation, rating, curriculum, learning methods, etc.)	52
Distance from home to school	50
Type of school (Religious, international, national)	50
Children's abilities	40
Extracurricular provided	26
Testimonials from other people (relatives / friends / social media, internet, etc.)	18
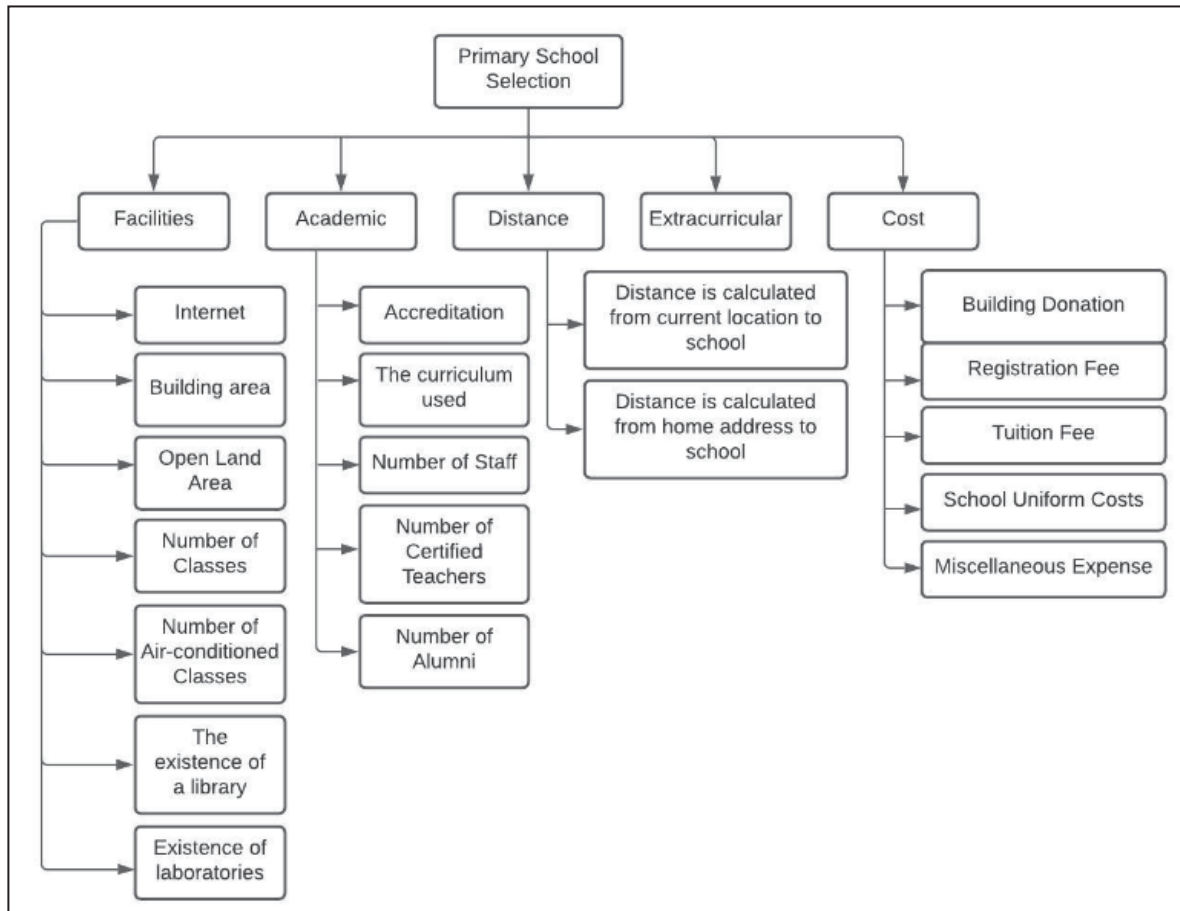
FIGURE 1. Criteria Hierarchy

Two types of trials that tested the system's accuracy were carried out, namely internal testing and external testing. Internal testing was conducted to find the results of recommendations using the AHP method. Four different scenarios were designed for internal testing. Each scenario uses a different combination of criteria and alternatives. Experts reviewed the results of the internal testing. After the system passes the internal test, then an external test is carried out. External testing was carried out by asking 30 respondents to try the system that had been built. Respondents are parents who will send their children to the elementary school level. The selection of respondents was carried out by cluster simple random sampling. The schools used as test sites were Al-Azhar 13 Kindergarten and Elementary School, Al-Azhar Kelapa Gading Kindergarten and Elementary School, and Al-Muttaqien Elementary School.
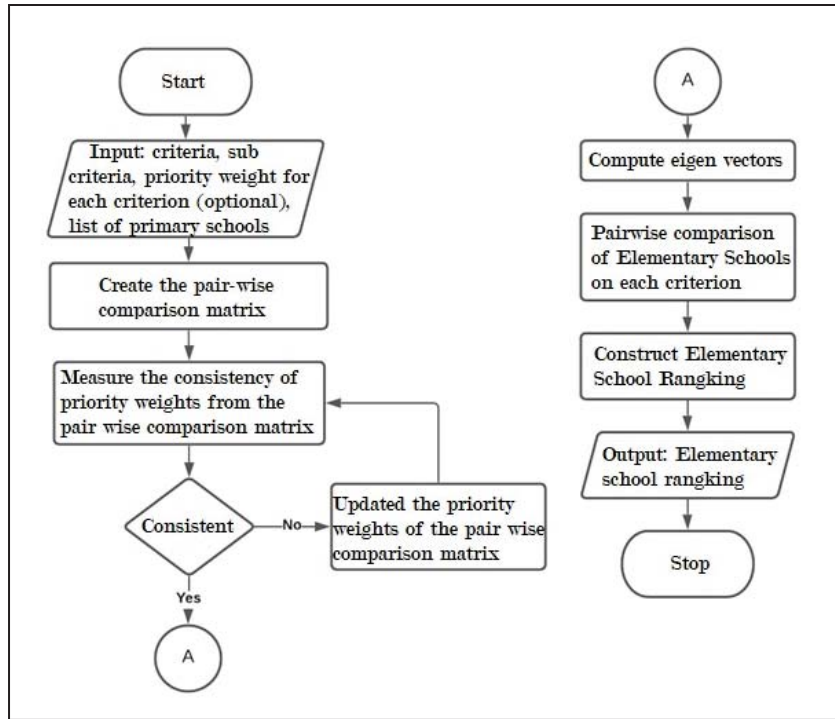
FIGURE 2. Main Process Design

RESULTS AND DISCUSSIONS

The system is built in the form of a mobile application and is named School Finder. Two types of users can use the application, namely parents and schools. The school must register first to be able to use the School Finder application. After joining, the school can add school data in the form of information on school identity, academics, facilities, extracurricular activities, fees, school location, and other data used as criteria for selecting elementary schools. If the super admin has validated the data input, the school data will appear on the parent user page and can be used as an alternative to selecting elementary schools. Fig. 3 is an example of a school identity page. School Finder provides three main features for parent users: elementary school information, elementary school selection recommendations, and application usage guidelines (see Fig. 4a). In addition, parents can provide ratings and comments/reviews on certain elementary schools. Utilization of the recommendation feature for elementary school selection begins by selecting the criteria to be used (Fig. 4b) and changing the weights for each pair of criteria if necessary (Fig. 4c). School Finder has provided a standard weight of each pair of criteria. The standard weight value is determined based on the results of a questionnaire to parents when determining the criteria provided in the School Finder application. Furthermore, if parents prefer a particular school, parents can choose an elementary school that will be processed to produce recommendations (Fig. 4d). If parents do not make a school selection, the system will use all elementary Schools listed in the School Finder for the recommendation process. Furthermore, using the AHP method, the system will provide elementary school recommendations according to the criteria determined by parents in the order of the best (Fig. 4e).
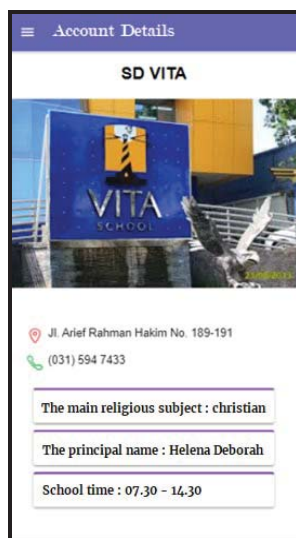
FIGURE 3. School Identity Page

The accuracy of the School Finder system was assessed through internal testing and external testing. In the internal test, a trial was first conducted to ensure that the recommendation process using the AHP method was free from calculation errors. After the application is confirmed to be free from calculation errors, then an evaluation is carried out by a mathematician on the accuracy of the recommendation results. Internal tests were carried out many times until they received recommendations from experts. The priority weights between each pair of criteria used in the internal test are inputted based on the survey results to determine the criteria used by the respondent to select elementary schools. In contrast, the value of each criterion for each alternative was obtained from the results of interviews with the school according to the existing school conditions, both in terms of facilities, academic, extracurricular, or cost.

Four different scenarios were used in the last internal test. The first scenario uses facilities, academic, and extracurricular criteria with alternatives to SD JAC School, SD Vita Surabaya, and SD AL Azhar 35 Surabaya. In the second scenario, academic and financial criteria are used, with the alternative of SD Vita Surabaya, SD Catholic Christ the King, and SD Mawar Sharon Christian. The third scenario is carried out using facility, academic, and extracurricular criteria along with the selected sub-criteria. The alternative schools are SD Al Islam, SD Luqman Al-Hakim, and SDIT Permata in the third scenario. Finally, the fourth scenario uses the criteria for facilities, academics, and costs along with their sub-criteria, with alternatives to SD JAC, SD Catholic Christ the King, and SD Mawar Sharon Christian. The results of the internal test can be seen in Table 2. Column 2 contains the criteria and sub-criteria used in each scenario. The schools selected as alternatives for the recommendation process can be seen in column 3. The results of the calculation of the AHP method using the School Finder application which also states the ranking of each school can be seen in column 4. Finally, column 5 contains the names of schools according to the existing grades in column 4. In this last internal trial, the expert stated that the results of the recommendations from the School Finder were able to accommodate all the criteria given by parents by the existing school conditions, with an accuracy of 99%. The result shows that School Finder is worth using.

The external test was conducted on 30 parents who will send their children to the elementary school level. The first time, an external test was carried out by demonstrating the features and workings of the School Finder. After that, respondents were allowed to try the School Finder application independently. After trying the School Finder application, each respondent was asked to fill out a questionnaire. Based on the questionnaire data, the following data were obtained:

- Parents' opinion regarding the suitability of the available criteria with the parents' wishes in considering selecting the right primary school for their child, 63% of respondents agreed, and 33% of respondents strongly agreed with this.
- 47% of respondents agree, and 50% of respondents strongly agree that the School Finder application is very helpful and makes it easier for parents to choose elementary schools according to their parents' wishes

- In addition, 57% of respondents agreed, and 40% strongly agreed that applications could provide complete information about schools. One of the available information is academic information, including the number of staff, the number of certified teachers, the number of alumni, the curriculum used, and school accreditation.
- Regarding the design made, 50% of respondents agree, and 50% of respondents strongly agree that the user interface design is clear and easy to understand.
- Forty seven percent of respondents agree, and 50% of respondents strongly agree that the application is easy to use.
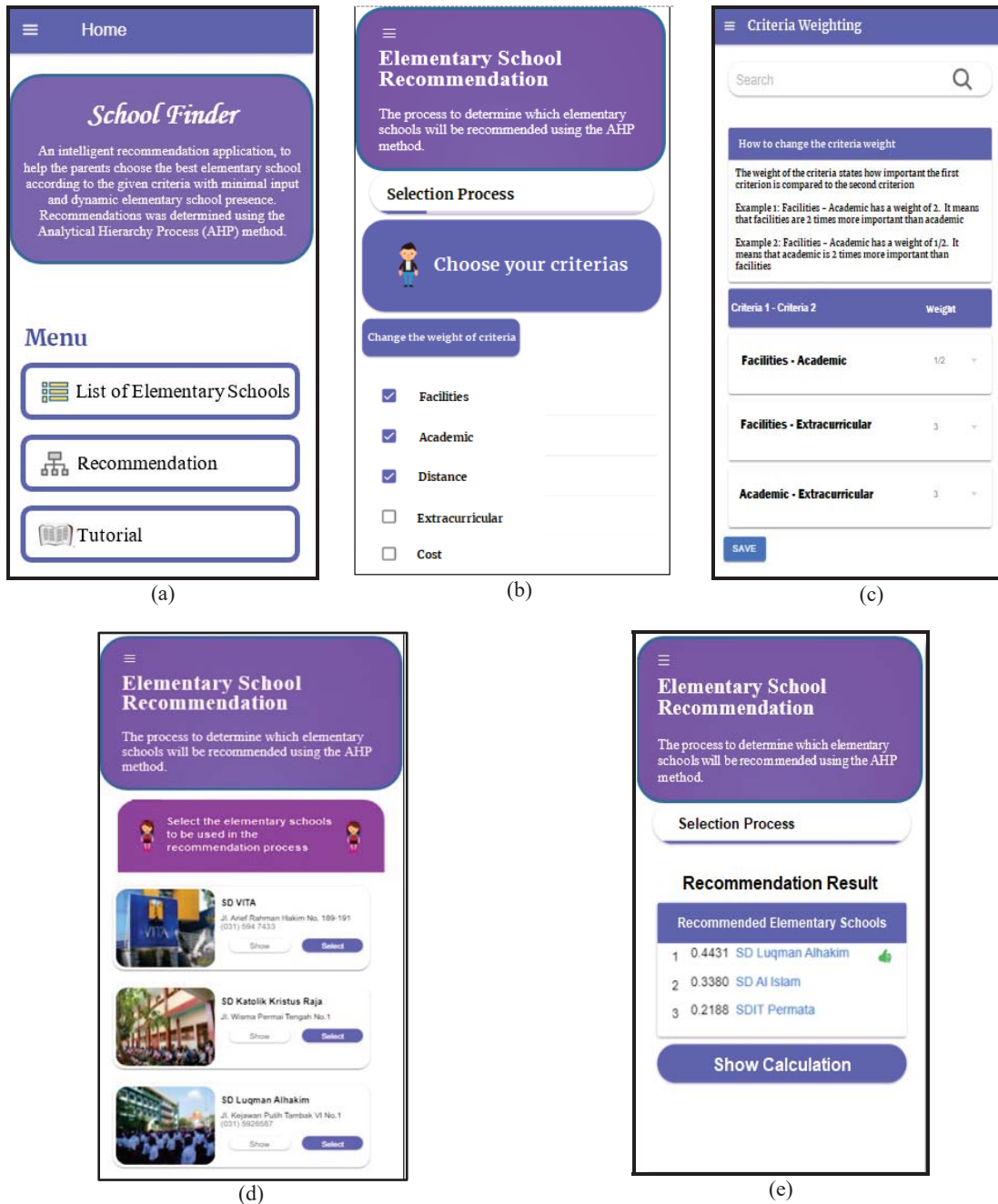

(a) (b) (c)

(d) (e)

FIGURE 4. Application Interface

<div align="center">

TABLE 2. Results of the Last Internal Test

</div>

Scenario	Criteria-Subcriteria	Alternative schools are used	Results of Recommendations	
			Score	Order of Priority
1	Facilities (Internet, school building area, open land area, number of classes, number of AC classes, library, laboratory) Academic (Accreditation, curriculum year, number of staff, number of certification teachers, number of graduates) Extracurricular	• SD Vita Surabaya • SD JAC School • SD Al Azhar 35	0.3573 0.3562 0.2863	1. SD Vita Surabaya 2. SD JAC School 3. SD Al Azhar 35
2	Academic (Accreditation, Curriculum year, Number of staff, Number of certification teachers) Costs (building fees, tuition fees)	• SD Vita Surabaya • SD Katolik Kristus Raja • SD Mawar Sharon Christian	0.4991 0.2734 0.2276	1. SD Katolik Kristus Raja 2. SD Vita Surabaya 3. SD Mawar Sharon Christian
3	Facilities (Internet, Building area, Open land area, Number of AC classes) Academic (Accreditation, Curriculum year, Number of certification teachers) Extracurricular	• SD Al Islam • SD Luqman Al-hakim • SDIT Permata	0.4431 0.3380 0.2186	1. SD Luqman Al-hakim 2. SD Al Islam 3. SDIT Permata
4	Facilities (Building area, Number of AC classes, Number of libraries) Academic (Accreditation, Curriculum year, Number of certification teachers) Costs (building fees, re-registration, tuition fee)	• SD JAC • SD Katolik Kristus Raja • SD Mawar Sharon Christian	0.4038 0.3487 0.2472	1. SD Katolik Kristus Raja 2. SD JAC 3. SD Mawar Sharon Christian

Based on the results of the questionnaire above, it can be seen that at least 96% of respondents answered agree or strongly agree for each question asked. Besides being useful for parents, the School Finder application can also be used by schools to promote their schools. For this reason, a trial was conducted through interviews with two staff from 2 different elementary schools. At first, the school was given an explanation about the School Finder application. A demonstration of the application was carried out to show the features, school access rights, and overall results. After that, an interview was conducted to determine whether the School Finder application can help the school promote. Based on the interview results, the school stated that the School Finder application made it easy for schools to disseminate detailed information on school facilities and infrastructure and can be one of the media to promote the school. The instructions provided are also very easy to understand, making it easier for schools to update data. However, the school suggested adding information regarding the achievements and awards that the school had received.

Based on the results above, it can be said that this application can be used easily by parents to find a school that suits their parents' wishes and helps the school to promote its school. Parents do not need to enter comparison scores between schools, so they do not know in advance information about schools because the school has inputted all the criteria to be compared. The recommended school ranking will be generated automatically by the application. With this system, parents can get a sequence of school recommendations according to the desired criteria without needing a lot of input.

CONCLUSION

The application made has resolved parents' problems in determining the elementary school choice for their child based on the criteria desired by the parents. Based on the results of external trials to parents, at least 96% of respondents (percentage of respondents who answered agree or strongly agree) stated that the application can provide detailed information about the schools. The criteria given are following the parents' wishes. The application is easy to understand and use. Overall, the application helps parents choose the school for their child. On the other hand, the School Finder application is helpful for elementary schools to promote schools. Changing school data can easily be carried out by the school administration.

In future research, distance calculations in the application can be made automatically, according to user input. In addition, awards and achievements achieved by schools can be used as criteria in school selection.

REFERENCES

1. Ni Kadek Santya Pratiwi. Pentingnya Peran Orang Tua dalam Pendidikan Karakter Anak Usia Sekolah Dasar. Jurnal Pendidikan Dasar, vol. 3(1), pp. 83-91.ISSN: 2527-5445 (2018).
2. Undang-Undang Republik Indonesia Nomor 20 Tahun 2003 Tentang Sistem Pendidikan Nasional, Jakarta
3. Iratna Dewi dan Dadan Suryana. Analisis Evaluasi Kinerja Pendidik Paud di PAUD Al Azhar Bukit tinggi. *Jurnal Obsesi :Jurnal Pendidikan Anak Usia Dini*, vol. 4(2), pp. 1051-1059. DOI: 10.31004/obsesi.v4i2.465 (2020).
4. Mulianah Khaironi. Pendidikan Karakter AnakU sia Dini. *Jurnal Golden Age Universitas Hamzanwadi*, vol. 1(2), pp.82-89. E-ISSN : 2549-7367 (2017).
5. Fatma Khaulani, Neviyarni S, dan Irda Murni. Fase dan Tugas Perkembangan Anak Sekolah Dasar. *Jurnal Ilmiah "Pendidikan Dasar"*, vol. 7(1), pp. 51-59.e-ISSN: 2685-211X (2020).
6. Susana Limanto, Liliana, Surono Purba. Edukasi Pemberian Makanan Tambahan Bagi Ibu Balita Gizi Kurang. *Community Development Journal*, vol. 3(1), pp. 33-44. e-ISSN 2580-5290 (2019).
7. Tessa Siswina, M. Nurhalim Shahib, Adjat S Rasyad. Pengaruh Stimulasi Pendidikan terhadap Perkembangan Kecerdasan Anak Usia 3-6 Tahun. *Jurnal Ilmiah Bidan*, Vol.1, No.2, pp. 27-33 (2016).
8. UUD 1945
9. Yoyo Zakaria Ansori. Pembinaan Karakter melalui Kegiatan Ekstrakulikuler bagi Siswa Sekolah Dasar. *Jurnal Elementaria Edukasia*, vol. 3(2), pp. 287-294. e-ISSN 2655-0857 (2020).
10. Teach Elementary. 2012-2021. Top 10 Reasons to Teach Elementary School. Cited from https://www.teachelementary.org/top-10-reasons-teach-elementary-school/, accessed March, 15 2021.
11. Ralph B. McNeal Jr. Parent Involvement, Academic Achievement and the Role of Student Attitudes and Behaviors as Mediators. *Universal Journal of Educational Research*, vol. 2(8), pp. 564-576 (2014).
12. Nuraeni. Pendidikan Karakter Pada Anak Usia Dini. *Jurnal Paedagogy*, vol.3(2), pp. 65-73. E-ISSN: 2722-4627 (2016).
13. Miftah Nurul Annisa, Ade Wiliah, dan Nia Rahmawati. Pentingnya Pendidikan Karakter pada Anak Sekolah Dasar di Zaman Serba Digital. *Bintang: Jurnal Pendidikan dan Sains*, vol. 2(1), pp. 35-48. ISSN : 2685-9610 (2020).
14. 123Helpme.com. 2000-2020. Parents Should Be Involved in Their Children's School. Cited from https://www.123helpme.com/essay/Parents-Should-Be-Involved-in-Their-Childrens-40605, accessed March, 15 2021.
15. Kurnia Puspita Sari, Neviyarni, dan Irdamurni. Pengembangan Kreativitas dan Konsep Diri Anak SD. *Jurnal Ilmiah "Pendidikan Dasar"*, vol. 7(1), pp. 44-50. e-ISSN: 2685-211X (2020).
16. Nurul Khasanah. Faktor-Faktor yang Mempengaruhi Orang Tua dalam Pengambilan Keputusan Memilih Sekolah Dasar Swasta (SD Virgo Maria 2 dan SDIP. H. Soebandi Kecamatan Bawen Kabupaten Semarang). *Jurnal Satya Widya*, vol. 28(2), pp. 137-146 (2012).
17. Maharani Ardi Putri. 2018. Orangtua Harus Berhati-hati Pilih Sekolah untuk Anak. Beritasatu.com. Cited from: https://www.beritasatu.com/bernadus-wijayaka/nasional/509355/orangtua-harus-hatihati-pilih-sekolah-untuk-anak, accessed October, 10 2019.
18. Ana Fitriani, Tri Widayani. Sistem Pendukung Keputusan Pemilihan Sekolah Dasar Islam di Pontianak. *Creative Information Technology Journal (CITEC Journal)*,vol. 4(1), pp. 45-55, ISSN:2460-4259(2016).

19. Kenti Yuliana dan Ahmad Aini. Sistem Pendukung Keputusan Pemilihan Sekolah Dasar Menggunakan Metode Analytic Hierarchy Process(AHP) pada Gugus Sungai Jingah Kecamatan Banjarmasin Utara. *Jurnal INFOKAM*, Vol. 14(1), pp. 40-49.ISSN: 1829-9458 (2018).

20. Kementerian Pendidikan dan Kebudayaan. ND. Jumlah Data Satuan Pendidikan (Sekolah) Prov. Jawa Timur. Cited from https://referensi.data.kemdikbud.go.id/index11.php?kode=050000&level=1, accessed March, 30 2021.

21. Fintri Indriyani. Sistem Penunjang Keputusan Pemilihan Sekolah Dasar Islam Menggunakan Analytic Hierarchy Process. *SWABUMI*, vol. 5(1), pp. 24-28. E-ISSN: 2549-5178 (2017).

CERTIFICATE
OF APPRECIATION

InCITE 2021

INTERNATIONAL CONFERENCE ON INFORMATICS, TECHNOLOGY, AND ENGINEERING
3rd Bi-Annual   25-26 AUGUST 2021

IS AWARDED TO:

Susana Limanto

For the contribution as: PRESENTER
in InCITE 2021 Conference "Leveraging Smart Engineering"

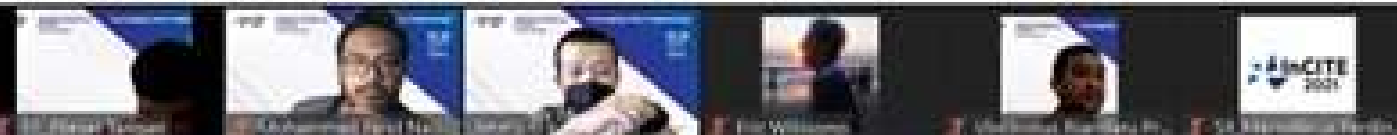DEAN,
FACULTY OF ENGINEERING

Ir. Eric Wibisono, Ph.D., IPU

CHAIR,
ORGANIZING COMMITEE

Dr. Jimmy, S.T., M.I.S.

UBAYA
UNIVERSITAS SURABAYA